Legal implications of data exchange in the built environment

An exploration of the force field between technological and societal developments and law

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Publication date
2022

Document Version
Final published version

Citation (APA)
Bruggeman, E. M. (2022). *Legal implications of data exchange in the built environment: An exploration of the force field between technological and societal developments and law*. Delft University of Technology, Faculteit Bouwkunde.

Faculteit Bouwkunde

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TU Delft

Intreerede 16 september 2022

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Rede in verkorte vorm uitgesproken bij de aanvaarding van het ambt
van hoogleraar Construction Law bij de Faculteit Bouwkunde
van de Technische Universiteit Delft op 16 september 2022

door

Prof. mr. dr. Evelien Bruggeman

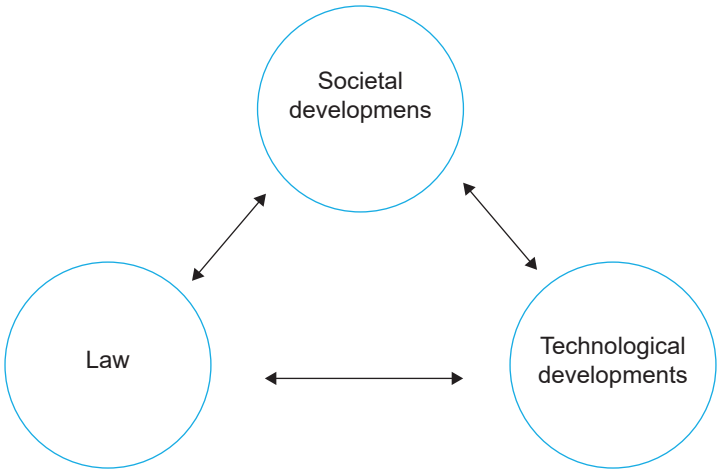
Mijnheer de Rector Magnificus, leden van het College van Bestuur,
collega hoogleraren en andere leden van de universitaire gemeenschap.
Zeer gewaardeerde toehoorders, dames en heren,

1 Intro

In a few weeks' time, it will be exactly sixty-one years since one of my predecessors here at the Technical University of Delft delivered his inaugural speech. That was Professor Van Poelje,[1] the first professor of construction law and urban planning law in Delft, who delivered his speech entitled *'De kringloop van het recht'* (The Cycle of Law) on the first of November nineteen sixty-one.[2] He did not deliver that speech right here, because this auditorium did not exist at the time,[3] but it did happen here in Delft, in the city centre where the University was then located.

Sixty-one years may not be that long ago, but it feels like centuries when we look at the changes in the world, in construction and in construction law since then. One example that sparks the imagination is the phenomenon of digitalisation. The enormous increase in the use of data and the great variety of forms of data exchange and digitalisation in the construction industry creates an equally great variety of legal aspects that all parties in the construction process have to deal with and must take into account. As digitalisation is one of the most important developments of our time, and is also so closely linked to education and research at this faculty, there is reason enough to take a closer look at the legal aspects relating to these developments.

It is this constant proliferation of new developments that has kept the field of construction law interesting for decades. Because of these developments, more and more areas of general law are becoming part of construction law; there is always something new to learn!
What makes construction law so fascinating is the functional independence of the legal field of construction law within – and in connection with – the classical legal fields.[4] This requires a lawyer in construction law to have the capacity to translate general law to construction practices and the developments in construction; it requires brainpower and creativity!
The field of construction law is also a very fascinating field of law, because of its inherent societal relevance: it genuinely matters! It is about how we design our public spaces, how we live and build, how we contract and cooperate with each other – in short, how we live together.[5] Finally, there is one other aspect that makes construction law extremely fascinating, and that is the aspect I want to talk about today. That is the interaction between technological and societal developments in construction and the law.



2 Interaction

So, what is this interaction? In law, there is always interaction between the law, the different fields of law and the rules. Additionally, legal standards also influence human behaviour,[6] and human behaviour influences those standards, or the substance of those standards.[7] In addition to this interaction within the law, there is the interaction between law and technological and societal developments.
By technological developments I mean every development in construction that is new or innovative or different to what it used to be. For example, technologies such as 3D printing, modular construction, robotisation, artificial intelligence, circular building technologies and, of course, the aforementioned digitalisation. I classify the wishes and tendencies in society as societal developments. Right now, for example, this includes the desire for more sustainable and circular construction, the desire for more cooperation in construction, and the need for deferred pricing systems[8] as a result of a multitude of developments in our society.[9] Both developments have their impact on the law, and vice versa.

This force field of interrelated developments interacts and determines the course of society. In this respect the law is part of a greater whole. The law forms and is formed by the continuous interaction that takes place in that force field.
And that is nothing new. In his inaugural speech sixty-one years ago, Van Poelje spoke of the cycle of law. He discussed the technological developments of the time and the *'ever-increasing flow of technology'* and the harmonious integration of technology into people's social and personal lives and the influence

of technological developments on the formation of law:[10] the cycle of law. Van Poelje referred in his speech to an even older speech on the same theme: that of Thorbecke almost 182 years ago at the University of Ghent on industrialisation and its impact on societal relations.[11]

The interaction between technological and societal developments and law is the subject of this speech. The questions I want to answer are: What does this interaction entail? And what are the consequences of these new developments for law, in particular for construction law? In order to answer these questions, I will first provide a brief description of the developments relating to data and digitalisation (section 3). I then discuss the legal aspects, the field of construction law and specifically construction law in relation to data and digitalisation (section 4). I will then provide more details about the interaction in general (section 5) and a number of consequences for construction law in particular, as a result of that interaction (sections 6-9). Finally, I would like to address the research to be carried out and the education associated with the interaction and its ensuing developments.

3 Approaches to data in the built environment

In recent years, much has been written about data – but almost as much has been written about what the term “data” means. To avoid getting bogged down in definitions here, I will keep it short and simple. In this document, data means all forms of data, information, drawings or models that parties can generate, process and exchange digitally.[12]

The digitalisation of the construction process,[13] and thus the generation, processing and exchange of data, is driven by the need to optimise that same construction process.[14] It may contribute to accelerating the current challenges in construction[15] and controlling all kinds of risks inherent in construction processes.[16] There are many ways in which digitalisation of, and in, the construction process and the collection and exchange of data take place. In a nutshell, it is always about generating, processing, combining or integrating, analysing, sharing and using data in and throughout the entire construction chain and beyond.[17]

It would be going too far to discuss all the separate developments in detail here. However, it is useful, certainly for the legal profession, to provide insight into the diversity and scale of digitalisation and data exchange at this time by organising how data are collected and exchanged. Compared to a few decades ago, it is particularly noticeable that the amount of data collected and how data are collected and used is fundamentally different and serves a different purpose

than the mostly paper-based information and information flows that many construction actors generated and transmitted in the past. The data and digital models that are now being passed on in the chain involve data that not only look different to how they used to on paper, but are also much larger in volume and serve a different purpose.[18] These data are increasingly being used to support the business processes of all parties in the chain, and data are analysed, even across projects, to gain knowledge about the company’s processes, the objects and their use, the construction materials, and the behaviour of their users, etc.[19] These data have long ceased to be ‘bycatch’, derived from information generated for the purpose of the construction process, and have become a value in their own right, are collected, processed and analysed independently, and are sometimes sold on to third parties.[20]

Roughly speaking, we can distinguish four ways of approaching data in the construction process. These ways or categories overlap. For example, some data collections or data flows in the construction industry fit into more than one category. The categorisation described here is only a tool, a method to outline the multitude and diversity of available data and data flows.

First of all, there are data that pass through the entire project life cycle, in the various construction phases: data are generated or collected, processed and some are passed on and used for the next phase. Each time, the relevant data for that phase are collected, supplemented, processed and passed on again.

In addition, we can distinguish data that are object- or location-specific: i.e. data about a building or originating from a building. For example, BIM models are a digital representation of a design or a physical object (a bridge, a building, etc.).[21] The digital twin[22] can form a data connection with the physical twin, for example by being updated manually or with the help of sensors in the physical twin.[23] Similar information can be merged into a network of digital twins,[24] which are referred to as linked digital twins. Specific data sets can also be retrieved in and about an area and its users, for example a smart district or smart city,[25] often using artificial intelligence.[26] The needs of the user of the twin or the data set or the physical structure always determine which form is used in which case. Completely different forms of object-oriented data collection are the in-house files that are being developed.[27]

Furthermore, data are often held by a certain actor in the construction process and are often only of interest to that actor in that form (also known as profession- or role-specific data). These are always data or data packages for one specific actor that they collect as part of their role, often in relation to a specific object.

Lastly, data collections often serve a specific purpose, such as the challenges facing the construction industry and the built environment in the context of circularity[28] and sustainability. For example, data can be used to improve the quality of the construction process and the building,[29] to monitor usage and energy consumption, and to make it easier to reuse materials.[30] Examples include the materials passport or demolition waste banks and the use of chips. Data can also be collected for solving structural safety or building safety problems, as is the case in the United Kingdom with the building file being developed under the name of *the golden thread*.[31]

4 Organising data in construction law

The developments in the area of data and construction that have just been outlined are forcing the legal experts among us to consider the legal aspects relating to these developments.

4.1 The galaxy of construction law

Traditionally, construction law has included a patchwork of legal fields.[32] A functional area of law,[33] such as construction law is characterised, by the fact that it is a cross-section of the law as a whole: public law *and* private law.[34] Unlike the classic areas of law, it is not characterised by the nature of the legal relationship, but by the societal objective that is the focal point of the area of law concerned, according to De Haan.[35] In construction law, that societal objective is, of course, construction in the broadest sense of the word.
According to De Haan, a lover of organising the law,[36] the aforementioned Van Poelje was the first to describe construction law as a functional area of law.[37] In 1961, Van Poelje described construction law as a system of legal planets or a complex atomic structure,[38] a galaxy. In view of the space available, it would be going too far to dwell on the organisation of construction law here. At this point I will suffice by mentioning two aspects that are important when studying the subject of construction law in the light of the digitalisation phenomenon; the connection between the system of construction law and general law (section 4.2) and the organisation of construction law in relation to data and digitalisation (section 4.3).

