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# Digital Information Law – Meaning, Challenge, and Future

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## Introduction

Mankind has evolved substantially, especially in recent decades with the construction of new digital<sup>1</sup> societies, as well as information,<sup>2</sup> data,<sup>3</sup> and

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1. Digital is a complex, combination, or contestable term. On the meaning of digital, see, e.g., Karl Dörner & David Edelman, *What “Digital” Really Means*, MCKINSEY & CO. (July 2015), <https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/what-digital-really-means>. Digital can be used in different ways and for the purposes of this paper can be understood to refer, inter alia, to the use of binary counting systems, more complex computer coding, other use applications, possible digital advantage, and digital impact or effect. These can be summarised in terms of expression, equation, employment, expediency, and effect. See also *Data in the Computer*, URI, <https://homepage.cs.uri.edu/faculty/wolfe/book/Readings/Reading02.htm> (last visited Jan. 8, 2020). Binary counting (using 0 and 1) was originally used by Gottfried Von Leibniz in *Explication de l’Arithmetique Binaire* in 1703. See generally GOTTFRIED VON LEIBNIZ, *EXPLICATION DE L’ARITHMETIQUE BINAIRE [EXPLANATION OF BINARY ARITHMETIC]* (1703). Binary counting was later developed by the English mathematician George Boole and later by the American mathematician Claude Shannon. See generally GEORGE BOOLE, *AN INVESTIGATION OF THE LAWS OF THOUGHT ON WHICH ARE FOUNDED THE MATHEMATICAL THEORIES OF LOGIC AND PROBABILITIES* (Cambridge University Press 1958) (1854); Claude Shannon, *A Mathematical Theory of Communication*, 27 BELL SYS. TECHNICAL J. 379, 379 – 423 (1948). Computers generally use bits (0 or 1), nibbles (4 bits), bytes (8 bits), and octets (16 bits) as counting systems and hexadecimal (16-digit based) coding. See *Data in the Computer*, *supra*. Decimal systems may then be constructed for various numeric and machine purposes and in different uses and applications. *Id.* A number of advantages can also be understood specifically in terms of ease of copying or reproduction, amplification, storage, transmission, and scaling and associated cost, speed, and efficiency benefits. See generally *id.* The term digital can also be used more generally to refer to the economic or social impact (or effect) of such digital systems and applications. See Joseph Kennedy, *Big Data’s Economic Impact*, COMMITTEE FOR ECONOMIC DEVELOPMENT, <https://www.ced.org/blog/entry/big-datas-economic-impact> (last visited Jan. 8, 2020). These meanings are then connected and polysemous rather than disconnected or homonymous. The term digital may also be considered to constitute an essential contestable concept in social science study. See Walter Bryce Gallie, *Essentially Contestable Concepts*, 56 PROCEEDINGS OF THE ARISTOTELIAN SOCIETY 167, 167 – 198 (1956). While its use is generally more technical than evaluative, digital can still be used to include a value or judgment element. *Id.* On contestability, see *infra* notes 26 – 28 and accompanying text.

2. For purposes of this paper, information is defined as any statement or point of fact, opinion, or law. On the meaning of information, see *infra* Section I. The “information economy” refers to a market system based on information products and services.

3. For purposes of this paper, data is defined as information collected or processed within specific limits, guidelines, parameters, constraints, or conditions. See *infra* Section I. The so-

knowledge<sup>4</sup> economies across the world. People have entered a new era of mass information collection, processing, and dissemination, including through new social communication and exchange. Modern markets, government systems, and wider communities and societies are essentially information- and information-exchange-based. Information has become an increasingly valuable and essential feature within modern economies.<sup>5</sup> A number of significant difficulties and uncertainties nevertheless arise in terms of understanding and managing this in legal and regulatory terms.

Financial markets have undergone substantial change and development in recent years. Much of this has been driven by new digital and technological innovation. We are possibly at the beginning of a new financial landscape and a new financial world. Unfortunately, more traditional legal examination and analysis have not evolved with these other markets, technological advances, and changes. It is time for a parallel revolution in legal language, approach, and analysis.

Financial markets have most recently been disrupted by the sudden explosion and growth in new Information Technology (InfoTech),<sup>6</sup> Data Technology (DataTech),<sup>7</sup> Financial Technology (FinTech),<sup>8</sup> and Regulatory

called data economy has not been separately defined formally, although it can be understood to refer to the management of processed data in personal, commercial, financial, and government systems. For a discussion on the meaning of data, see *infra* Section 3. The Data Economy is associated with the rise in modern electronic data management systems and more recently with Big Data analytics and the Internet of Things (IoT). See, e.g., ALBERT OPIER ET AL., *THE RISE OF THE DATA ECONOMY: DRIVING VALUE THROUGH INTERNET OF THINGS DATA MONETISATION 2* (2016), <https://www.ibm.com/downloads/cas/4JROLDQ7>. The European Commission has included the construction of a data economy as part of its larger European Digital Single Market strategy. *Building a European Data Economy*, at 2, COM (2017) 9 final (Jan. 10, 2017); *Commission Staff Working Document on the Free Flow of Data and Emerging Issues of the European Data Economy*, at 5, COM (2017) 2 final (Oct. 1, 2017).

4. Knowledge is defined for the purposes of this paper as referring to understanding, appreciation, or awareness. See *infra* Section I. The knowledge economy is concerned with the use of knowledge or human capital to generate additional economic value. As an example, the term was used by Peter Drucker in *THE AGE OF DISCONTINUITY* (Transaction Publishers, 9th ed., 2011) (1969).

5. See CARL SHAPIRO & HAL R. VARIAN, *INFORMATION RULES* 6 (1998).

6. See Margaret Rouse, *Information Technology (IT)*, SEARCH DATA CTR., <https://searchdatacenter.techtarget.com/definition/IT> (last visited Jan. 8, 2020). Information technology can be understood to refer to any device or process involving the transmission, storage, or management of any information source. *Id.* While InfoTech would include any form of historical communication, this has become of even more significance in recent decades with the expansion of telecommunications and mobile telephony and with the massive expansion in social media platforms in recent years. *Id.* For discussion on technological development, see *infra* Section II.

7. The term DataTech is used in this paper to refer to any new technology involving the collection, analysis, storage, retrieval, or transmission of processed data. Data refers to information collected and processed within pre-determined and specific limits, guidelines, or parameters. For more discussion on the meaning of information, knowledge, and data, see *infra* Section III.

Technology (RegTech) markets and devices.<sup>9</sup> Reference may also be made to the use of technology in the provision of government services (GovTech) and in legal services (LawTech). All of this has developed against a background of digitalisation, personalisation, socialisation, and democratization and the globalisation and virtualisation of the Internet and society. This has been supported by substantial developments in computing, telephony and mobile telephony, the Internet, and social media with InfoTech, DataTech, and most recently FinTech.<sup>10</sup>

This is expected to result in major disruption to many traditional financial sectors, business practices, and models.<sup>11</sup> Incumbent institutions are having to deal with high maintenance or replacement costs of legacy systems and processes while new start-up entities and platforms are bringing in innovative new structures and programmes. All of this has created significant new challenges with regard to legal response and reform.

