

Information as Property

by **Herbert Zech***

Abstract: Information is widely regarded as one of the key concepts of modern society. The production, distribution and use of information are some of the key aspects of modern economies. Driven by technological progress information has become a good in its own right. This established an information economy and challenged the law to provide an apt framework suitable to promote the production of information, enable its distribution and efficient allocation, and deal with the risks inherent in information technology. Property rights are a major component of such a framework. However, information as an object of property rights is not limited to intellectual property but may also occur as personality aspects or even tangible property. Accordingly, information

as property can be found in the area of intellectual property, personality protection and other property rights. This essay attempts to categorize three different types of information that can be understood as a good in the economic sense and an object in the legal sense: semantic information, syntactic information and structural information. It shows how legal ownership of such information is established by different subjective rights. In addition the widespread debate regarding the justification of intellectual property rights is demonstrated from the wider perspective of informational property in general. Finally, in light of current debates, this essay explores whether "data producers" shall have a new kind of property right in data.

Keywords: information as a property good; property rights; economic good; ownership of information; data producers

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A. Information as a Commodity: Semantic, Syntactic and Structural Information*

1 From a legal perspective the "nature" of information is far less important than the question of how information is treated as an object in everyday life and - closely associated with this - how information is treated as a commercial good or commodity. This is driven by and relevant to the development of information technology that not only enhanced our capabilities in handling information but also altered our view of information in everyday life. Therefore, before proposing the concept of semantic, syntactic and structural information, the influence of technological developments shall be briefly outlined.

I. How Technological Progress Influences our Perception of Information

2 The technological development of information

processing has its roots in very early human history.¹ Beginning with the development of language and scripture, followed by ever advancing printing presses on to punched cards in weaving machines, photography, telegraphs, telephones, sound recording, radio, TV, photocopying, and finally information technology; multiplication, storage, transfer and automated processing of information has become increasingly easier, more powerful and widespread.

1. Easier Multiplication of Information and the Loosening of its Ties to Physical Carriers

3 Scripture provided the first means of storing information other than the human mind. As a consequence, storing information has become increasingly simplified, especially with the advent of printing presses that allowed the multiplication

¹ One of the best accounts of technological and cultural developments influencing the handling of information is given by Levinson, *The Soft Edge, A Natural History and Future of the Information Revolution*, 1998.

of such information and eventually the development of modern information technology. The amount of information that can be stored on a physical carrier and distributed for a certain sum of money has been steadily increasing at an exponential rate. This has led to a loosening of the link between information and its physical carrier. Jon Bing wrote: “The computer has set information free. Traditionally, information has been chained in words to a page. Modern technology – especially computer based technology – has liberated the words from the medium. A text or a set of characters is more appropriately viewed as something separate, rather than a property of a page, a book, a stone slab or a film strip.”²

- 4 The latest development in this respect is the advent of cloud computing. Cloud computing finally severed the link between information and one single discernible physical object as an information carrier. Although information has to be stored on a physical carrier somewhere, the practical determination of such a carrier to specific information is no longer possible.

2. Easier Multiplication and the Relation between Information and Creator

- 5 Not only has the link between information and a physical carrier been weakened, but also the link between information and a human creator is no longer necessary. Whereas traditional methods such as writing and drawing required a human mind to attach information to a physical carrier, this has changed with technological development. A landmark within this development was the introduction of photography and sound recording which triggered legal reactions (reactions of the lawmakers) in many countries. Subsequently, photocopying and modern data processing were introduced. Nowadays the automated registration of all kinds of phenomena and storage of the resulting data is commonplace. Ranging from scientific measurements to audio and video recording devices and special applications like Google street view, the production of information (especially data) without creativity is of increasing economic importance.
- 6 Finally, with the development of artificial agents, the question arises how information that was neither produced by human creativity nor by the recording of natural phenomena shall be treated. One example of this debate is the question of how “software written by software” shall be protected.³

² Bing Journal of Media Law and Practice 1981, 219.

³ See De Wachter, CRI, 2010, 12; Paton/Morton, CRI, 2011, 8.

3. The Unimportance of Meaning

- 7 A further effect of modern information technology is that information - particularly electronically stored information - is perceived as an object without any regard to its meaning. A text is still a text even if it is nonsensical, although arguably a mere mass of coincidental letters might not be regarded a text. A file is treated as a file whether it contains proper code that can be processed by computers or not and whether it contains any useful meaning that can be understood by a human being or not.

4. Information Technology and the Relation between Information and a Recipient

- 8 Traditionally, information is understood as something being exchanged between a sender and a recipient in the act of communication. However, with the establishment of information technology software as a new kind of data where information can be widely exchanged, the classical understanding of information has been altered. Software is a kind of information which is meant to be received only by machines (i.e. computers), not human recipients. Software is a special type of data with the function of steering machines. Data can be understood as information encoded in a way that can be processed by machines comprising software and application data alike. Neither data nor software as a special form of data need to carry any specific meaning (see above 3.) for a potential human recipient.