4.2 The connection between the system of construction law and general law

The galaxy of construction law does not stand alone, but is in continuous connection with and is part of the system of general law. More than sixty years ago, the question was whether functional fields such as construction law had material autonomy[39] within general law and therefore interfered with the unity of the law.[40] Summarizing, Van Poelje considers a functional approach to law (such as construction law) in which there is formal autonomy of that area to be excellent, as long as we keep an eye on the connection with the general principles of law and do not try, for example, by overestimating the particularity of one's own problems, to develop a system that deviates from what is generally accepted without necessity.[41] Thus, construction law is not, or should not be, separate from general law. In terms of substance, the galaxy of construction law is the same as that of general law – the classic areas of law. And thus it is also subject to, or influenced by, developments in those areas.

4.3 Organising construction law in relation to data and digitalisation

De Haan was fascinated with organising construction law,[42] but that fascination was also shared by many other construction lawyers, including Van Poelje.[43] According to Van Poelje, having a purpose for organising is essential.[44] What, then, is the purpose of organising the law in the case of digitalisation in the construction industry and the greater availability of data? In my opinion, that purpose is a better understanding of the law and thus better application of the law – for both the academic and the lawyer practising construction law.
When studying construction law in relation to data and digitalisation, a multitude of legal regulations, contracts, behavioural standards and other standards reveal themselves to those who deal with data.[45] Organising the legal aspects in relation to digitalisation in the construction industry helps to better classify them within the system of private construction law and to better apply the law.

The most important classification with regard to data and digitalisation in construction law is, first of all, that of public and private law. Although in this speech I will only discuss private law, it is important to note that public construction law is also being affected by data and digitalisation.
Another way of organising the law with regard to data and digitalisation is to follow the sequence of the construction process.[46] It produces the image of data that are generated and passed on during the entire life cycle of a building.[47]
With regard to private construction law and data, a distinction can also be made between types or origins of rules relating to data and digitalisation. Agreements or rules can originate from legislation, regulations or policy.[48] At national level, there are no laws or regulations – at least not yet– relating to data, data exchange and digitalisation in the construction industry. However, there are numerous laws that affect data requirements, data exchange and digitalisation in the construction industry. There are also policy documents or government-promoted initiatives that are intended to shape and promote data and digitalisation in the construction industry.

In addition to legislation, regulations and policy, there are rules and agreements relating to data and digitalisation that originate from contractual arrangements

– whether or not these are laid down in more or less standardized contract forms or general terms. This is what Van Poelje called the field of autonomous construction law,[49] which even back then he described as flourishing, and which is still flourishing (think of the available sets of general terms and conditions), but is currently beginning to flourish even more in the context of data and digitalisation. Since the advent of digitalisation in the construction sector, a multitude of agreements – frameworks – have been developed regarding data requirements and data exchange; the Netherlands has a rich pallet of documents intended to serve as contracts, such as so called Informatie Levering Specificaties (in Dutch) or Employer Information Requirements (in English), BIM protocols and BIM execution plans.[50] These documents describe the obligations parties bear with regard to processes surrounding data exchange and the data to be delivered.[51]

However, data are not only collected, processed and shared within the aforementioned contractual chains; increasingly, data are also collected, processed and shared outside the contractual chains. Legal aspects regarding data and data exchange outside contractual chains will become even more important with the application of smart chips, smart buildings, cities or districts, digital twins and linked digital twins.[52] The importance of these extra-contractual rights and obligations regarding data is increasing.

Another approach to the organisation of data and law is through the inventory of rights to data.[53] When we speak of rights to data, different kinds of rights are conceivable. For example, parties can make contractual arrangements and have rights to data on that basis, such as the right to receive certain data, in a specific form and at a specific time, or the right to use or process data.[54] But rights can also arise from current or existing statutory rules. For example, data and data collections may be subject to Intellectual Property Rights (IPR) such as database rights[55] and copyrights,[56] or they may be subject to the Trade Secret Protection Act.[57] Specific data may also be subject to privacy rights, for example in the case of smart metering,[58] smart houses, districts or cities.[59] Other data that could be subject to privacy rights include data collected in the context of security and access to the construction site, or the so called house files.[60]

In the same way as rights to data, obligations can often be distinguished with regard to those same data. These may be statutory obligations (such as the aforementioned IP rights and privacy rights and the duty to respect them[61]) or contractual obligations, such as the duty to deliver data (in a certain form or at a specific time) or even the duty to tolerate – or even facilitate – the use, processing and transfer of data. But other kinds of duties can also be attached to data collections, data possession or data processing; there are contractual and statutory duties to communicate or inform attached to having data at one's disposal, or duties to warn arising from digitally available data or information.[62]

As noted in the introduction to this section, the categorisation made is not definitive or conclusive, but merely one way of approaching legal data questions in construction.[63] In addition, the classification has no hard lines or boundaries. Contractual arrangements on data may also include or contain rights to – or obligations relating to – data. Contractual obligations may be related to or overlap with statutory provisions. There is a *continuous* coherence, overlap and connection. In addition, there is always interaction between rules of law; interaction between statutory and contractual rules and between statutory, contractual and non-contractual rights and obligations.[64]

5 What does the interaction between law and digitalisation look like?

I have indicated that the interaction between technological and societal developments and the law exists and is ongoing (section 2), outlined the current developments (section 3) and organised the legal aspects in various ways (section 4) in order to be able to now pay more detailed attention to some topics that illustrate this interaction. Where does the interaction manifest itself in the construction law galaxy? What types of reciprocal influence can be found in construction law? In order to answer this question, I will outline four types of reciprocal influence that, in my opinion, can be found in the force field of digitalisation, societal developments and the law. In each case, the law has a different role to play:

- Cases in which an existing legal standard evolves to reflect developments
- Cases in which developments lead to the application of other legal standards
- Cases in which the law must be revised *as a result of* the developments
- Cases in which the law must be revised *to stimulate* the societal and technological developments

The first manifestation of the interaction between technological and societal developments and the law is that of the refinement or substantive interpretation, or perhaps even substantive clarification, in response to changing circumstances, technologies or working methods.[65]

The second manifestation refers to the situation in which the prevailing standard becomes obsolete or is disputed due to societal changes and the courts can respond to change by adjusting the standard – in this case, by choosing a different existing standard.[66]

The third and fourth manifestations involve adapting autonomous law to societal and technological developments because existing law is no longer adequate to suit these developments.[67] In the third case, either the existing law is inadequate or it no longer 'fits' with the technological or societal change. In the

fourth case, the law is used as an instrument to steer technological or societal developments.

Apart from these cases, there is off course, the situation in which the law effortlessly 'fits' the new developments and the interaction is virtually invisible or perhaps even non-existent. This case type is a variant of the first, since in the first the open standard still has to be tailored with the help of the new situation, and in this variant the law – after some research – simply appears to be adequate without further tailoring of the standard. There are, of course, plenty of examples.[68] The task of the lawyer in this case is to establish that the law fits and to remove the alleged barrier to the law. This is the type of case that most lawyers deal with on a daily basis; often the law only needs to be translated to fit the new situation.

In the following sections (7-9), I will discuss three of the aforementioned cases in more detail and try to illustrate the interaction in the force field with examples. The first case is only briefly discussed in section 6.

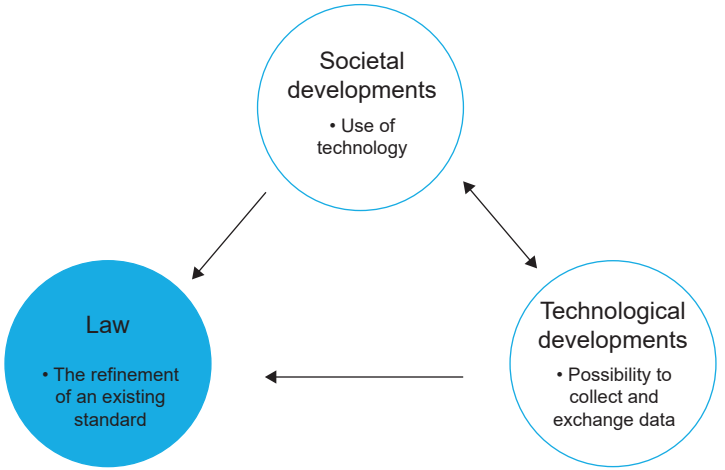
Before I do so, let me briefly address a more legal theoretical question, namely whether the case types described here involve the finding of law or the formation of law:[69] are we creating new law or merely applying old or existing law to a new situation? Ignoring the myriad literature that has appeared on this subject, I will stick to a simplified observation: where existing standards are adequate and can be refined or interpreted with a view to the new development, there is a finding of law (finding the existing law in a new situation). Where new rules are developed, whether in the form of legislation or within autonomous construction law, there is formation of law.[70]

6 Cases in which an existing legal standard is refined in response to new developments

The first manifestation of the interaction between technological and societal developments and the law is that of the refinement or tailoring of an existing standard in response to changing circumstances, technologies or working methods. Various examples can be found in the force field where old rules, usually open standards,[71] are applied to new situations and where an existing standard has been, or could be substantively interpreted or refined in the future. I now cite three examples from the field of construction law which, in my opinion, all involve the refinement or tailoring of existing standards rather than the revision thereof.[72]

- The substantive interpretation of the contractor's duty to warn[73]
- The substantive interpretation of the architect's duty to exercise due care[74]
- The substantive interpretation of the doctrine of explanation in the case of digitalised sales material and a digitalised purchasing process[75]

Once lawyers have figured out that even new developments, in this case digitalisation, can be adequately addressed within the framework of the existing standards, this category immediately becomes far less "exciting" than the three other categories mentioned above.
Nevertheless, here too the interaction within the forcefield should be examined, as it is of vital importance for practice to establish that the existing standards are adequate and do not obstruct developments, and subsequently to find out how these standards are affected by new developments.[76]



The function of the legal profession in general, and of science in particular, will always be to remove perceived barriers to the application of these new developments by researching and interpreting legal developments and informing parties about their legal position in a changing world.