Many of these new areas of innovation are based on digital data and large volumes of aggregate or Big Data.<sup>12</sup> Data collection has grown massively in recent years and is expected to grow further, especially with the construction of the Internet of Things (IoT).<sup>13</sup> It is understood that a 175 zettabyte world will be created by 2025.<sup>14</sup> Scientific and media attention has recently

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8. See generally George Walker, *Financial Technology Law – A New Beginning and a New Future*, 50 INT'L LAW. 137 (2017).

9. InfoTech, DataTech, and FinTech constitute forms of syllabic abbreviation used or developed for the purpose of this paper. See generally Walker, *supra* note 8. See also George Walker, *Regulatory Technology (RegTech) – Construction of a New Regulatory Policy and Model*, 36 BANKING & FIN. L. REV. (forthcoming Dec. 2020) [hereinafter Walker on RegTech]; George Walker, *BigTech, StableTech and Libra Coin – New Dawn, New Challenges, New Solutions*, 35 BANKING & FINANCE LAW REVIEW (forthcoming July 2020).

10. See Justine Cassell, *By 2030, This Is What Computers Will Be Able To Do*, WORLD ECONOMIC FORUM (Dec. 5, 2016), <https://www.weforum.org/agenda/2016/12/by-2030-this-is-what-computers-will-do/>.

11. See Walker, *supra* note 8.

12. On aggregate or Big Data, see *infra* Section IV.D.

13. See Bernard Marr, *How Much Data Do We Create Every Day? The Mind-Blowing Stats Everyone Should Read*, FORBES (May 21, 2018), <https://www.forbes.com/sites/bernardmarr/2018/05/21/how-much-data-do-we-create-every-day-the-mind-blowing-stats-everyone-should-read/#c241b1f60ba9>.

14. See Andrew Cave, *What Will We Do When The World's Data Hits 163 Zettabytes in 2025?*, FORBES (Apr. 13, 2017), <https://www.forbes.com/sites/andrewcave/2017/04/13/what-will-we-do-when-the-worlds-data-hits-163-zettabytes-in-2025/#3ee9f672349a>. The Global Datasphere increased from 2.8 zettabytes (a trillion gigabytes) in 2012 to twenty-five zettabytes in 2017 and thirty-three zettabytes in 2018. See generally John Burn-Murdoch, *Study: Less Than 1% of the World's Data is Analysed, Over 80% is Unprotected*, THE GUARDIAN (Dec. 19, 2012), <https://www.theguardian.com/news/datablog/2012/dec/19/big-data-study-digital-universe-global-volume>. It was estimated to grow to 175 zettabytes by 2015. See generally Charles Arthur, *What's a Zettabyte? By 2015, the Internet Will Know, Says Cisco*, THE GUARDIAN (June 29, 2011), <https://www.theguardian.com/technology/blog/2011/jun/29/zettabyte-data-internet-cisco>. Sixty percent of the world's data is estimated to be generated by businesses in relation to life critical applications, embedded systems, and the Internet of Things (IoT). See Cave, *supra*. People will connect and interact with connected devices 4,900 times per day and every 18

focused on the importance of data and the impact of digital data collection and use across many spheres of business and social engagement.<sup>15</sup> We have created a new digital datasphere or databiome. Many commentators refer to this new faith in digital informational as Dataism.<sup>16</sup> Dataism has been described as replacing humanism, which supplanted religion as one of the primary pre-determinants of human conduct and action.<sup>17</sup> Decision taking has become increasingly based on instinct and emotion, rather than strict rationality, with big data collection and Dataism to replace this with new digital algorithms.<sup>18</sup>

Specific difficulties arise in connection with the nature of information in new digital ecosystems and the definition and classification of digital rights, assets and claims. Information is a difficult concept which can be used in

seconds. Tricia Morris, *20 Data and Analytics Predictions Through 2025*, MICROSTRATEGY (Apr. 16, 2019), <https://www.microstrategy.com/us/resources/blog/bi-trends/20-data-and-analytics-predictions-through-2025>. Over a quarter of data will be created in real time. *Id.* Less than 1 percent of data created is stored with less than 15 percent being stored in future. Alex Woodie, *Only a Fraction of 160 Zettabyte "Datasphere" to Be Stored*, DATANAMI (Apr. 25, 2017), <https://www.datanami.com/2017/04/25/fraction-160-zettabyte-datasphere-stored>. Only 0.5 percent was used for analysis. Bernard Marr, *Big Data: 20 Mind-Boggling Facts Everyone Must Read*, FORBES (Sept. 30, 2015), <https://www.forbes.com/sites/bernardmarr/2015/09/30/big-data-20-mind-boggling-facts-everyone-must-read/#2e02899617b1>. See generally John Gantz & David Reinsel, *The Digital Universe in 2020*, IDC (December 2012), <https://www.cs.princeton.edu/courses/archive/spring13/cos598C/idc-the-digital-universe-in-2020.pdf>; David Reinsel et al., *Data Age 2025: The Digitization of the World From Edge to Core*, IDC (Nov. 2018), <https://www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf>.

15. See Marr, *supra* note 13.

16. See, e.g., Steve Lohr, *Dataism: The Big Data Revolution* (2016).

17. Humanism became important in Europe during the Renaissance from the fourteenth century and then again in the eighteenth and nineteenth centuries and represented a shift in thought with ideas being based on science and investigation rather than religion and revelation. See generally TONY DAVIES, *HUMANISM* (1997). Humanism was used to support religious belief and then later replace it. See generally *id.*

18. See generally Petr Hájek, *Beyond Data-ism: Big Data and the Human Intuition*, PROFINIT (Aug. 16, 2019), <https://profinet.eu/en/blog/beyond-data-ism-big-data-and-the-human-intuition>. Humanists justify belief in terms of personal opinion, which is based on instinct, with science subsequently confirming that this is attributable to biochemical reactions and millions of years of evolution. See Fred Edwards, *The Humanist Philosophy in Perspective*, AM. HUMANIST ASS'N, <https://americanhumanist.org/what-is-humanism/humanist-philosophy-perspective/> (last visited Jan. 8, 2020). Big data collection will allow these natural or chemical algorithms to be supported or supplanted by new digital algorithms. See, e.g., Yuval Noah Harari, *Yuval Noah Harari On Big Data, Google And The End Of Free Will*, FIN. TIMES (Aug. 26, 2016), <https://www.ft.com/content/50bb4830-6a4c-11e6-ae5b-a7cc5dd5a28c>. Harari summarises human history in terms of the cognitive revolution, agricultural revolution, unification and scientific revolution, and with the dominance of man being explained in terms of the ability of communities to cooperate in large numbers flexibly and to control ideas through imagination. See generally YUVAL NOAH HARARI, *SAPIENS* (Yuval Noah Harari et al. trans., HarperCollins Publishers 2015) (2011). Harari predicts that technology will over time challenge mankind and create a form of Homo Deus (human God). See generally YUVAL NOAH HARARI, *HOMO DEUS* (Yuval Noah Harari trans., HaperCollins Publishers 2017) (2015).