5. Abstraction of Information as a General Trend

- 9 As shown above, technological developments have led to everyday use of information as something separate from a physical carrier, a human creator, a specific meaning or a potential human recipient. This trend of seeing information as something “on its own” and therefore as an object may be called abstraction of information. However, this leaves open the theoretical and practical questions concerning how information can be defined as an object without all these references. This necessitates a closer look into semiotics.

II. Three Levels of Talking about Information: Meaning, Signs and Medium

- 10 Semiotics demonstrates the exceptional importance of signs representing information.⁴ Abstraction as defined above can be seen as a practical trend to accept information as an object defined only by signs. The semiotic distinction between the semantic level of information (meaning), the syntactic level of information (signs and their relation with each other) and communication channel (on the physical level) leads to the distinction between content layer, code layer and physical layer. When talking about information transfer in modern information technology as proposed by Benkler and Lessig⁵ for instance, in the discussion about big data it is very important to distinguish between “raw” data and actual knowledge.⁶
- 11 Most importantly, from an IP lawyer’s perspective (and a practical perspective in general), this distinction can be applied to the definition of information as an object too.

III. Treating Information as an Object: Semantic, Syntactic and Structural Information

- 12 The distinction between content layer, code layer and physical layer provides a powerful tool for defining information which can be treated as an object: it reveals that information can be defined on the semantic level (information with a certain meaning), on the syntactic level (information represented by a certain amount of signs), or even by its physical carrier (information contained in a certain physical carrier or in a wider sense information represented by the structure of a physical object).

1. Semantic, Syntactic and Structural Information

- 13 Each of the three types of information can be found in everyday life - when we talk about the news, a story or the “content” of a book we refer to the semantic level. Handling a text or a file refers to the syntactic level. Finally, dealing with a CD, a printed book etc.

⁴ Eco, *A Theory of Semiotics*, 1978.

⁵ Benkler, 52 *Federal Communications Law Journal*, 2000, 561, 562; Lessig, *The Future of Ideas, The Fate of the Commons in a Connected World*, 2002, 23.

⁶ Silver, *The Signal and the Noise*, 2012, 13.

refers to the structural level. Of course the three levels are connected as meaning can be contained within a text and a text can be printed. Thus, the physical layer carries the syntactic layer and the syntactic layer the semantic layer. Nevertheless from an economic and legal perspective, each layer represents independent possibilities to define a certain amount of information.

- 14 In order to facilitate the description of information that is defined on the semantic, syntactic or structural level, I propose the terms semantic information, syntactic information and structural information. In economics, information is very often used in the sense of semantic information. To know something means having access to the semantic information. Accordingly, an invention (understood as applied knowledge) is also semantic information. Other examples are news, personal data, trade secrets, and genetic information. An important aspect of semantic information is that it can be correct or incorrect.
- 15 On a syntactic level, information is defined without meaning (i.e. abstract from any meaning) and therefore cannot be right or wrong but, when it comes to software, it can be functional or dysfunctional. Examples for syntactic information are texts, pictures (which represent whatever they depict and therefore they act as an amount of signs), sound recordings or any data (understood as information coded for machines instead of data about something which includes a semantic component). The act of translating meaning into a certain amount of signs can be called coding (code meaning the rule of translation). However, there is also a possibility of translating from the structural to the syntactic level (like in any kind of automatic measurement of recording), which can be understood as automated coding as well.
- 16 On the structural level, any kind of information carrier contains structural information. If a physical object carries syntactic information like a book, hard drive or a CD, its informational content is evident. However, even if a physical object does not contain any syntactic or semantic information, it nevertheless carries structural information that potentially can be detected.

2. Information Goods

- 17 Whenever information serves a certain use and can be transferred, it can also be addressed as a good. The definition of such goods is achieved in the same way information can be defined as an object in general. Therefore, information goods can also be divided in semantic, syntactic and structural information

goods. A news story can be sold as such, as a text containing the story or as a USB device storing the text containing the story. In the following section it will be demonstrated how this method of defining information objects and information goods can be used to analyse the construction of property rights.