7 Cases in which developments lead to the application of other legal standards

The technological and societal changes in construction as outlined above will also have consequences for the application of the law and legal standards within the law.

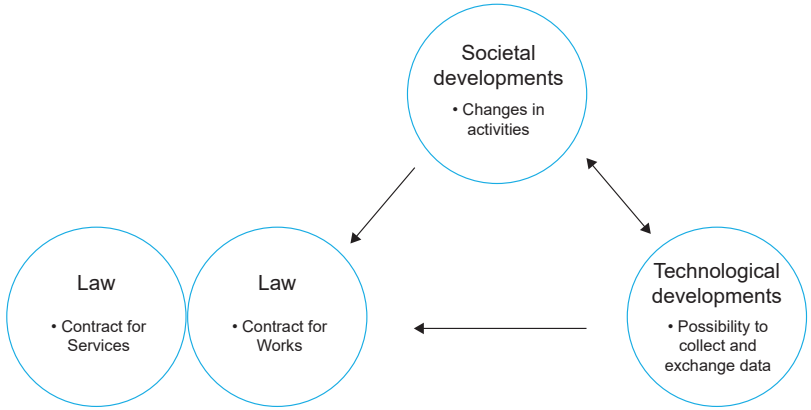
The day-to-day activities of the many actors in the building process are changing. These changes are prompted both by the evolving technological possibilities of collecting and sharing data, and by society's desire to actually do so. Consequently, architects, builders, suppliers and managers all have to deal with the delivery of data or digital information about the building or the building process. In addition to providing a design, delivering a physical building or infrastructural work, contractors (be they designers, contractors or suppliers) are increasingly delivering data or digital models to their clients.[77] Such data delivery can comprise all or part of the digital design drawings but it can also include specific digital data about the building itself, how it will be used[78] or maintained, or comprise data packages that can contain all kinds of information. The data can take many forms, from maintenance reports in "simple" PDFs transmitted via Visi to data packages or BIM models of specific data and complete interactive digital twins.

It is important to note once again that the activities and obligations relating to these data go far beyond the usual range of tasks performed by the actors described here. It involves more and different data and information, which are furthermore provided using a different method. This way of working would make the application of the law (as provided for in the Dutch Civil Code as 'overeenkomst van opdracht' and the general terms and conditions governing the contract for services) appropriate. The contractor, in keeping with a broader trend, is increasingly also becoming a service provider.[79] This transition began decades ago when management and operation also became part of the contractor's tasks, but working with data means that this trend is gaining momentum.

In summary, this means that the change in the activities performed by the actors in construction will impact the qualification of the contract (section 7.1), and as a result this, among other things, will also impact the application of certain legal standards, in particular, greater emphasis will be given to information and communication obligations (section 7.2).

7.1 Change in the qualification of the contract

As noted above, changing the scope of the tasks and activities of actors in the construction industry raises the possibility of a change in the nature of their contracts and the consequent need for a different qualification of those contracts, resulting in the application of a different set of legal standards.



In previous publications, I wrote[80] that with regard to the performance of digitalisation activities and the delivery of data, qualifications such as a purchase contract or a contract for works are not obvious and that this type of contract is most likely a contract for services. With regard to the combination of the performance of work on physical structures (which qualifies as contract for works), and/or design work and the performance of digitalisation activities or the delivery of data (which qualifies as a contract for services), I concluded that this, in all likelihood, was a mixed contract.[81]

Most construction lawyers will by now recognize the almost classic discussion in construction law about the qualification of contracts with a design and execution component. This discussion, which dates back twenty years, is today more topical than ever![82] It would be taking matters too far for me to repeat here all the positions taken in that twenty-year old discussion and my earlier publications on this subject. In a nutshell, the question of how a contract for works that also includes data or digitalisation should be qualified, cannot be dealt with along the same lines as the discussion on the qualification of integrated contracts.[83] In the case of contracts where activities – both physical and construction – and digital activities are part of the contract, I am very much in favour of assuming a mixed contract,[84] and for activities that, by their nature, are characterised as activities that fall under a contract for services,[85] of then declaring the legal regime governing contracts for services (overeenkomst van opdracht, in Dutch) applicable.[86] This approach does justice to the nature of the digitalisation activities and the corresponding legal consequences. The consequences are discussed (in part) below.

7.2 Greater emphasis on rights and duties to inform and communicate

In the wake of the changes in activities and qualification of the contract, though not only as a consequence thereof, it could be argued that for all parties in the construction process an ever-increasing emphasis is being given to the duties of care in the form of duties to inform and communicate.[87] This shift towards more duties to inform and communicate follows from a number of circumstances.

First of all, it follows, as said, from the mixed nature of such contracts, as described in Section 7.1.[88] But it does not follow from this alone, or even depend on that qualification. A number of other forces within the force field are also giving greater emphasis to duties to inform and duties to warn.

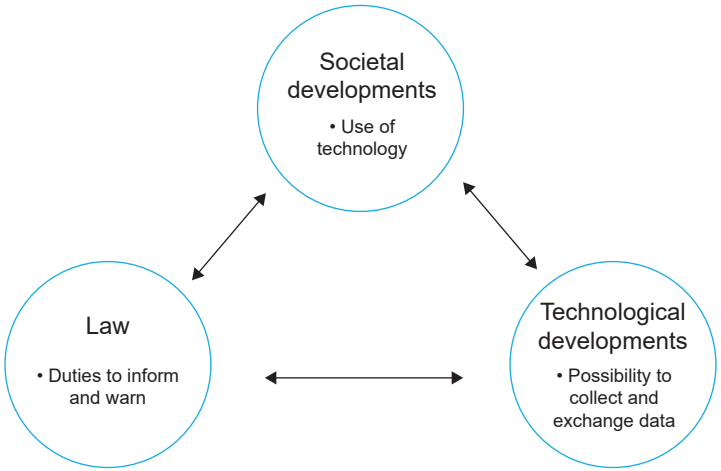
A second development that contributes to greater emphasis on duties to information and duties to warn, is the introduction of new legislation.[89] This development manifests an interaction between law and societal developments; the desire to better inform parties is given shape by means of legislation. New legal provisions to be introduced in the Dutch Civil Code in the section on Contracts for works, as part of the Act on Quality Assurance in Construction, which will in all likelihood be introduced as of 1 January 2023, make the obligation more explicit, and endorse the trend towards greater emphasis on duties to inform, warn and communicate.[90]

The trend towards more emphasis on sharing of data and information is also evident in autonomous construction law. Over the past decade, this obligation has been made explicit in the increasing number of contract documents that oblige parties to exchange data and cooperate digitally. The Netherlands now has a large number of ILSes,[91] BIM protocols, implementation plans and standards[92] relating to this. In addition, the increased use of the open standard Visi, which is often used by large clients in particular, is leading to more obligations regarding the exchange of data and digital communication.

The trend towards providing more information and improving communication amongst parties is also evident in a societal development, namely the increased desire among many parties in construction for more and better cooperation and more and earlier communication with one another. I will discuss this societal development later (section 8).

Finally, the literature advocates a coherent approach to, or convergence of, the statutory regulations on contracts for services and contracts for works, partly because it is said that the contract for works is a variant of the contract for services[93] and in order to avoid delimitation problems between the two[94] and because the increasing of the increasing demands of society to convert to a service economy, means that the positioning and coherence of the titles for contracts for works and contract for services, merits attention.[95] Although from a systemic law perspective there may be something to be said for a better

coherence or an equalisation of the two titles, I wonder whether the adoption of a mixed contract, as described in Section 7.1, does not provide a more pragmatic approach that also does justice to the respective parts of the contract and their legal character.[96]



7.3 The interaction

The developments outlined above and their legal consequences have strong circular reasoning characteristics: we are going to collect and ask for more data, autonomous building law changes as a result,[97] and as a direct consequence the nature of the contract changes, which means that we are also expected to communicate and share more on the basis of general law, etc. Consequently, on the basis of a multitude of societal and technological developments, new obligations arise, which, in turn, change legal relationships. The interaction between the law, societal developments and technology is clearly evident here.

8 Cases in which the law must be revised as a result of the developments

For a number of years, a shift in the approach of the content of many of the well-known types of general terms and conditions for construction, has been evident. Both the societal need and the increased availability of data lead to a movement towards contract forms and the new content of existing standard terms, that focuses more on collaboration.[98] This is a societal development that is gaining momentum thanks to the technological possibilities for data collection and sharing. I will briefly discuss this development in this section.