different ways with different meanings.<sup>19</sup> The nature of information also has to be considered with other related terms such as data, knowledge, ideas, language, and communication. A number of different types of information can be identified. Information can be valued in different ways. A number of separate rights and interests can also be created which arise in the context of protecting information.<sup>20</sup>

All of this becomes of specific importance in the banking and financial area due to the fact that banks and other financial institutions manage accounts on behalf of customers in which information and data is held.<sup>21</sup> A significant amount of personal data is collected to support these accounts either for general record, credit assessment, or more specific money-laundering purposes.<sup>22</sup> Banking and financial services have increasingly become customer information- and data-based.<sup>23</sup> Modern financial services can, to a significant extent, be considered to constitute a data processing or managing industry at its core.<sup>24</sup>

Information is of fundamental importance although it has received less relative attention in terms of law and regulation. The purpose of this paper is to construct a provisional or experimental examination of information and closely related concepts in modern markets and societies. The objective is not to draw any firm conclusions at this stage but to promote examination and debate from a legal and regulatory perspective. The nature of information is considered in further detail with related ideas including data, knowledge, ideas, and archives. A series of connected or dependent definitions are constructed, and different types of information and information value are identified. The study of information across related fields or disciplines is reviewed. The nature of information as property is considered in further detail, with related rights identified to explain the various laws and regulations that apply in this area. The effect of this is to create a new series of information and data theories in law. Each of these principal areas is then reviewed in turn. A series of provisional comments and conclusions are drawn with some final closing comments.

## I. Digital Information

The term information is used in many different contexts with separate meanings and intent. The difficulty with the multiplicity of uses of the term information is that it creates confusion in the absence of further definition

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19. See discussion *infra* Sections II and III.

20. See discussion *infra* Section IV.

21. See Christian Ball, *Why Data Has Become Banks Most Important Commodity*, GLOBAL BANKING & FIN. REV. (July 28, 2017), <https://www.globalbankingandfinance.com/why-data-has-become-banks-most-important-commodity/>.

22. See *id.*

23. See *id.*

24. See *id.*

and specification.<sup>25</sup> Information is a complex, combination, or contestable concept.<sup>26</sup> Information is more of a technical than evaluative term, although it may still be considered to constitute an essentially contested concept with some separate value or qualitative meaning.<sup>27</sup> It is in any case necessary to define information clearly and all key related references in terms of law and regulation.<sup>28</sup>

Many aspects of modern economics and law are information based, although this and other related key terms have not been clearly defined. For the purpose of this paper, information can be considered to constitute any single point or statement of fact, opinion, or law. Fact and law are distinct in so far as law creates legal rights in accordance with the judicial or legislative framework applicable to any particular society.<sup>29</sup>

Information is distinct from data, which is defined to refer to information collected or processed within specific limits, guidelines, parameters, constraints, or conditions.<sup>30</sup> Data is structured or controlled information.<sup>31</sup> Knowledge can then be understood to refer to understanding, appreciation, or awareness.<sup>32</sup> This is essentially processed information or data which can

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25. Common or continuous use can create confusion and uncertainty especially in relation to terms with an apparent, clear meaning. This may be described in terms of a falsity or a fallacy of familiarity, which can create defective understanding and false knowledge or meaning.

26. For purposes of this article, contestable is used to refer to and is correlated with separate or conflicting meanings. See *supra* note 1 and accompanying text (regarding the contestable nature of digital data).

27. Essentially contested concepts were identified by the Scottish social theorist, Walter Bryce Gallie (1912 – 1998), in 1956. Gallie, *supra* note 1. Essentially contested concepts referred to a term or notion that had more than a single meaning with conflicting qualitative or evaluative opinions. *Id.* This applies with regards to polysemic terms that have multiple meanings based on different underlying units of meaning (semes) and atomic or indivisible points of meaning (sememes). *Id.* Gallie developed a set of seven conditions to identify an essentially contested concept. *Id.* at 180. See Barry Clarke, *Eccentrically Contested Concepts*, 9 BRIT. J. POL. SCI. 122, 125 (1979) (explaining the difference between contested and contestable).

28. See generally Jonathan (Yoni) Schenker & Craig A. Newman, *Part I: A Closer Look at California's New Privacy Regime: The Definition of "Personal Information,"* PATTERSON BELKNAP (Apr. 9, 2019), <https://www.pbwt.com/data-security-law-blog/part-i-a-closer-look-at-californias-new-privacy-regime-the-definition-of-personal-information>. While information may not be considered to constitute an essentially contested concept, related terms, such as data rights, data privacy, and freedom of expression, may constitute an essentially contested concept. See Clarke, *supra* note 27.

29. Angela Fernandez, *An Object Lesson in Speculation: Multiple Views of the Cathedral in "Leaf v. International Galleries,"* 58 UNIV. TORONTO L. J. 481 (2008). Law and fact may be considered to be indistinguishable from a non-legal perspective although in terms of legal analysis, a strict distinction is drawn between points of fact and law. See *id.* A legal representation, for example, generally consists of a statement of fact rather than of opinion or law. See *Leaf v. International Galleries* [1950] 2 K.B. 86 (C.A.).

30. See *supra* note 3 and accompanying text.

31. *Id.*

32. Shannon Kempe, *The Data – Information – Knowledge Cycle*, DATAVERSITY (Nov. 14, 2013), <https://www.dataversity.net/the-data-information-knowledge-cycle>.

be used to secure some identifiable policy objective or purpose.<sup>33</sup> Ideas can be considered to constitute mental representations of facts, opinions, or other intellectual abstractions.<sup>34</sup> This may include information, data, and knowledge. Ideas effectively bridge the intellectual and physical worlds.<sup>35</sup> Records or archives refer to stored, accumulated, or assembled information, or data held over time in some protected form.

Language can be understood to consist of any set of characters, symbols, gestures, or sounds used to convey meaning. Communication is concerned with the transfer of information, data,<sup>36</sup> or ideas. Information may be based on language and used to convey or communicate meaning, or it may simply represent statistical results, outputs, or values. Meaning is understood in terms of intent or sense.

Information is a social or statistical creation and represents intellectual or statistical content.<sup>37</sup> This may arise naturally or form the basis of expression, communication, and exchange.<sup>38</sup> Different types of information may be distinguished. Information may have an intended meaning or sense or have no meaning. It may carry sense or only represent arbitrary results or outputs. It may be created through individual effort or generated for communication purposes. Information may separately only represent descriptive effects of natural phenomena or the statistical results of scientific

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33. *Id.*

34. John Locke defined ideas in terms of understanding in *An Essay Concerning Human Understanding*. See generally JOHN LOCKE, AN ESSAY CONCERNING HUMAN UNDERSTANDING (1689). Ideas in philosophy include concrete ideas (connected with a specific referent) and abstract ideas (abstracta) from Plato's Theory of Forms. See, e.g., PLATO, THE SEVENTH LETTER 341b – 345c. Ideas may either arise as a result of experience, perception, or sensation, or from innatism (natural pre-provision) or nativism (genetics or cognition). See generally Coulibaly Yacouba, *Critique of John Locke Objection to the Innate Ideas*, 6 OPEN J. PHIL. 302 (2016). Locke and David Hume were empiricists, and Plato and Rene Descartes were innatists. See generally DAVID HUME, A TREATISE OF HUMAN NATURE (1738); DESCARTES, MEDITATIONS ON FIRST PHILOSOPHY (Michael Moriarty trans., Oxford Univ. Press 2008) (1641).