B. Applying the Bundle of Rights Theory to Information

- 18 Since information is a much less clearly defined object than corporeal objects, property rights in information have to be carefully constructed as a bundle of rights. In addition, it should be considered that informational goods - at least semantic and syntactic information - are public goods in the sense that their use is non-exclusive and non-rival. Moreover, information as such is not depreciable, which is especially important for the justification of property rights to information.
- 19 Building on the standard categories of property rights: use (*usus*), enjoying the benefits of the use (*usus fructus*), changing form and substance (*abusus*) and transfer of the property three basic categories of rights to information can be distinguished: possessing information, using information and destroying information.⁷

I. Possessing Information: Access

- 20 The first category of information related activity that can be exclusively attributed to a right holder is information access. It equals the category of possession in tangible property.⁸ Possessing an object enables the owner to perform any kind of activity related to this object, especially to use it. Unlike processing a corporeal object, having access to information is both non-rival and non-exclusive. Therefore property rights (as well as contracts) regarding access to information should be constructed differently.

II. Using Information

- 21 The second category is information use. Although access to information is a necessary requirement for

⁷ The transfer of a property right is not regarded as a specific category of property like possessing, using or destroying. It belongs to a different level since it is not part of the activities exclusively assigned to the right owner but rather captures the question of the assignability of such a right on a higher level (or meta-level).

⁸ Cf. Rifkin, *The Age of Access*, 2000.

using information, the two aspects can be attributed differently. An example for this would be the difference between patents and copyright: whereas patents limit the use of information without limiting access (and on the contrary aim at distributing technical information among the public), copyright limits the information by limiting access (namely prohibiting the copying and distributing of copyrighted works).

III. Destroying Information: Integrity

- 22 The third category is the destruction of information. This can be achieved by altering syntactic information on the code level or by falsifying semantic information. Moreover, syntactical information can be destroyed completely by deleting it, that is by destroying every existing carrier (structural information) containing the specific syntactic information. Knowledge, that is semantic information in the human mind, cannot be destroyed - or at least it cannot be destroyed without violating the integrity of the persons who have access to it.

C. Legal Ownership of Information

- 23 As shown above, legal ownership of information ought to be constructed according to the bundle of rights theory, as the exclusive attribution of certain aspects or activities dealing with specific information (defined as an object, i.e. as semantic, syntactic or structural information).

I. Semantic Information: Patents and Personality Protection

- 24 Semantic information can be defined as actual or potential knowledge regarding an individual or other objects. Information concerning other persons is the object of personality rights. Whereas personality protection has its roots in the protection of a legal subject which cannot be commoditized, information about a person can be separated from the person and therefore be treated as an object. This also led to the distinction between personality protection on the one hand and the right to publicity on the other hand, which can also be assigned to other right holders. Informational aspects of personality can be data, pictures, voice recordings or genetic information. Such information can either be defined on a semantic level (a certain fact about a certain person) or on a syntactic level (photographic pictures, voice recordings, gene sequences). Both are attributed to the original right owner on

the semantic level, meaning they belong to the individual concerned.

- 25 A different mechanism of attribution can be found for semantic information regarding technical functioning (such information is protected in the form of inventions which are attributed to the inventor). Arguably one of the fundamental principles of classical intellectual property is that IP rights are conferred to the individual who creates information.
- 26 Trade secrets are another example of semantic information as an object of legal protection. Trade secrets are basically defined by their semantic connection with a company that can be embodied as a file (syntactic information) or a sheet of paper (structural information). However, the legal protection mechanism is different. Exclusivity is not established by attributing exclusive rights but pre-exists as a factual consequence of the secrecy. Trade secret protection acts as a legal intensifier of such factual exclusivity. The protection conferred is also incomplete as such secrets are not protected against independent recreation (especially in the case of technological knowledge) or in case they get disclosed.

II. Syntactic Information: Copyright and Design

- 27 The best example for syntactic information as an object of property rights are copyrighted works. According to the definition given in art. 9 (2) TRIPS, only expressions are protected, not ideas. These expressions are syntactic information as opposed to the free content (ideas) which qualifies as semantic information. Like patents the exclusive right is conferred upon the creator. Among the rights conferred is not only the use (excluding the mere perception of a copyrighted work) but also the granting of access to others.
- 28 Similarly design protection confers exclusive competences with regard to syntactic information, i.e. the design, to its creator. However, the information is not protected per se, but only when used as a design, i.e. by making articles to the design or creating a design document in order to make such articles not by distributing a design document (cf. art. 228 (6) UK-CDPA).

III. Structural Level: Tangible Property

- 29 Somewhat surprising also property rights in corporeal things (real property rights) confer legal

exclusivity with respect to the information contained within. The possession of a data carrier ensures access to the information. Property protection for the carrier - especially the possession of the carrier - indirectly protects access to the information. Moreover the exclusive right to alter and destroy a data carrier indirectly entitles the right holder to prevent the alteration or destruction of the contained information. This mechanism is still of great importance for the protection of data although it encounters limitations when property rights and data usage divert (like working on somebody else's computer) or a specific data carrier is difficult to discern (for instance in cloud computing).