8.1 Collaborative contracting

Digitalisation, BIM, digital twins and other forms of data collection and exchange ideally lead to better information exchange and thus better communication; after all, an important aspect of communication is the sharing of data and information. In other publications, I argued that data and information sharing can take place within all types of contracting in construction.[99] However, the sharing of data is better and more efficient in an environment that is focussing on collaboration and the sharing of information.[100]

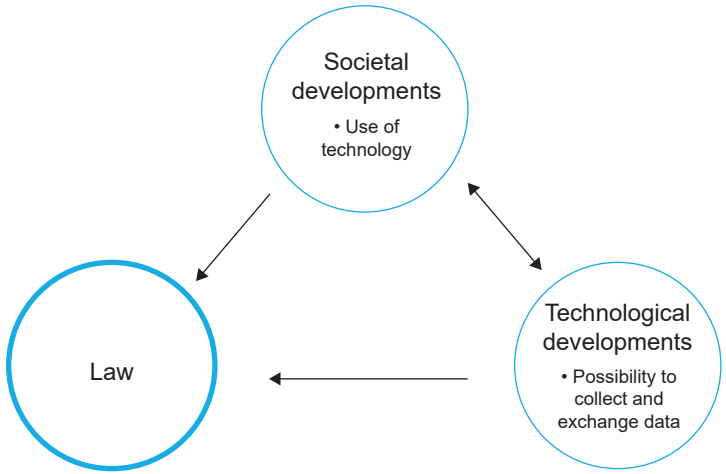
As I have said, there are increasing calls to include collaboration in construction contracts. These calls are neither new nor unique to the Netherlands.[101] This desire is expressed in market views, strategies and a different way of organising collaboration between clients and contractors, the development of the new Dutch early contractor involvement model,the DG2020-model,[102] and a provision on collaboration included in the draft version of the UAV-IC, the Dutch set of general terms and conditions for integrated contracts.[103] Furthermore, there is an increase in literature on the subject[104] and – for me closer to home – the initiative, also shaped by the Dutch Institute for Construction Law (IBR) in cooperation with the VU University Amsterdam, to work together with all stakeholders, to give tangible form to collaboration in our legal administrative frameworks.[105]

This new approach to the relationships between parties, namely one that is geared towards collaboration, communication and the sharing of information, leads to a change in the content of legal provisions. The radical aspect of this approach lies not only in the content of the proposed change (i.e. from transactional to relational), but also and in particular in the implementation of the relational approach in legal documentation.[106]

Given the increase in digitalisation of the construction process outlined above, as well as the need to share and reuse data, the need for relational or collaborative contracting and therefore the need for general terms and conditions that incorporate a different approach and content, will only increase.[107] Therefore, prompted by the prevailing societal desire for better cooperation and the ever-increasing digitalisation, those general terms and conditions must be more geared towards improving communication and collaboration.[108] The following quote, which I once came across on Twitter, sums up the need for a different approach[109]:

> *"adding software to a broken process doesn't make you digital. The biggest challenge is reimagining process, not writing software".*

I can think of no better way of describing the importance of combining digitalisation with appropriate collaboration and corresponding legal frameworks.[110]



8.2 The interaction

It is, in short, a circle or cycle: data is collected and exchanged to work more efficiently. This also improves communication and collaboration, but in order to exchange data and information efficiently and create the right environment to promote data and information exchange, a need arises for different types of relationships and the corresponding legal frameworks in the construction industry. At this point, the interaction within the force field is complete: to promote data exchange, collaboration must be organised within both the organisational and legal frameworks. The force towards collaborative contracting is strong!

9 Cases in which the law must be revised to promote the societal and technological developments

In the developments outlined above, the law has been consistently regarded as a force subject to other forces. Finally, there is one area within the force field where the law could, and perhaps should, take the lead: the area of standardisation of data requirements and the legal frameworks surrounding those data requirements.

9.1 Standardisation of data requirements and the legal frameworks in relation to data

The harmonisation of standard terms and conditions has always been the subject of much debate in construction law.[111] The flourishing existence of the field of autonomous construction law is clear from the plethora of general terms and conditions available. The discussion about how those terms and conditions

should come about and whether they should be harmonised or not, has been going on for well over fifty years.[112]

The standardisation of general terms and conditions is not the only thing that the sector is concerned about and in need of.[113] Great, too, perhaps even greater, is the need for standardisation of data requirements and the legal framework regarding data. As with the standardisation of legal terms and conditions, standardisation of data requirements has great advantages as it provides tested and legitimate solutions that the "market" can anticipate. Standardised data requirements are essential for the sector to be able to prepare for data and digitalisation requirements from its clients.
The question is how that need can be standardised. The DSGO programme – DSGO standing for Digital Cooperation in the Built Environment – was recently launched to take the first steps towards further standardising data requirements and the use of standards.[114] The question, however, is whether developing a system of agreements with the sector will be enough, or whether the legislature must take the lead in this respect and include an obligation to use digital resources using pre-determined standards, or whether the government – as the largest contracting authority in the Netherlands – must impose this obligation (on) itself.

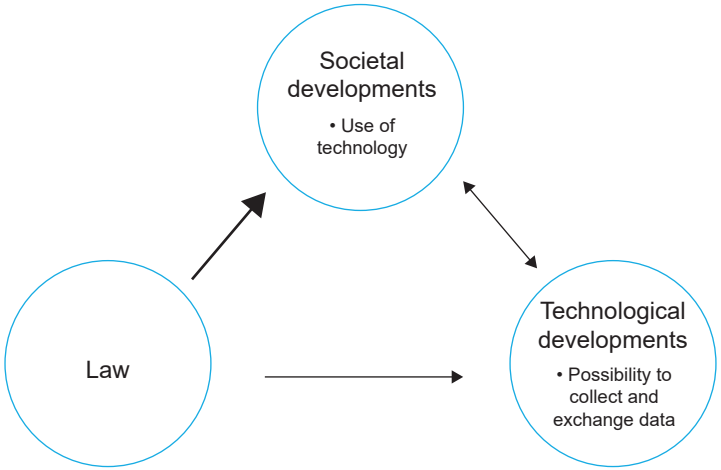
In addition to standardising data requirements, there is also the issue of standardising the legal frameworks regarding those data requirements. As a lawyer, my answer to this question is, of course, "yes". The sector needs legal frameworks regarding those data agreements as much as it needs technical agreements pertaining to the data themselves. These legal frameworks must be both coherent and consistent with existing laws and regulations,[115] as well as with the existing general terms and conditions.[116] The wide variety of available EIR's,[117] protocols, execution plans and other data-related – and also legal – documents, show the significant need for legal documents laying down data requirements, data-related work processes and rights and obligations regarding data in a coherent way.

Volumes could be written about the form and substance of those frameworks.[118] We do not have enough time to do that today. Let me suffice by noting that offering lawful and uniform standards and requirements that fit within legal-administrative frameworks and that can be applied in tender procedures and contracts without leaving any uncertainty as to their lawfulness, would contribute to facilitating and stimulating digitalisation in the construction industry and would thus fulfil a societal need.
This, among other things, will present lawyers with a significant challenge in the

coming years. Namely, it will be up to us to eliminate the alleged barriers and to conduct studies and provide information about the legal consequences, to draft a checklist, or to develop uniform legal solutions, perhaps in the form of provisions that can be applied modularly and that can be adapted to fit EIR's , protocols and execution plans, or that can be used as part of specifications or an annex to a contract.

9.2 The interaction

The rapid pace of data-related technological developments in the construction field is the order of the day; that is a fact. The question, however, is whether societal developments – the need and willingness to use technology – will keep up with the technological developments if the legal issues have not been sufficiently resolved. The law, and perhaps the legislature – a powerful legal



player – or large clients and contracting authorities – powerful societal players – can – and perhaps should – take the lead to ensure that adequate form and substance are imparted to legal data requirements.

10 Research and education

"A long time ago in a galaxy far, far away…", so goes the rolling text at the beginning of the Star Wars films. Fans will already have recognised the music that played as they entered this room. Over the past half an hour I have taken you on a trip through another galaxy, the construction law galaxy. I have tried to show you the place of construction law in the bigger picture, in the force field between technological and societal developments. Although we focused on data and digitalisation in the construction field as we travelled through

the construction law galaxy, that force field is interwoven through every area of construction law. The sixty-one years that have passed since Van Poelje's inauguration and the one hundred and eighty-two years that have passed since Thorbecke's may feel like many centuries if we compare their eras with the progress being made in ours; but the force field remains unchanged and timeless – and I have provided you with specific examples that illustrate just that.

As part of this University, I hope to be able to contribute in the coming years to the balance in this force field by practising law in a technological environment and, in so doing, to work for and with one of the other forces in the force field. As my narration has hopefully led you to expect, I have many plans for studying and shaping the force field – not just from an academic legal perspective, but also in a multidisciplinary environment and as part of a team. That study will sometimes lead to the conclusion that existing legal standards adapt to a new situation as soon as alleged legal barriers are shown to be non-existent. In other cases, the study will pertain to one or more of the other guises the law takes in the force field, as I touched upon here today.

In collaboration with my colleagues at the TU, IBR and the VU,[119] the continuation of the research I mentioned earlier into collaborative contracting and the embedding of that collaboration in the legal framework, is a subject that demands additional attention and concrete solutions not only in the context of digitalisation, but in other contexts as well. Many studies by colleagues and graduate students in Delft fit seamlessly in this theme, given that it is pre-eminently a subject where construction management meets the framework of the law. In other words, cooperation between the two disciplines is indispensable to success.

I have also noted the need for standardisation of the legal frameworks for data requirements. It is important that the documentation regarding data requirements and data-related processes can be harmonised with the existing legal framework, and that agreements can be clearly structured and imposed in the supply chain and are consistent with known legal terminology, and that new legal questions that arise in connection with the exchange of data and digitalisation – such as those relating to IP rights – are researched and answered, including from an international perspective. It is also important to do additional research into the substance of existing EIR's, protocols and execution plans and the repercussions that that substance will have on contractual relationships. Above all, attention must be devoted to formulating data requirements in the tender phase and the implementation of digitalisation-related requirements in the selection and award phases.[120] In this area, as well, both national and international research are crucial to the accumulation of knowledge.

Furthermore, specific research is also needed in the field of duties of care such as the duties to warn, communicate and cooperate in the field of construction law (general terms and conditions) and their relationship to general law (amongst others the Dutch Civil Code).[121] This research is essential, given that parties will be collecting and exchanging information that is becoming increasingly easy to search. It is important for both academics and practitioners in the field of law to gain insight into the rights and duties that will accrue to parties as a result of these technological and societal changes. In the context of substantively interpreting the existing norms, it is also important to research the substantive interpretation of the duties of care and their effect on the scope of data suppliers' duty to perform. The importance of that issue will only increase given that more work is being done with digital twins, artificial intelligence and algorithms and (re)using data is becoming more important in the decision-making process regarding use, maintenance and renovation.[122]
Furthermore, the construction industry is increasingly using the open (BIM) standard Visi as a means of communication. One avenue of research, perhaps also for graduate students, would be to take stock of the consequences that using Visi will have on the relationships between parties, the organisations that use Visi, and the extent to which it successfully contributes to project management. There are also questions surrounding the legal consequences of using Visi: how will it shape the relationships between parties – what interaction do we see here between law and technology – how will mandates and digital signatures be safeguarded, what value will Visi communication have when used in courts, and so forth. Important questions that demand further academic research!