35. Information and ideas could be considered in ontological terms or terms of existence. See JOANNA BENJAMIN, INTERESTS IN SECURITIES (2000). The known parameters of existence can then be summarised in terms of the physical world and mental ideas, as well as things, in the form of property and obligations, and actions or legal remedies and protections. *Id.* The trinity of persons, things, and actions corresponds with the core legal classification or taxonomy adopted by Gaius and Justinian, to which the physical and intellectual spheres can be added. *Id.* Philosophy itself can be structured in terms of ontology or existence, knowledge or epistemology, political philosophy, moral philosophy, and aesthetics. See *Philosophy*, NEW WORLD ENCYCLOPEDIA, <https://www.newworldencyclopedia.org/entry/Philosophy> (last visited Jan. 7, 2019).

36. See Kempe, *supra* note 32. Information subject to any formal selection, collection, collation, ordering, or presentation process becomes structured and would constitute data. *Id.* Raw data may be understood to refer to original data without meaningful content. *Id.*

37. See *Information*, STAN. ENCYCLOPEDIA OF PHIL., <https://plato.stanford.edu/entries/information> (last updated Dec. 14, 2018).

38. *Id.*



or mathematical observation, which may be referred to as raw information.<sup>39</sup> Information may be non-structured or structured, which creates data. Information may be fixed or static, which is not transferred, or dynamic and used for communication or exchange purposes. Information may be understood to include sound where this involves the expression or transfer of meaning, such as with speech, singing, or music. Other sounds without meaning may simply be classified as noise.

Five further specific types of information may then be identified. Information may be private or public and held by private, corporate, or public bodies. Information may be subject to some form of non-disclosure obligation either in the form of contractual or other legal privacy or confidentiality requirements or for trade or official purposes. This may be understood in terms of private, trade, and official secrets. Information may be subject to some form of statutory control such as in the form of the European Union's General Data Protection Regulation<sup>40</sup> and the U.K. Data Protection Act 2018, intellectual property laws, or other computer protection measures. Information may also be subject to separate constitutional protection, such as with the right to free speech in the United States,<sup>41</sup> or subject to convention, such as the European Convention on Human Rights.<sup>42</sup>

Separate types of value may also be identified. Information may have personal value or attachment, corporate worth, or be of government and political relevance. It may have a separate use or utility function or significance. It may have separate value in terms of providing a raw statistical or historical record of other physical or scientific phenomena as noted. If this is collected within a controlled or structured environment, it will become data.

Other data-related terms may also be distinguished. Data architecture refers to the policies or standards governing the overall framework within which data is held.<sup>43</sup> Data archaeology involves the recovery of data from older formats or media.<sup>44</sup> Different types of data processing may also be distinguished. This includes data mining,<sup>45</sup> curating,<sup>46</sup> aggregating,<sup>47</sup>

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39. Raw information may consist of any physically generated output or statistical description. Kempe, *supra* note 32. Where this is controlled or structured in any way, this will produce data. *Id.* Any form of managed observation will also produce data. See discussion *supra* note 3.

40. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation), 2016 O.J. (L 119) 1 [hereinafter GDPR].

41. See discussion *infra* Section IV.C.2.

42. See discussion *infra* Section IV.C.

43. See Michelle Knight, *What is Data Architecture?*, DATAVERSITY (Jan. 8, 2018), <https://www.dataversity.net/what-is-data-architecture>.

44. See *Data Archaeology*, TECHOPEDIA, <https://www.techopedia.com/definition/28031/data-archaeology> (last visited Jan. 8, 2020).

45. Data mining involves the examination of large data sets to identify patterns or meaning. Data mining includes text mining (or statistical pattern learning), sequential (chronological)

scraping,<sup>48</sup> and wrangling or munging.<sup>49</sup> Data integration involves the collation of data from different sources and may be subject to data transformation which converts it from one format to another.<sup>50</sup> Data cleansing involves the removal of defective or corrupt code.<sup>51</sup> Data warehouses are used to collect and hold large amounts of data from different sources using an operational data store (ODS).<sup>52</sup> Data decay or degradation is concerned with the loss of data or data readability through mechanical or logical failures.<sup>53</sup>

## II. Digital Information Study

Information study is a complex and inter-disciplinary area. A significant amount of material has been published from a number of perspectives. Basic information theory examination began with the construction of a mathematical theory of communication in 1948 by American mathematician, Claude Elwood Shannon (1916 – 2001).<sup>54</sup> Information has also been examined from a philosophical, economic, linguistic, and

mining, process mining (or automated business process discovery (ABPD)), and intention mining. Mining may involve cluster analysis to identify object groups within larger data fields. See generally PANG-NING TAN, *INTRODUCTION TO DATA MINING* (2018); JIAWEI HAN, *DATA MINING: CONCEPTS AND TECHNIQUES* (2012); NON YE, *DATA MINING: THEORIES, ALGORITHMS, AND EXAMPLES* (2014).

46. Data curation involves the organisation and management of data through collection, presentation and archiving on a controlled basis. Michelle Knight, *What is Data Curation*, DATAVERSIY (Dec. 25, 2017), <https://www.dataversity.net/what-is-data-curation/>.

47. See generally *Data Aggregation*, IBM, [https://www.ibm.com/support/knowledgecenter/en/SSBNJ7\\_1.4.2/dataView/Concepts/ctnpm\\_dv\\_use\\_data\\_aggreg.html](https://www.ibm.com/support/knowledgecenter/en/SSBNJ7_1.4.2/dataView/Concepts/ctnpm_dv_use_data_aggreg.html) (last visited Jan. 8, 2020) (explaining that data aggregation involves the collection of data and re-presentation in a summary or specific structured form).

48. *What is Data Scraping and How Can You Use It?*, TARGETINTERNET, <https://www.targetinternet.com/what-is-data-scraping-and-how-can-you-use-it/> (last visited Jan. 8, 2020) (reporting that scraping is the extraction of information or data from other programmes or from other websites more generally).

49. See Mike Thuber, *What is Data Wrangling and Why Does it Take So Long*, ELDER RESEARCH (Apr. 6, 2018), <https://www.elderresearch.com/blog/what-is-data-wrangling>. Data wrangling or data munging is the process of transforming raw data into a more structured form for further processing. *Id.*

50. . See Keith D. Foote, *The Fundamentals of Data Integration*, DATAVERSIY (Dec. 12, 2019), <https://www.dataversity.net/the-fundamentals-of-data-integration/>.

51. . See *Data Cleansing*, EXPERIAN, <https://www.edq.com/glossary/data-cleansing/> (last visited Jan. 8, 2020).