- 30 The practical relevance of corporeal property tends to use it as a mechanism for the attribution of incorporeal aspects. Even real estate has been used as an informational property right.⁹ The question could be posed regarding whether the picture of a building belongs to the land owner, especially when the building can only be perceived from within the premises. However this has to be strongly refuted since corporeal property is tailor-made for rival and exclusive uses due to the corporeality of its object. The picture of a building is classical intellectual property and may be subject to the architect's copyright. If it contains (semantic) information about the owner, its distribution may conflict with personality protection. Nevertheless, it should be strictly detached from the question regarding who the owner of the building is.

D. Justifying Legal Ownership and Creation of New Property rights

I. Justification

- 31 The discussion regarding the justification of IP covers a large part of information as property. The classification of information goods adds only a small argument: semantic information as a property causes greater losses to the public domain than syntactic information. Having an exclusive right to use semantic information (e.g. certain knowledge) gives a greater range of exclusive competences than having an exclusive right to use syntactic information (e.g. a certain text). A text is only one possibility to embody certain knowledge, while many others are left free. Therefore, creating property rights within semantic information requires a stronger justification than creating property rights within syntactic information. For instance, copyright becomes more

⁹ See the German Federal Court of Justice: BGH V ZR 44/10, V ZR 45/10, V ZR 46/10 (17 Dec 2010) Preußische Schlösser und Gärten; V ZR 14/12 (1 Mar 2013).

problematic if copyrighted works and the scope of protection shifts from mere expression (syntactic information) to content (semantic information, like the case of a novel which under the German “fabric doctrine” is protected if many details are imitated¹⁰).

- 32 Accordingly, real property rights, which assign structural information are even less detrimental to the public domain than property rights assigning syntactic information. This may be one of the reasons why the justification of real property rights is much less disputed than the justification of IP. Moreover justifying real property can be based on different arguments such as the “tragedy of the commons”¹¹ instead of the incentive paradigm or the creation of markets in public goods. Unlike semantic and syntactic information, structural information is identical with the physical object and therefore not a public good. Assigning structural information thus only means assigning competences that are already exclusive and rival. Factually exclusive competences are legally allocated; no new exclusivities are legally created.

II. Data Collection or Generation as a Reason for Property Protection?

- 33 The concept of information also allows a more precise description of the creation of information and informational goods either by a creative mind or by automated processes. Classical IP protects information created by human minds like inventions, works of art or designs. However, with the advent of big data applications, the question whether mere investments in information (like the creation of a database, Directive No. 96/9/EC) or the generation of information by automated sensors (like in smart cars or complex production machines) shall lead to exclusive rights.
- 34 The issue of a “data property” is currently hotly debated.¹² In fact, some good reasons exist for creating a new exclusive right to use data (defined as syntactic information generated by machines with automated sensors) for big data analyses pertaining to the person economically maintaining the machine. The reason is found not so much in an incentive to generate data or in the creation of a market for data (like in classical IP) but in ensuring a fair allocation of the profits generated by analysing the data. Instead of relying on existing factual ownership and secrecy, a clear property rule can provide the framework for a functioning data economy (as also envisaged by the

EU commission¹³).

E. Trading Information Goods

- 35 The concept of information goods also highlights the function of exclusive rights in trading these goods. Instead of trading the carrier (like a CD) the legal framework as well as the individual contract should focus on the information good itself (like software). Therefore the CJEU’s jurisprudence regarding software resales (UsedSoft¹⁴) is problematic. The doctrine of exhaustion serves to streamline IP rights to the free trade of corporeal goods. If no corporeal goods are involved anymore, the doctrine should be abandoned. Instead, IP law provides the means for trading exclusive competences by trading the rights or granting licenses. Therefore, if it is economically desirable to enable the resale of software, e-books or audio-books this should be achieved by adapting the legal rules on licensing and contract law. For instance, it could be argued that it is one of the main obligations of a purchase contract to deliver a resalable good. At least under German doctrine, this can be understood as one of the typical features of a purchase contract which cannot be waived using general clauses.

F. Conclusion

- 36 The three tier model of communication as proposed by Benkler may well be used to analyse information as an object of property rights. This analytical tool allows a clear distinction between property rights in semantic information, syntactic information and structural information (real property rights). The distinction has consequences for the construction and justification of property rights as well as the contractual exchange of information.

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10 Cf. Oechsler, GRUR, 2009, 1101, 1103 seqq.

11 Hardin, 162 SCIENCE, 1968, 1243, 1244.

12 Hoeren, MMR, 2013, 486; Dorner, CR, 2014, 617; Zech, CR, 2015, 137.

13 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Digital Single Market Strategy for Europe, 6 May 2015, COM(2015) 192 final.

14 CJEU C-128/11 (3 Jul 2012) - UsedSoft v. Oracle. Cf. Zech 5 ZGE / IPJ, 2013, 368.