One important topic for research, particularly with a view to the development of digital twins, networks of digital twins and smart cities, will be the rights and obligations attached to data and data packages outside contractual frameworks. This research could eliminate the alleged legal barriers by mapping out rights and obligations and by offering justified legal solutions for using these new technologies.

Finally, my goal is to carve out a permanent place in education for data and digitalisation and its legal aspects and its connection with construction management and the contracting and tendering process. In general, it is essential for students at this faculty and the faculty of civil engineering to obtain knowledge about construction law. This is, in fact, the main reason why that knowledge has been embedded in its own area of study at this university through the continuation of this construction law chair. At the same time, it will contribute to perfecting the interaction in the force field.[123] Knowledge of the legal aspects

associated with digitization of the built environment is, considering the developments in the upcoming sixty-one years, particularly essential.

11 Conclusion

In the Star Wars Galaxy, far, far away, the ultimate battle between good and evil is being fought. It is the battle between the Dark Side and the Light Side. Fighters from both sides use The Force. Obi Wan Kenobi, one of the Jedi masters – fighting on the side of good – explains what The Force is:

> *"The force is what gives a Jedi his power, it's an energy field created by all living things. It surrounds us and penetrates us: it binds the galaxy together."* [124]

The question is whether The Force itself is good or evil. The answer is nuanced: it comes down to the fact that there are different aspects to The Force.[125] Two of those aspects are the Dark Side of The Force and The Light Side of The Force. These two aspects are considered to be the moral compass of The Force. They manifest themselves in the behaviour and emotions of the living beings who are themselves part of The Force. What is true for The Force is also true for the force field I have described: it is part of us all, we are all part of it, it affects us and it binds us and our galaxy together.

Ladies and gentlemen, you may decide for yourselves on which side of the spectrum in the force field of technological and societal developments and the law you find yourself. In his inaugural speech, Van Poelje also pointed out the role of everyone active in what he refers to as the cycle.[126] Are you part of the Dark Side, or The Light Side? Or at which point do you find yourself on the Dark Side or The Light Side, because no Jedi or Sith is considered to be completely good or completely evil. Every participant in the force field with force sensitivity can use the force for good or for evil.[127]
What is certain is that all of us here, as participants in the world of construction and the built environment, are part of the force field. We influence it, we use it and we are sometimes merely the pawns of the forces in the field. Maintaining the balance in our galaxy is a responsibility we all share.

Sixty-one years ago, Van Poelje did not use a futuristic metaphor to give shape to the interaction between the forces (or disciplines) and stuck to a solid plea for multidisciplinary cooperation:

> *"I hope [...] that we all carry a full and shared societal responsibility and that technicians and lawyers in particular must reach out to each other in the pursuit of the proper functioning of the cycle of law."*[128]

I am saying it in my own words: "May the Force be with you."

12 Word of thanks

We have reached the end of my talk. And because what I am going to say now is very personal, parts of it will be in Dutch.

Geachte aanwezigen, collega's, vakgenoten, vrienden en familie, allereest aan jullie hartelijk dank dat jullie de tijd hebben genomen hier aanwezig te zijn om deze dag samen met mij te vieren.

Heel veel dank ben ik verschuldigd aan de TU en de faculteit Bouwkunde. Dat ze deze leerstoel hebben willen continueren is voor het bouwrecht van groot belang, dat ik de functie mag vervullen is een grote eer. Veel dank ben ik ook verschuldigd aan mijn collega's van de faculteit Bouwkunde en ook aan die van Civiele Techniek. Dank voor het warme welkom hier. Het is een genoegen om met jullie samen te werken en ik hoop nog vele jaren inspirerende projecten met jullie op te pakken en onderwijs te mogen verzorgen.
Dan mijn collega's bij het Instituut voor Bouwrecht. We zijn een bijzondere club die met weinig mensen veel gedaan krijgt. Het is een eer en genoegen om samen met jullie aan de bevordering van het bouwrecht in Nederland en daarbuiten te werken. Daarbij wil ik met name Arjan Bregman noemen, dank voor het vertrouwen en je steun, en Natasja van Wijk, voor haar redigeerwerk en haar eindeloze geduld, ook weer bij het schrijven van dit stuk en Laure Overmeire, voor haar hulp bij de PowerPoint en de voetnoten in dit stuk. Dank ook aan mijn inmiddels oud-collega Monika Chao-Duivis, mijn voorganger bij het Instituut, mijn promotor en mijn voorganger van deze leerstoel, ik heb heel veel van je geleerd! Ook aan het bestuur van het IBR ben ik veel dank verschuldigd voor het in mij gestelde vertrouwen.
Veel dank ben ik verschuldigd aan wat ik altijd de Bouwrechtgemeenschap noem, alle mensen die met het Instituut voor Bouwrecht samenwerken aan onderwijs of projecten. Door jullie kan het Instituut bestaan. In het bijzonder wil ik bedanken al die mensen die met ons werken aan de deelprojecten van het onderzoeksprogramma rond coherente juridisch administratieve kaders, jullie bijdragen zijn onmisbaar voor het slagen van het project. In dat kader wil ook Chris Jansen bedanken voor de samenwerking in dit onderzoeksprogramma maar ook daarbuiten.

To my friends from the European Society of Construction Law, the council and the national societies, thank you all for your passion for construction law and the inspiration and friendship you bring to our community. It is a joy to be part of it.

To my international Legal BIM and data friends from the law@group. Every time we meet, whether it is online or in person, it is an absolute joy to discuss legal

aspects of data and digitalization in construction law with you. You are a true inspiration.

Aan mijn vrienden en familie en schoonouders dank dat jullie er zijn, dank voor alle gezelligheid, alle steun, alle mooie vakanties samen en die momenten waarop we zo hard moesten lachen dat we bijna een restaurant werden uitgezet. Dank aan mijn zussen, Dominiek en Madelon, en mijn zwager Paul, voor alles. En dan mijn vader: Pa, ik had je hier zo graag nog bij gehad, maar helaas heeft het niet zo mogen zijn.

En dan ons gezin. Rosalie en Olivier, jullie zijn de leukste kinderen van de wereld, we hadden ons niets beters kunnen wensen. En Hans, zonder jou had ik hier niet gestaan. Dankjewel.

Ik heb gezegd

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[1] https://www.parlement.com/id/vg09llybstzz/s_o_ot_van_poelje
[2] He was also the first chairman of the Institute of Construction law (IBR), founded in 1968. See M.A.B. Chao-Duivis, *Bouwrecht in kort bestek*, Den Haag: Instituut voor Bouwrecht 2016, par. 1.2.
[3] It was built in 1966. Before that (between 1923 and 1966) the Hypolytuskapel was used as auditorium: https://nl.wikipedia.org/wiki/Aula_(TU_Delft)
[4] S.O. Van Poelje, 'Bouwrecht; een publiekrechtelijke verkenning', *BR* 1964, p. 4-6 en P. de Haan, 'Vijfentwintig jaar Bouwrecht. De ontwikkeling van een functioneel vak', *BR* 1988, p. 873.
[5] E.M. Bruggeman, 'Redactionele bijdrage: Parels aan de kroon en de brug bij Bommel', Actualiteiten Bouwrecht 21 april 2022. Zie ook L. Volker, *Just a little of that human touch: towards a value-based ecosystem for delivering infrastructure services = Gewoon een beetje meer menselijkheid: richting op waarde gebaseerde ecosystemen voor het leveren van infrastructuurdiensten,* Enschede: University of Twente, 2019, p. 1.
[6] See also Asser/Vranken, Algemeen deel**** 2014/55 about the development of the law.
[7] Van Poelje, De kringloop van het Recht, 1961, p. 8-9.
[8] In Dutch: uitgestelde prijsbepaling.
[9] See Research Framework: a coherent and future-proof system of procurement and legal-administrative frameworks for construction, subproject II: pricing, to be consulted via: https://www.ibr.nl/deelproject-ii-aanbesteden-en-contracteren-met-uitgestelde-prijsbepaling-voor-de-uitvoeringsfase/
[10] Van Poelje 1961, p. 19.
[11] J.R. Thorbecke, 1830, 'Verhandeling over den invloed der machines op het zamenstel der maatschappelijke en burgerlijke betrekkingen', to be consulted via: http://home.planet.nl/~dmjanssen1960/Invloed_der_Machines.html
[12] For an extensive overview, see: V. Mak, E. Tjong Tjin Tai & A. Berlee, *Research Handbook in Data Science and Law*, Cheltenham, UK, Northampton, MA, USA: Edward Elgar Publising 2018, p. 3-5; E.M. Bruggeman, *Handboek Juridische aspecten van werken met BIM*, Den Haag: Instituut voor Bouwrecht 2020, hoofdstuk 3, par. 3.2.1. Verder T.F.E. Tjong Tjin Tai, *Privaatrecht voor de homo digitalis: eigendom, gebruik en handhaving*, NVJ Preadvies 2016, p. 253-255. See over the definition of BIM, being a collection of data: E.M. Bruggeman 2020. See also: T.F.E. Tjong Tjin Tai, 'Data in het vermogensrecht', WPNR 2015(7085), p. 993-998.
[13] In the broadest sense of the word: thus both initiation, design, construct, use and maintenance and demolition.
[14] A.M. Adriaanse, *Bruggen bouwen met ICT,* Enschede: Universiteit Twente 2014. A.M. Adriaanse, E.M. Bruggeman & T.J. Voordijk, *Digitale transformatie van het bouwproces en haar juridische en organisatorische aspecten (Preadviezen voor de Vereniging voor Bouwrecht, nr. 48),* Den Haag: Instituut voor Bouwrecht 2020.
[15] E.g. the replacement and renovation assignments and the ambitions in the context of circularity and sustainability.
[16] This includes the (joint) management of risks, the exchange of information, see e.g. Adriaanse 2014.
[17] Adriaanse, Bruggeman & Voordijk 2020, Par. 1.3.3.
[18] See e.g. Adriaanse 2014, p. 19 en p. 25 e.v.
[19] See e.g. Centre for Digital Built Britain, *Gemini Papers: a blueprint for the future,* 2022, to be consulted via: https://www.cdbb.cam.ac.uk/news/gemini-papers See in particular: Centre for Digital Built Britain, *Why connected digital twins*, 2022. https://www.cdbb.cam.ac.uk/files/gemini_papers_-_why_connected_digital_twins.pdf
[20] On the value of digital data compared to analog data, see also: Mak, Tjong Tjin Tai & Berlee 2018, p. 4.
[21] TNO, 'Naar netwerken van predictive twins van de gebouwde omgeving', 2021, p. 5-6, to be consulted via: www.tno.nl/nl/over-tno/nieuws/2020/11/predictive-twins-oplossing-voor-uitdagingen-in-de-bouw/
[22] Also: J.F.A. Hokkeling, *Towards construction 4.0: An assessment on the potential of Digital Twins in de infrastructure sector (Scriptie Twente), 2020, hf. 4; BTIC, Kennis- en innovatieprogramma digitalisering (deelprogramma digital twins),* Delft: 11 mei 2020 , to be consulted via: https://btic.nu/wp-content/uploads/2020/05/Digitalisering-DigitalTwins_Kennis-en-innovatieprogramma_BTIC.pdf