52. Frank Hayes, *The Story So Far*, COMPUTERWORLD (Apr. 15, 2002), <https://www.computerworld.com/article/2588199/the-story-so-far.html>. Data marts are specific subject holding points within larger data warehouses. *Id.* The first database management system (DMS) was constructed by Charles Bachman at General Electric Co in 1961. *Id.* Data warehouses were originally developed by Barry Devlin and Paul Murphy at IBM in 1988. *Id.*

53. Li Sheng Lance, *What Is Data Decay and How Does It Affect Your Business?*, TECH IN ASIA (July 21, 2015), <https://www.techinasia.com/talk/data-decay-affect-business>.

54. See generally Shannon, *supra* note 1.

computer science perspective, among others. Some of the principal observations and conclusions drawn are considered below.

### A. INFORMATION STUDY AND PHILOSOPHY

The study of information has had a complex history. The history of information review and the philosophy of information have generally moved from an examination of forms (and the nature of ideas), to sensation, rationalism, empiricism, the mathematics of communication, and modern restatements. Early Greek and Roman writers considered knowledge in terms of forms,<sup>55</sup> though this approach was reassessed by medieval scholars and extended to include, *inter alia*, sensation and perception.<sup>56</sup> The early modern period was dominated by the division between rationalism, with innate knowledge, and empiricism based on experience and *posteriori* rather than *a priori* knowledge which marked the beginning of modern scientific methodology.<sup>57</sup>

Language and communication were restated in mathematical terms with the development of cyphers and decipher technologies for military purposes during the first and second world wars.<sup>58</sup> The study of information then

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55. 6 THE ENGLISH CYCLOPÆDIA 457 (1861). Information was examined in terms of forms by Ancient Greek writers including Plato and Aristotle and was closely associated with ontology, epistemological, and mathematics from the earliest times. *See, e.g., Information*, STAN. ENCYCLOPEDIA OF PHIL., <https://plato.stanford.edu/entries/information> (last updated Dec. 14, 2018).

56. Information as *informatio* or *informare* was studied by medieval writers such as Augustine of Hippo, Avicenna, John Locke, Thomas Aquinas, and Duns Scotus. *See generally, e.g., AUGUSTINE, DE TRINITATE XI [ON THE TRINITY: BOOK XI]* (Kevin Knight ed., Arthur West Haddan trans., New Advent 2017) (c. 418); EDMUND HILL, ST. AUGUSTINE ON THE TRINITY—1, 15 LIFE OF THE SPIRIT 540 (1961). Augustine distinguished between the corporeal form and *information* in the sense of vision and the resulting form in the mind. *See generally AUGUSTINE, supra.*

57. Rationalism, and the theory of innate universal ideas, was largely defeated by empiricism, which was based on experience and the *a posteriori* rather than *a priori* accumulation of knowledge. *See HUME, supra* note 34. Hume argued that man was driven by passion rather than reason, and knowledge was only acquired through experience. *Id.* Rationalism was associated with Rene Descartes and his distinction between matter (*res extensa*) and the mind (*res cogitans*). Hume advocated empiricism, which rejected any form of prior knowledge and induction. *Id.* Descartes constructed knowledge on the basis of his ability to think and to doubt his own thoughts, which confirmed his own existence (*cogito ergo sum*). *See generally RENE DESCARTES, DISCOURSE ON THE METHOD* (1637); RENE DESCARTES, PRINCIPLES OF PHILOSOPHY (1644).

58. *See Cracking the Code*, CIA, <https://www.cia.gov/news-information/featured-story-archive/2007-featured-story-archive/cracking-the-code.html> (last updated Oct. 23, 2019). The examination of information in mathematical terms is taken forward by Claude Shannon, Warren Weaver, Alan Turing, and Norbert Wiener. *See Claude Shannon*, INFO. PHILOSOPHER, <https://www.informationphilosopher.com/solutions/scientists/shannon> (last visited Jan. 6, 2020). Shannon and Weaver would separate information and meaning to focus on the transfer of messages through mechanical and electronic devices irrespective of the meaning or sense covered. *See supra* note 54 and accompanying text. Alan Turing worked for the Government Code and Cypher School (GC&CS) at Bletchley Park and developed a Turing machine to

spread into the social sciences, including economics, with the focus especially on the information qualities of the price mechanism<sup>59</sup> and the inability of individuals and governments to be able to absorb and process all available information.<sup>60</sup>

Information subsequently grew into a more general area of wider philosophical study during the second half of the twentieth century with a number of specific new perspectives emerging.<sup>61</sup> Writers such as Cesar

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demonstrate the limits of mechanical computation with modern computers using random access memory (RAM) to read data without the restrictions created by their physical location. *Government Code and Cypher School*, SPARTACUS-EDUCATIONAL, <https://spartacus-educational.com/GCCS.htm> (last updated Dec. 2014). Turing completeness refers to the ability of a system to simulate a Turing machine. *Id.*

59. Friedrich Hayek identified the importance of price signals in transmitting information on the market and supply and demand for specific goods. Friedrich Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519, 526 (1945) [hereinafter *The Use of Knowledge in Society*]. Signals communicated dispersed and tacit knowledge. *Id.* at 525. This supported Smith's invisible hand and Hayek's "extended order." *Id.* Hayek states that, "In a system in which the knowledge of the relevant facts is dispersed among many people, prices can act to coordinate the separate actions of different people." *Id.* Smith's invisible hand would later be restated in terms of "autopoiesis, cybernetics, homeostasis, spontaneous orders, self-organisation, synergetics, systems theory, and so on." FRIEDRICH HAYEK, 1 THE FATAL CONCEIT 9 (W. W. Bartley III ed., 1988) [hereinafter THE FATAL CONCEIT]. Hayek explained the extended order as a "framework of institutions—economic, legal, and moral—into which we fit ourselves by obeying certain rules of conduct that we never made, and which we have never understood in the sense of which we understand how the things that we manufacture function." *Id.* at 14. According to Hayek, "order resulted not from human design or intention but spontaneously: it arose from unintentionally conforming to certain traditional and largely moral practices, many of which men tend to dislike, whose significance they usually fail to understand, whose validity they cannot prove, and which have nonetheless fairly rapidly spread by means of an evolutionary selection—the comparative increase of population and wealth—of those groups that happened to follow them. *Id.* at 6.

60. See Scott H. Young, *How Much Can You Possibly Learn?*, SCOTTHYOUNG (Nov. 2017), <https://www.scotthyoung.com/blog/2017/11/15/how-much-can-you-possibly-learn>. Hayek criticised socialist systems in terms of their inherent inability to be able to collect and understand all relevant market information and to take the right decisions based on this. THE FATAL CONCEIT, *supra* note 59, at 14. Hayek stressed the importance of individual information and individual advantage, which other parties did not enjoy. *Id.* at 29. "It is with respect to this that practically every individual has some advantage over all others in that he possesses unique information of which beneficial use might be made, but of which use can be made only if the decisions depending on it are left to him or are made with his active cooperation." See *The Use of Knowledge in Society*, *supra* note 59, at 521 – 22.