[23] See E.M. Bruggeman en J.R. Hoogendoorn, 'Een eerste inventarisatie van juridische aandachtspunten bij het gebruik van digital twins: Twinning is winning', *TBR* 2021/42, par. 3. See also the TU project: https://www.tudelft.nl/urbanenergy/research/projects/brains-4-buildings

[24] TNO 2021, and also Centre for Digital Built Britain 2022.

[25] Colleague Ellen van Bueren also wrote about urban development and the role of ICT, digitization and data in her inaugural address: E. van Bueren, *The great urban bake off: inaugural lecture*, Delft: TU Delft 2015.

[26] The Faculty of Architecture has three AI labs. In short: the first (3DUU) seeks to sense the built and urban environment by building 3D urban understanding. The second (AIDAPT) reads and writes the built environment, combining imaging and condition monitoring. The third (AiBLE) examines how multiple actors work with artificial intelligence to drive better decisions for lasting and liveable environments.

[27] https://www.hethuisdossier.nl/

[28] Research into digitization and circularity is being done at this faculty, see e.g. S. Çetin, C.E.L. de Wolf & N. Bocken, 'Circular Digital Built Environment: An Emerging Framework', *Sustainability* 2021, 13, 6348, P.W.C. Chan, C. de Wolf & A. Koutamanis, *The digital potential in creating a circular construction economy*, 2021, P.W.C. Chan, 'Construction in the platform society. New directions for construction management research', in: L. Scott & C.J. Neilson (Eds.), *Proceedings of the 36th Annual Conference 2020 (ARCOM 2020)*, p. 396-305.

[29] See e.g. *Autodesk Construction Cloud, Quality and Completion Management in the Digital Age. How Clouw-Based Technology Is Revolutionising Quality Management,* Autodesk 2020.

[30] See S. van Gulijk, 'Correspondents report: the Netherlands, the circular economy: adaptive law for Dutch circular and safe buildings', [2021] ICLR, p. 132- 144 and S. van Gulijk, *Circulair en veilig bouwen: Verantwoordelijkheid is geen estafettestokje*, Tilburg: Tilburg University 2019, p. 24-25.

[31] See J.Hackitt, *Building a Safer Future. Independent Review of Building Regulations and Fire Safety: Final Report 2018,* chapter 8, to be consulted via: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/707785/Building_a_Safer_Future_-_web.pdf See also: Building Regulations Advisory Committee: *Golden Thread Report,* to be consulted via: https://www.gov.uk/government/publications/building-regulations-advisory-committee-golden-thread-report

[32] On the term construction law and what it means: M.A.B. Chao-Duivis 2016, par. 1.1, p.1 referring to H. Verkouteren in het *Bouwkundig Weekblad* 1900, p. 172.

[33] More about that concept: C.A. Groenendijk, 'Ouderenrecht, funktionele rechtsgebieden en discriminatie. Mobilisatie van recht door ouderen of mobilisatie van ouderen door recht?', *AA* 37 (1988) 10, p. 615 e.v. referring to De Haan.

[34] De Haan, *BR* 1988, p. 874 referring to Cerutti (footnote 4). See also M.M. van Praag, 'Het Bouwrecht', *BR* 1964, p. 7. See also A.G.J. Van Wassenaer, 'Bouwrecht, publiek-private hybride of twee diersoorten onder één dak? Een private causerie met publieke aspecten', *TBR* 2013/6.

[35] De Haan *BR* 1988, p. 874.

[36] See e.g. the many articles written by him: 'Functionele vakken als dwarsdoorsneden van publiek- en privaatrecht, in het bijzonder betreffende onroerend goed', *AA* 1987, p. 361, 'Vijfentwintig jaar Bouwrecht. De ontwikkeling van een functioneel vak', *BR* 1988, p. 873 and 'Vijftig jaar rechtsontwikkeling met betrekking tot de landbouw', *Agrarisch recht* 1990, p. 581.

[37] De Haan *BR* 1988, p. 873. Van Poelje did this first in his inaugural address in 1961, as said before almost 61 years ago, and later in the opening article in the first edition of the Tijdschrift Bouwrecht in 1964. Van Poelje, *1961*, p. 4-6. See also: Van Praag *BR* 1964 p. 7.

[38] Van Poelje 1961, p. 14. He then distinguishes the circles of law formation in that structure according to, among other things, rotation time, terroir and organs.

[39] Material autonomy means that it is not 'subject' to the dogmatics of geenral law.

[40] See e.g. De Haan, 25 jaar later (*BR* 1988, p. 873). See the inaugural address by J.M. Polak, *De eenheid van het recht, inaugurale rede Wageningen,* Zwolle 1958 and the reaction to it by Pitlo in 1961, see: A. Pitlo, 'Het gemene recht en de autonomie van zijn onderdelen', R.M. Themis 1961, p. 575. Also Van Poelje *BR* 1964, p. 4.

[41] Van Poelje *BR* 1964.

[42] See A.A. van Velten, 'Veertig jaar Vereniging voor Bouwrecht: een korte privaatrechtelijke terugblik', *TBR* 2013/8.

[43] See e.g. Van Velten *TBR* 2013/8 , W.J. Slagter, *Prijsregeling in de bouw, in Aanbestedings- en mededingingsrecht in de bouw, publikatie van de Vereniging voor Bouwrecht Nr. 14, J.J. Goudsmit, Voorwoord 25 jaar Vereniging voor Bouwrecht, preadvies nr. 25.* In my opinion, the organization of law is also the task of every scientist, and the organization of construction law is the task of every construction law scientist, although Van Velten seems to be only moderately able to appreciate the discussion around the question of what exactly construction law is: *TBR* 2013/8.

[44] Van Poelje *1961*, p. 12.

[45] E.M. Bruggeman en N. van Wijk-van Gilst, 'Introductie Intellectuele Eigendomsrecht in het bouwrecht' in: *Praktijkboek Intellectuele Eigendomsrechten in het bouwrecht,* Den Haag: Instituut voor Bouwrecht, 2022.

[46] C.E.C. Jansen, *Towards a European Building Contract Law,* Deventer: W.E.J. Tjeenk Willink 1998.

[47] This approach is in line with the data inventoried in section 3 during the life cycle of the building.

[48] I. Kuiper & C. Duffield, *Describing proposed elements of and considerations for public procurement to frame research into building information modelling (BIM) and infrastructure projects,* Department of Infrastructure Engineering, The University of Melbourne, 2018.

[49] Van Poelje 1961.

[50] Bruggeman 2020; Adriaanse, Bruggeman & Voordijk 2020 and L. Ransijn & D Spekkink, *Onderzoek ILS'en in Nederland,* Oktober 2019.

[51] ILS-en or EIR's (Employer Information Requirements) usually contain the data product requirements, execution plans ideally contain the translation of those requirements into the (cooperation) process. Bruggeman, *Handboek Juridische aspecten van werken met BIM 2020,* hoofdstuk 3 of 4.

[52] See Bruggeman & Hoogendoorn *TBR* 2021/42. E. Papadonikolaki, 'Formal and informal relationships within BIM-enabled supply chain partnerships', *CM and E* 2017 and E. Papadonikolaki, *Alignment of Partnering with Construction IT,* Delft: TU Delft 2016. About thinking in networks: G. Teubner, *Networks as connected contracts,* 2011 edition, edited by Hugh Collins.

[53] Aside: rights to data are often seen as legal barriers. The question is whether these are always barriers, or whether they should be approached that way. In many cases they are the guarantees for the functioning of our democratic constitutional state and they protect the rights of citizens and the owners of intellectual property.

[54] On data and (the imposibility of) property: T.F.E. Tjong Tjin Tai 2016, p. 253-255; J.H.M. van Erp en W. Loof, *Eigendom in het algemeen; eigendom van digitale inhoud (titel 1). About digital contents:* NJV Preadvies 2016, p. 23-63. See T.F.E. Tjong Tjin Tai, 'Een goederenrechtelijke benadering van databestanden', *NJB* 2018/1242 , J.L. Naves, 'Data in de rechtspraktijk', *Computerrecht* 2018/2, p. 3-10.

[55] BIM models or other data collections that qualify as a database are protected by special IP rights, rights that parties must take into account both within and outside the contractual chain, see: Bruggeman & Hoogendoorn, *TBR* 2021/117 and Bruggeman 2020.

[56] See Bruggeman & Hoogendoorn, *TBR* 2021/117 en E.M. Bruggeman en J.R. Hoogendoorn, 'Bescherming van dataverzamelingen onder het IE-recht' in: *Praktijkboek Intellectuele Eigendomsrechten in het bouwrecht,* Den Haag: Instituut voor Bouwrecht 2022. Also: E.D.C. Neppelenbroek, 'Digitalisering, auteursrecht en vier waarnemingen over de eigendom', *RM* Themis, 2012-5, p. 211-222.

[57] See e.g. M. Kool, 'Data, de Wet bescherming bedrijfsgeheimen en het contractenrecht', *Contracteren* 2021, nr. 2, p. 40-47.

[58] About smart metering and privacy see C. Cuijpers & B.J. Koops, 'Smart metering and privacy in Europe: lessons from the Dutch case', in: S. Gutwirth et al., *European Data Protection: Coming of Age,* Dordrecht: Springer, p. 269-293; C. Cuijpers & B.J. Koops, *The 'smart meters' bill: a privacy test based on article 8 of the ECHR,* Tilburg University 2008; M. Galič, 'Surveillance, privacy and public space in the Stratumseind Living Lab. The smart city debate, beyond data', *AA* 2019, p. 570-579.

[59] See e.g. M. Lanzing & B. van der Sloot, 'Living Labs. De stad als laboratorium en de burgers als proefkonijn', *NJB* 2017, afl.6, p. 309; M. Baumgart, 'A (legal) challenge to privacy: on the implementation of smart meters in the EU and the US', *Renewable Energy, Law and Policy,* 2017, 8(1), p.19-29; B.E. Apráez & S. Lavrijssen, 'Exploring the regulatory challenges of a possible rollout of smart water meters in the Netherlands', *Competition and Regulation in Network Industries,* 2018 19(3-4), p. 159-179.

[60] M. Galič, *AA* 2019, p. 570-579.

[61] Privacy obligations for one party are a mirror image of privacy rights for the other party.
[62] E.M. Bruggeman, 'De waarschuwingsplicht van art. 7:754 BW en digitaal ontwerpen en bouwen', *TBR* 2018/140; Bruggeman 2020.
[63] Van Poelje also realized that a tight categorization was impossible. Van Poelje *BR* 1964, p. 14.
[64] Van Poelje described this as the interaction between higher and lower norms and the gradual development form higher norm to concrete legal determination and, as he described it, 'the strong current in the opposite direction', see Van Poelje *BR* 1964, p. 8-9. He refers to Kelsen, p. 6-7 e.v. See about the influence of change within one part of the law on another part also: Asser/Vranken Algemeen deel** 1995/96. Vranken describes it as: *"[..] civil law is a mosaic in which no shifts can take place on any part without affecting other parts in terms of location or color scheme."*
[65] See Asser/Vranken Algemeen deel**** 2014/91.
[66] Asser/Vranken Algemeen deel**** 2014/92. Asser/Vranken also mentions a third possibility, namely infringement of the standard. And a fourth, the atypical situation (nr. 97 e.v.).
[67] See also on this theme: TILEC discussion paper, regulation of innovation or regulation of innovation?
[68] Think of 'fitting' the database right to a database such as the BIM model, see Bruggeman & Hoogendoorn, *TBR* 2021/117.
[69] In his inaugural adress, Van Poelje spoke about legal formation (Van Poelje 1961 p. 6 en p. 13), because he spoke about the interpretation of the higher norm by the lower norm (p. 7). In addition, he spoke of 'legal realization' for the concrete case in which law was made 'effective, visible and real in the last instance', for example in the form of case law or agreements (p. 7). Scholten spoke in a general sense about the phenomenon and (in my opinion) calls what Van Poelje calls legal formation, legal finding: Scholten, *Algemene Methode van het Privaatrecht, Bewerkte Heruitgave van het Eerste Hoofdstuk van het Algemeen Deel van de Asser-serie,* DPSP Annual, III: Edited Reissues, Volume 1 (2020), 435-554, nr. 51 en nr. 52, to be consulted via: https://paulscholten.eu/research/article/algemene-methode-van-het-privaatrecht/ Scholten nr. 51 en 52)
[70] E.M. Bruggeman, Data en het bouwrecht, een verkenning van het krachtenveld, *IBR* 2022.
[71] See also: Asser/Vranken Algemeen deel**** 2014/91
[72] Compare Asser/Vranken Algemeen deel**** 2014/91-92
[73] See also Bruggeman 2022, see also: Bruggeman 2018, par 1-3 and Bruggeman, *TBR* 2018/140.
[74] See also Bruggeman 2022, previously discussed in: Bruggeman, *TBR* 2018/140, par. 7. See D. Mosey e.a., *Enabling BIM through procurement and contracts, A Research Report by the Centre of* Construction Law and Dispute Resolution, King's College London 2016.
[75] See also Bruggeman 2022, See also E.M. Bruggeman, 'Het leerstuk van de uitleg en de consumentennieuwbouw- naar een andere wijze van uitleg van de overeenkomst?', in: A.G. Bregman, E.M. Bruggeman, A.M.B. Chao & N. van Wijk – van Gilst, *Eindafrekening met pepernoten. Voor een onbetaalbare bijdrage aan het bouwrecht and beyond. Liber amicorum prof. mr. dr. Monika Chao-Duivis,* Den Haag: Instituut voor Bouwrecht 2019, p. 595-613. See also: L. Boellaard en J.P. Bolhaar, 'Waardecreatie met BIM buiten de bouwsector', *TBR* 2019/43.
With regard to the developments in consumer construction law, referred to in section par. 7.3, there are other legal specificities or points for attention that do not relate to the refinement of existing standards. These include questions about copyrights and database rights with regard to used BIM models or used datasets. Another question is what about the consumer's position with regard to evidence if the website goes offline or is (interim) changed. These aspects deserve future research. See for example aforementioned contribution on the doctrine of explanation, but also: Bruggeman & Hoogendoorn 2022.
[76] The same refinement of a standard could become visible in the interpretation of the duties to cooperate and to inform on the part if the client, see in short: Bruggeman 2022.
[77] That client van be a classic client as well as a (main) contractor.
[78] Think about smart buildings or smart cities or about DBFMO agreements where more classic failure, maintenance and usage data are supplied digitally.
[79] See T.F.E. Tjong Tjin Tai, 'Juridische aandachtspunten bij servitization, in het bijzonder ten aanzien van IT', WPNR 7326, p. 402, S. van Gulijk, De juridische kwalificatie van verdienstelijking in de gebouwde omgeving, WPNR 7326, p. 409. See also: Van Gulijk 2019, p. 29.
[80] See E.M. Bruggeman 2020, p. 165 e.v. I also adressed the question of whether digital objects such as BIM models or data or data packages can be qualifies as 'objects' within the meaning of art. 3:2 CC: Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020, p. 168, par. 7.2.2.1.
[81] Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020 p. 165 e.v. and Adriaanse, Bruggeman & Voordijk 2020 par. 4.
[82] Asser/Van Gulijk 7-VI 2022/28; C.E.C. Jansen, *Totstandkoming en inhoud van design & construct-contracten voor complexe infrastructurele projecten. (Preadviezen voor de Vereniging voor Bouwrecht), Deventer: Kluwer 2001; J.J. Goudsmit, Verschuivende patronen, nieuwe structuren; juridische bewegingen in de bouw, in: De veranderende bouwopgave (Publikatie van de Vereniging voor Bouwrecht Nr. 17)*, Deventer: Kluwer 1989, en de bijdragen van M.A.M.C. van den Berg & C.E.C. Jansen, M.A.M.C. van den Berg, J.W. van Nouhuys & J.A. Karstenberg in *De ontwerpende bouwer, Over turnkey- en design en build-contracten,* Deventer: W.E.J. Tjeenk Willink 1996.
[83] See Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020, hoofdstuk 7.
[84] The line of L. De Boer, 'Turnkey en design & construct: concepten, aansprakelijkheid en risico', in: M.A.M.C. van den Berg en C.E.C. Jansen, *De ontwerpende bouwer,* Deventer: W.E.J. Tjeenk Willink 1996, p. 198-202.
[85] See Bruggeman 2020, par. 7.2.3.2 for the many combinations of work that may occur.
[86] See also the considerations in the context of circular construction by Van Gulijk in Asser/Van Gulijk 7-IV 2022/29.
[87] Conversely, it is also claimed that this movement is taking place: software developers who provide more and more customization on the instruction of their client would increasingly shy away from service contarcts and therefore have to comply with the duty to warn included in the contract for works title, see: P.G. van der Putt & C.A.M. Van de Bunt, 'Bijzondere zorgplichten van IT-leveranciers', Computerrecht 2018/160, p. 194. That comment, incidentally, ignores the question of whether software is a "work of a material nature", see T.F.E. Tjong Tjin Tai 2016, p. 253-255.
[88] The standards of the service contract apply to the consultancy part, the data deliveries. See e.g. art. 7:402 section 1 CC (the contractor's duty to warn and the special care that must be taken with such instructions (Zie Asser/Tjong Tjin Tai 7-IV 2022/103-107), art. 7:403 section 1 CC about duties to inform and notify of the contractor and section 2 about accountability and accountability for the way in which the assignment was performed. See also: Tjong Tjin Tai, *WPNR* 7326, p. 404. See also Van Gulijk 2019, p. 41-44.
[89] A development that can also be seen outside legislation in more special duties of care in the form of a duty to inform, for example for IT suppliers, see Van der Putt & van de Bunt, *Computerrecht* 2018/160, p. 193-200.
[90] The law introduces a number of new information obligations in the civil code and is partly due to the wish to provide the contractor with better information. A number of these are aimed at the relationship between consumer and client, while a number concern the legal relationship between all typed of client and their contractor.
[91] See Ransijn & Spekkink 2019.
[92] For example ISO 19650.
[93] Asser/Tjong Tjin Tai 2018/35, Asser/Tjong Tjin Tai 2022/35 and T.F.E. Tjong Tjin Tai, 'Service Contracts in the Dutch Civil Code' in: R. Zimmermann, *Service Contracts,* Tubingen: Mohr Siebeck 2010, p. 172-173.
[94] Van Gulijk 2019, p. 32.
[95] Van Gulijk argues for this in the context of both developments in the field of circularity and the need for constructive safety, see Van Gulijk 2019, p. 35 en p. 51.
[96] See par. 7.1. See also: Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020: That is to say, approaching similarities that show both contract for services and contract for work traits, as well as mixed similarities. I do not see the so-called partitions between the titles of Book 7 of the Civil Code (Van Gulijk 2019, p. 51) as an obstacle to the development of a circular economy or constructive safety (as she says) or other developments. A shift (from one legal regime to another) or further interpretation of existing standards (see par. 7), also leads to suitable solutions (for concrete legal relationships). Asser/Vranken Algemeen Deel**** 2014/16.
[97] See the multitude of EIR's, protocols and execution plans, and other more or less standardized data requirements and data agreements.