61. This includes the development of logical positivism and the merger of empiricism and logics, with leading writers publishing through the Berlin and Vienna Circles in the 1920s. See generally, e.g., MICHAEL FRIEDMAN, RECONSIDERING LOGICAL POSITIVISM (1999). Karl Popper explained the quality of empirical information in terms of its ability to be falsified. KARL POPPER, THE LOGIC OF SCIENTIFIC DISCOVERY (Karl Popper et al. trans., Hutchinson & Co. trans. 2004) (1934). Fred Dretske examined the nature of knowledge and information. FRED DRETSKE, SEEING AND KNOWING (1969); FRED DRETSKE, KNOWLEDGE AND THE FLOW OF INFORMATION (1981). See also *Information*, *supra* note 55. Semantic information has been brought forward by Luciano Floridi, who developed a constructionist philosophy focusing on modelling and design as well as computation and information ethics. See generally Luciano

Hidalgo have attempted to develop a separate physical theory of information,<sup>62</sup> building on the earlier work of Ludwig Boltzmann,<sup>63</sup> although this may not be fully made out.<sup>64</sup> These writings comingle the different meanings and definitions developed in this paper<sup>65</sup> and also focus on separate aspects of philosophy, including ontology or existence, epistemology or knowledge and logic, as well as language, physical science, and neuroscience.<sup>66</sup> Keeping these writings more simple and distinct can clarify policy, law formulation, and law study and can facilitate reform in this area.

## B. INFORMATION THEORY

Information is studied under information theory, which examines the meaning, extraction, processing, use, and transmission of information in

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Floridi, *Information Ethics: On the Theoretical Foundations of Computer Ethics*, 1 *ETHICS AND INFORMATION TECHNOLOGY* 37 (1999); Luciano Floridi, *What is the Philosophy of Information?*, 33 *METAPHILOSOPHY* 123, 125 (2002). Separate work has been carried out on the definition and examination of quantum information and qubits within quantum systems. See *Information, supra* note 55.

62. See CESAR A. HIDALGO, <https://chidalgo.com> (last visited Jan. 11, 2020). Hidalgo explains information in terms of physical facts, with information of itself being meaningless. CESAR HIDALGO, *WHY INFORMATION GROWS* xv (2015). Hidalgo equates information with physical order, with the earth being a core example and with the development of complex modern economies which reflect order and control also confirming this. *Id.* at xiv, xvii. Hidalgo attempts to explain in terms of an “arrow of complexity,” rather than a more traditional “arrow of time,” linking Ludwig Boltzmann and Shannon’s physical examination of information. *Id.* at xvii. Hidalgo attributes the continued growth of information and order to “out-of-equilibrium systems, the accumulation of information in solids, and the ability of matter to compute” in the planet and in our bodies. *Id.* at xx. Hidalgo refers to the importance of “the accumulation of information and our ability to process information,” with the growth of information unifying “the emergence of life with the growth of economies, and the emergence of complexity with the origins of wealth.” *Id.* at xx. The growth of information is nevertheless uneven, which explains the residual existence of disorder and entropy that Boltzmann failed to account for. *Id.* Hidalgo describes our fascination with information in terms of “the high concentration of complexity that we see every time we open our eyes, not because information is everywhere in the universe but because we are born from it, and it is born from us.” *Id.* at xxi.

63. Cesar A. Hidalgo, *A New Perspective on Economic Growth: What is Information and Why Does it Grow?*, *EVONOMICS* (Dec. 4, 2015), <https://evonomics.com/what-is-information-and-why-does-it-grow>.

64. Hidalgo arguably confuses information as simple statements of physical fact or intellectual opinion with the order that can be produced from applied information and processes that create knowledge. It is also questionable to what extent his attribution of physical order can be understood in terms of the structurally cohesive effects of information alone, with many physical properties increasingly being explained in terms of random effects and complex emergence. See discussion *supra* note 62.

65. See *supra* notes 2 – 4 and accompanying text.

66. *Philosophy*, *NEW WORLD ENCYCLOPEDIA*, <https://www.newworldencyclopedia.org/entry/Philosophy> (last visited Jan. 7, 2019). For the purposes of this article, philosophy consists of five disciplines: ontology or existence, epistemology or knowledge and logic, political philosophy or politics, moral philosophy or ethics, and aesthetics.

communication.<sup>67</sup> Shannon stated that “the fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point.”<sup>68</sup> Shannon described the information source, transmitter, channel, receiver, and destination.<sup>69</sup> Shannon defined a bit as a basic unit of information and communication.<sup>70</sup> He also defined entropy in terms of the relative expected value of information received from a transmitter, and he defined redundancy, which refers to loss or waste of capacity in transmitting data.<sup>71</sup>

### C. INFORMATION ECONOMICS AND INFORMATION MANAGEMENT

Information Economics is concerned with the effects of information and information systems on the economy and decision taking.<sup>72</sup> In economics, information can be considered to constitute a resource rather than a good,<sup>73</sup> while the impact of information and information systems on economics and decision taking is examined under information economics.<sup>74</sup>

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67. Information theory originated with Claude Shannon. See Shannon, *supra* note 1; CLAUDE E. SHANNON & WARREN WEAVER, *THE MATHEMATICAL THEORY OF COMMUNICATION* 50 (1964).

68. See Shannon, *supra* note 1, at 379.

69. *Id.* at 381.

70. *Id.* at 380.

71. *Id.* at 392, 398.

72. See generally, e.g., George E. Stigler, *The Economics of Information*, 69 J. POL. ECON. 213 (1961).

73. Information products question traditional market assumptions within new information economies. See, e.g., J. Bradford DeLong & A. Michael Froomkin, *Speculative Microeconomics for Tomorrow's Economy*, FIRST MONDAY (Feb. 7, 2000), <https://firstmonday.org/ojs/index.php/fm/article/view/726/635>. Dealing in information within new technological markets is different from buying and selling goods, as information is non-rivalrous (with no loss on consumption), non-exclusionary (difficult to prevent others from using), and non-transparent. *Id.* Information cannot be a good under the law. See *infra* note 139.

74. Information allows economic choices to be taken. Frederick Hayek examined the importance of the price mechanism in communicating information as part of an attack on central planning policies. See generally Friedrich A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519 (1945). Hayek had earlier attacked the assumption in equilibrium theory that agents have full and correct information in *Economics and Knowledge*, 4 ECONOMICA 33 (1937). Hayek explained the limits of information with a single agent only being able to appreciate a fraction of all knowledge available within a society and with the price mechanism acting as the most efficient mechanism for allocating resources. See *id.* This can be understood in terms of dispersed knowledge, with market mechanisms allowing the most efficient use of this and with this creating an extended order in Hayek's language, which reflects Adam Smith's earlier invisible hand theory in *The Wealth of Nations* (1776). See Norman Barry, *The Tradition of Spontaneous Order*, 5 LITERATURE LIBERTY 7 (1982). This reflects ideas of spontaneous order in science. Hayek also referred to economics in terms of catallactics, or the science of exchanges, from Richard Whately in *Introductory Lectures on Political Economy* (1831). Hayek attacked collectivism. See generally FRIEDRICH A. HAYEK, *INDIVIDUALISM AND ECONOMIC ORDER* (1948); FRIEDRICH A. HAYEK, *THE ROAD TO SERFDOM* (1944). Hayek developed his ideas on the extended order and the limits of information with society and civilisation being based on