[98] See also C.E.C. Jansen, 'Over 'twee-fasen-proces', 'bouwteam met UAV-GC' en 'alliantie': mogelijke oplossingen voor een verbeterde beheersing van het informatierisico bij de aanbesteding en realisatie van geïntegreerde projecten', *TBR* 2021/94.

[99] Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020; Adriaanse, Bruggeman & Voordijk 2020. It is therefore not necessary to collaborate in an integrated way, to arrive at the sharing of information and data, a view that was sometimes used a few decades ago was that integrated collaboration and the associated building organization forms were the most obvious to achieve an efficient construction process, see e.g. Adriaanse 2014, p. 11-12 en 37-38, M. Suprato, H.L.M. Bakker, H.G. Mooi & M.J.C.M. Hertogh, 'How do contract types and incentives matter to project performance?', *International Journal of Project Management*, (34) 2016/6, p. 1071-1087, H.W. Ashcraft, 'Building Information Modeling: A Framework for Collaboration', Construction Law (28) 2008/3, A.M. Adriaanse, H. Voordijk & G.P.M.R. Dewulf, 'Alignment between ICT and communication in construction projects', *International Journal of Human Resources Development and Management,* 2004/4, afl. 4, p. 353. Nuanced: Adriaanse, Bruggeman & Voordijk, 2020, par. 1.3.1.

[100] Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020.

[101] See M.S. Latham, Constructing the Team. *Final report of the Government/Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry,* Richmond: HMSO 1994. See the emergence of the NEC models and the development of the FIDIC model on collaborative contracting and the emergence of the FAC-1 Framework alliance model in the UK. See also some of the literature: R. Vornicu & P.E. Giana, 'Pursuing Zero Carbon Targets through Collaborative Construction Procurement and Contracting, ICLR [2022]; see also: D. Mosey, *Collaborative Construction Procurement and Improved Value,* Hoboken, NJ: Wiley-Blackwell, 2019.

[102] In which the emphasis is much more on collaboration, communication and sharing information, See also the models ChainCollaboration, via https://www.bouwrechtbedrijf.nl/publicaties/

[103] art. 2a MBO/uav-gc: 'Prior to and during the execution of the work, the Parties adopt a proactive attitude and communicate with each other. They therefore have in mind that the Work and the Long-term Maintenance will be realized in accordance with the Agreement. In that context, the Parties ensure, among other things, that they mutually understand the purpose of the Agreement and what is expected of them with a view to the realization of the Work and the Long-term Maintenance. The Parties regard this as a guiding principle of the Agreement.'

[104] Read also: M.A.B. Chao-Duivis & J.W.F. Wamelink, *Juridische aspecten van ketensamenwerking. Naar een multidisciplinaire benadering (Publicaties Vereniging voor Bouwrecht; No. 42),* Den Haag: Instituut voor Bouwrecht 2013 and A.G.J. van Wassenaer en C.H.J. Thomas, *www.Werkinuitvoering21.com: interactief naar een nieuwe generatie bouwcontracten* (Preadvies), Den Haag: Instituut voor Bouwrecht 2008.

[105] See the Research Framework: a coherent and future-proof system of procurement and legal-administrative frameworks for construction, subproject I: cooperation, to be consulted via: https://www.ibr.nl/deelproject-i-het-juridisch-vormgeven-van-samenwerking-in-de-aanbestedings-en-contractfase/. This call was recently followed up with a congress on April 1, 2022 and will continue to be followed up in the future. See also: M.C. Aalstein & A.G.J. van Wassenaer, 'Een land breken voor 'Guiding Principles'. Een handreiking voor het voorkomen van geschillen', *TBR* 2022/38, p. 248.

[106] A place where many people did not think they belonged before, see the decades-long quite business-like approach to contracting.

[107] See, among others: Adriaanse, Bruggeman & Voordijk 2020; Mosey 2019, p.9, p. 29 and chapters 13 and 14; Rapport Digital Built Britain: *level 3 building information modelling – strategic plan,* 2015 to be consulted via: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/410096/bis-15-155-digital-built-britain-level-3-strategy.pdf and see also the answers to a questionnaire recently issued by the magazine Construction Management and the website BIMplus, which can be consulted via: https://www.bimplus.co.uk/improving-bim-adoption-more-human-language-less-tech-talk/ Ans the new model for collaborative contracting and data exchange developed in the UK: Integrated Information Management Contract (IIMC) developed by the King's College London Centre of Construction Law and the University of Cambridge Laing O'Rourke Centre for Construction Engineering and Technology.

[108] Similar are the current developments from the UK about the need to combine digitization and collaborative contracting. See Mosey 2019; Vornicu & Giana 2022, p. 414. Also: C.Blamire-Brown & D. Griffiths, 'Collaborating and Contracting for Success: how future-proofed are the new NEC4 and FIDIC 2017 suites for the needs of the global construction industry in the technological age?', [2019] ICLR, p. 296-319.

[109] Derived from Adam Levie https://twitter.com/levie/status/599045909825982464

[110] But not every collaboration or legal relationship in the construction industry has to be designed collaboratively. Data can also be exchanged within a UAV relationship, which also improves efficiency and communication within those relationships.

[111] C.E.C. Jansen, *Een werk tot stand brengen. Over de integratie van de UAV in de UAV-GC,* Tilburg: Tilburg University 2014 en C.E.C. Jansen, 'Naar een permanente commissie voor coherente juridisch-administratieve voorwaarden in de bouw', in: A.G. Bregman, E.M. Bruggeman, A.M.B. Chao & N. van Wijk – van Gilst, Eindafrekening met pepernoten. *Voor een onbetaalbare bijdrage aan het bouwrecht en beyond. Liber amicorum prof. mr. dr. Monika Chao-Duivis,* Den Haag: Instituut voor Bouwrecht 2019.

[112] C.M. Straver e.a., *Harmonisatie van standaardvoorwaarden in de bouw,* Deventer: Kluwer BV en Samsom Uitgeverij NV, 1981, G.J. Scholten, 'Harmonisatie van Standaardvoorwaarden in de bouw. Bespreking van de hoofdstukken VI t/m IX over Aansprakelijkheid en risico', *BR* 1982, p. 277 en C.E.C. Jansen 2014.

[113] See the subprojects part of the Research Framework: a coherent and future-proof system of procurement and legal-administrative frameworks for construction, subproject I: cooperation, to be consulted via https://www.ibr.nl/onderzoekskader-een-coherent-en-toekomstbestendig-stelsel-van-aanbestedings-en-juridisch-administratieve-kaders-voor-de-bouw/

[114] See https://digigo.mett.nl/default.aspx and the sources mentioned there.

[115] Think of IP rights and other rights based on data, but given the circular and sustainable ambitions of Digigo it is also conceivable that other rights to data or (contractual) agreements about this may be important, and the rules of procurement law, see what is included in possible legal subjects in par. 4.3.

[116] Think of connecting to or being in line with the commonly used general terms and conditions in construction. For a number of relevant legal questions about data to be addressed, see e.g. Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020. Also M. Winfield, *Building Information Modelling: The Legal Frontier – Overcoming Legal and Contractual Obstacles,* SCL 2015.

[117] Ransijn & Spekkink 2019 and Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020.

[118] See e.g. Bruggeman, *Handboek Juridische aspecten van werken met BIM* 2020.

[119] See the Research Framework: a coherent and future-proof system of procurement and legal-administrative frameworks for construction, subproject I: cooperation, to be consulted via: https://www.ibr.nl/onderzoekskader-een-coherent-en-toekomstbestendig-stelsel-van-aanbestedings-en-juridisch-administratieve-kaders-voor-de-bouw/

[120] See already: I.S. van Milaan, *From BIM to Digital Twins: Towards a successful data exchange through public procurement. A case study research within the Dutch building industry,* TU Delft 2022.

[121] How are these obligations shaped in the various building organization forms and their general terms and conditions and in practice, how are they interpreted and explained in case law and arbitration and how does this relate to general law. What influences do we see in the reasoning and applications of these kinds of duties and what is the influence of the increase in data and information and the changing relationship on those duties.

[122] Within Architecture, too, there is of course a lot of attention for digitization in research and education, where the legal aspects also belong. See Meerjarenplan Bouwkunde 2021-2025, p. 10, p. 13, p. 20 and p. 35.

[123] F.A.M. Hobma, 'Bouwrecht doceren aan niet-juridische studenten', in: A.G. Bregman, E.M. Bruggeman, A.M.B. Chao & N. van Wijk – van Gilst, *Eindafrekening met pepernoten. Voor een onbetaalbare bijdrage aan het bouwrecht en beyond. Liber amicorum prof. mr. dr. Monika Chao-Duivis,* Den Haag: Instituut voor Bouwrecht 2019.

[124] Star Wars, Episode IV, A New Hope.

[125] https://starwars.fandom.com/wiki/The_Force/Legends

[126] Van Poelje *1961*, p. 17-18. See also what De Ru says about the role of the individual and interest

groups in the field of legal formation: H.J. de Ru, ‘Rechtsvorming en maatschappelijke organisaties’, *BR* 1989, p. 509-510.

[127] “Force-sensitive beings were able to tap into the Force to perform acts of great skill and agility as well as control and shape the world around them. Sometimes this ability was described as having a strong Force ‘aura’” https://starwars.fandom.com/wiki/The_Force/Legends

[128] Van Poelje *1961*, p. 19.

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