Difficulties with information management were referred to by such writers as the Austro-British economist Friedrich Hayek. Hayek opined that it was impossible for any single individual or collective group, including a government, to comprehend all aspects of economic management or society more generally.<sup>75</sup> Mankind individually and collectively is incapable of understanding all information—a difficulty that has become even more significant with continued advances in science and knowledge.<sup>76</sup> It is essential to recognise this limitation in understanding modern freedom and liberty.<sup>77</sup> It is impossible to design perfect systems with social order having to evolve and adapt with the most effective results being used and protected.<sup>78</sup> Hayek supported the great Scottish writers such as Adam Smith and Hume and their empiricist rather than the rationalist approach to reason and design of French writers, such as René Descartes and Jean-Jacques Rousseau.<sup>79</sup> Design could not be secured through reason, as man had insufficient information, with success being achieved through experimentation and adaptation.<sup>80</sup>

Hayek developed Ludwig von Mises' "economic calculation problem."<sup>81</sup> Mises identified the importance of the price system in allowing subjective

private property in *The Fatal Conceit* (1988), with the title being derived from Adam Smith's *The Theory of Moral Sentiments* (1759). See THE FATAL CONCEIT, *supra* note 59.

75. Hayek states that "[t]he Socratic maxim that the recognition of our ignorance is the beginning of wisdom has profound significance for our understanding of society." F. A. HAYEK, *THE CONSTITUTION OF LIBERTY* 21 (Routledge Classics 2006) (1960). ("The first requisite for this is that we become aware of men's necessary ignorance of much that helps him achieve his aims. Most of the advantages of social life, especially in its more advanced forms which we call 'civilization,' rest on the fact that the individual benefits from more knowledge than he is aware of. . . . This fundamental fact of man's unavoidable ignorance of much on which the working of civilization rests has received little attention.")

76. See Scott H. Young, *How Much Can You Possibly Learn?*, SCOTTHYOUNG.COM (Nov. 2017), <https://www.scottheyoung.com/blog/2017/11/15/how-much-can-you-possibly-learn>.

77. In Chapter 2 of *The Constitution of Liberty*, Hayek contends that "the case for individual freedom rests chiefly on the recognition of the inevitable ignorance of all of us concerning a great many of the factors on which the achievement of our ends and welfare depends." See HAYEK, *supra* note 75, at 28.

78. *Id.* at 29 ("Certainty we cannot achieve in human affairs, and it is for this reason that, to make the best use of what knowledge we have, we must adhere to rules which experience has shown to serve best on the whole, though we do not know what will be the consequences of obeying them in the particular instance.")

79. See Gerald P. O'Driscoll, Jr., *Hayek and the Scots on Liberty*, 30 J. OF PRIV. ENTERPRISE 1, 5 (2015).

80. See HAYEK, *supra* note 75, at 38 ("The rationalist who desires to subject everything to human reason is thus faced with a real dilemma. The use of reason aims at control and predictability. But the process of the advance of reason rests on freedom and the unpredictability of human action . . . . There can be little doubt that man owes some of his greatest successes in the past to the fact that he has not been able to control social life. His continued advance may well depend on his deliberately refraining from exercising controls which are now in his power.")

81. See generally LUDWIG VON MISES, *ECONOMIC CALCULATION IN THE SOCIALIST COMMONWEALTH* (1990).

values determined by individuals to be translated from subjective into objective data or information, which would allow a rational allocation of resources. Mises and Hayek developed “catallactics,” which referred to the order created by the mutual adjustment of many individual economies within a market.<sup>82</sup> This reflects Smith’s earlier invisible hand.<sup>83</sup> Hayek promoted the free flow of information within an open system through catallaxy, which would be much more efficient than through any central control even if this was intended to secure any express public good intent.<sup>84</sup> The free market allowed the free flow of information from which prices could be determined which allowed a reconciliation of all of the complex underlying factors involved.<sup>85</sup> These ideas were later developed through Milton Friedman’s adaptive expectations and then rational expectations theory and the efficient market hypothesis.<sup>86</sup> More recent writings have attempted to bridge the property examination of information from a legal and economic perspective, although the specific implications of this are not always clear.<sup>87</sup>

#### D. INFORMATION SCIENCE

Information science is an interdisciplinary field which examines the representation, storage, supply, search for, and retrieval of information.<sup>88</sup> This includes theoretical and applied information science with specific sub-disciplines.<sup>89</sup> Information science dates from the beginning of the earliest libraries or repositories.<sup>90</sup> Use of the term information science dates from 1955.<sup>91</sup> This is also referred to as informatics.<sup>92</sup>

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82. F.A. HAYEK, 2 *LAW, LEGISLATION AND LIBERTY* 108 – 09 (Routledge 1982).

83. See HAYEK, *supra* note 75, at 37.

84. *Id.* at 21 – 35.

85. See *id.*

86. Thomas J. Sargent, *Rational Expectations*, *LIBR. ECON. & LIBERTY*, <https://www.econlib.org/library/Enc/RationalExpectations.html> (last visited Feb. 16, 2020).

87. Thomas W. Merrill and Henry E. Smith have attempted to develop a new economics-based exclusion theory regarding property in place of more traditional collections or bundle of rights theories. See THOMAS W. MERRILL & HENRY E. SMITH, *PROPERTY: PRINCIPLES AND POLICIES* 5 (3rd ed. 2016). For a critical review of this work, see Eric R. Claeys, *Property 101: Is Property a Thing or a Bundle?*, 32 *SEATTLE U. L. REV.* 617 (2009). Claeys concludes that property should be considered in terms of the right to determine the exclusive use of an item rather than the right to exclude others from the item. *Id.* at 649 – 50. The idea of exclusion builds on the writings of J.E. Penner and J.W. Harris. See generally J.E. PENNER, *THE IDEA OF PROPERTY IN LAW* (1997); J.W. HARRIS, *PROPERTY AND JUSTICE* (photo. reprint 2003) (1996).

88. See generally WOLFGANG G. STOCK & MECHTILD STOCK, *HANDBOOK OF INFORMATION SCIENCE* 3 – 5 (2013).

89. Sub-disciplines include: (a) information retrieval; (b) knowledge representation; (c) knowledge management and information literacy; (d) Information Society and Information Markets Research; and (e) informetrics. *Id.* at 5 – 7.

90. See generally JOHN WILLIS CLARK, *THE CARE OF BOOKS* (1901).

91. *Information Science*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/information%20science> (last visited Feb. 16, 2020).



## E. DIGITAL CODE AND COMMUNICATION

Information can be communicated or expressed in the form of any oral or written language.<sup>93</sup> Specific difficulties arise where information is stored in a digital form. This is not a problem where rights and entitlements are expressed in an oral or written form and recorded in writing. When rights are stored on computers, this requires their translation into a digital script for coding purposes.<sup>94</sup> When information is transferred by the Internet, this is separately deconstructed into individual datagrams or packets, passed through multiple routers within a packet-switched network in a wholly unpredictable manner, and then reconstructed by the recipient system.<sup>95</sup> Computers also only work using internal computer code that is machine-readable. All of this may be referred to as creating a form of digital translation, separation, or expressive separation.<sup>96</sup>

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92. Informatics was first referred to as *Informatika* by the Russian scientist, Alexander Mikhailov (1905 – 1988). See generally A.I. MIKHAILOV ET AL., SCIENTIFIC COMMUNICATIONS AND INFORMATICS 363 – 86 (Robert H. Burger trans., 1984); A.I. MIKHAILOV & R. S. GILYAREVSKYI, AN INTRODUCTORY COURSE ON INFORMATICS/DOCUMENTATION (Int'l Federation for Documentation, 1971) (1967); A.I. MIKHAILOV ET AL., FUNDAMENTALS OF INFORMATICS (1968).

93. Vincent Ferraro & Kathryn C. Palmer, *Differences Between Oral and Written Communication*, MOUNT HOLYOKE COLLEGE, <https://www.mtholyoke.edu/acad/intrel/speech/differences.htm> (last visited Jan. 5, 2020).

94. David Banisar & Simon Davies, *Privacy and Human Rights*, GLOBAL INTERNET LIBERTY CAMPAIGN, <http://gilc.org/privacy/survey/intro.html> (last visited Jan. 5, 2020).

95. The package consists of a header to identify its source or destination and a payload that contains its contents. Lawrence G. Roberts, *The Evolution of Packet Switching*, 66 INST. ELECTRICAL & ELECTRONICS ENGINEERS 1307, 1308 (1978). Packet (as opposed to circuit) switching was developed by British scientist Donald Davies at the National Physical Laboratory (NPL) in the 1960s following earlier work carried out by American scientist Paul Baran at the RAND Corporation in the 1950s. *Id.* at 1307 – 08.

96. See generally *A Primer on Machine Readability for Online Documents and Data*, DATA.GOV (Sept. 24, 2012), <https://www.data.gov/developers/blog/primer-machine-readability-online-documents-and-data>. Several basic concerns arise about this translation function. The immediate problem that arises is the separation of the form of expression of the information or idea, requiring digital translation and coding at every stage in the use of the information covered. This, in turn, creates a form of specific technological translation dependence. It is essential that there is access to information on a continuing basis. Appropriate security measures must be adopted to prevent interference and ensure the necessary continuity planning arrangements in the event of failure of the access or memory device. It is also necessary to ensure that a complete and accurate historical record of data is kept over time with data not simply being overwritten on a continuous basis to allow the accurate identification of assets and liabilities at any specific point of time in the past. This is important in the event of litigation and the need to define information at a particular point in time, such as on the insolvency of a company, as occurred in the case of the Lehman (Europe) bankruptcy in September 2008. Separate issues have arisen with the transfer of the earlier Financial Services Authority (FSA) Handbook of rules and guidance established under sections 138 and 157 of the Financial Services and Markets Act (FSMA) 2000 to the U.K. National Archive records system following dissolution of the FSA in April, 2013, with it subsequently being difficult to confirm the exact provisions that applied at any particular point in time without reference to separate private copies of the changes made to the rules and guidance of the time. See Financial Services and

Using computer languages generally involves the conversion of numbers and letters into decimal code and binary code (0 and 1).<sup>97</sup> The American Standard Code for Information Interchange (ASCII) was first published in 1963 and was one of the most commonly used early computer languages to allow for the conversion of numbers and letters into decimal code and binary code.<sup>98</sup> A number of different generations of later programme languages can be distinguished.<sup>99</sup> These generally operate on a hexadecimal (16 points or two 8 bit bytes) rather than strictly decimal basis, which creates a multitude

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Markets Act 2000, c. 1, §§ 138, 157 (U.K.). These five information issues may be summarized in terms of technical translation, technological dependence, continuing access, security, and continuity and integrity of historical record.

97. See generally LEIBNIZ, *supra* note 1.

98. Mary Brandel, 1963: *The Debut of ASCII*, CNN (July 6, 1999), <http://edition.cnn.com/TECH/computing/9907/06/1963.idg/index.html>. ASCII consists of system codes (0 – 31), lower ASCII (32 – 127), including punctuation, numbers and upper and lower letters, and higher ASCII (128 – 255), which uses eight bits and can accommodate special symbols, foreign language letters and drawing characters. *ASCII Code*, ASCII-CODE, <http://www.ascii-code.com> (last visited Jan. 4, 2019).

99. See generally *Generations, Languages*, ENCYCLOPEDIA.COM, <https://www.encyclopedia.com/computing/news-wires-white-papers-and-books/generations-languages> (last updated Dec. 15, 2019). These include first-generation machine or absolute program languages (using magnetic tape or punch cards), second-generation assembly languages, and third-generation high-level programming languages. *Id.* The earliest third-level languages included the University of Manchester Mark I written in 1952 and second autocode in 1954. S.H. Lavington, *The Manchester Mark I and Atlas: A Historical Perspective*, 21 COMM. ACM 4, 6 (1978). IBM introduced FORTRAN (Formula Transition) in 1954. *FORTRAN The Pioneering Programming Language*, IBM, <https://www.ibm.com/ibm/history/ibm100/us/en/icons/fortran> (last visited Jan. 7, 2020). Coding for the Electronic Delay Storage Automatic Calculator (EDSAC) was written by the University of Cambridge in 1961. Kaushik Kumar, *EDSAC Computer – History, Work and Development*, COMPUTERTECHMATES (Aug. 29, 2018), <https://www.computertechmate.com/2018/08/EDSAC-computer-in-hindi.html>. Subsequent languages included APL (“A Programming Language” IBM 1960), LISP (“LISt Processor” Massachusetts Institute of technology (MIT) 1958), ALGOL (“Algorithmic Language” Zurich 1960), C, C++, and C# (Bell Laboratories 1969 – 1973), Prolog (PROgramableLOGic France 1972), and ML (MetaLanguage Edinburgh 1973), and more recently Perl (Unisys 1987), Java (Sun Microsystems 1995), JavaScript (Netscape Communications 1995), Python (Netherlands 1991), and Ruby (Japan 1995). *Programming Languages Through the Years*, SOFTWARE GUILD (July 30, 2015), <https://www.thesoftwareguild.com/blog/history-of-programming-languages>. Fourth generation languages were intended to be more powerful and programmable, operating at higher levels of abstraction. IBM, DB2 DEVELOPER’S GUIDE 486 (6th ed. 2012). Fifth generation languages were designed to operate independently and autonomously without separate programming and programmers. See Richard Grigonis, *Fifth-Generation Computers*, ATARIARCHIVES, [http://www.atariarchives.org/deli/fifth\\_generation.php](http://www.atariarchives.org/deli/fifth_generation.php) (last visited Jan. 11, 2020). Fifth generation computers will specifically support artificial intelligence (AI). See generally Richard Grigonis, *Fifth-Generation Computers*, ATARIARCHIVES.ORG, [http://www.atariarchives.org/deli/fifth\\_generation.php](http://www.atariarchives.org/deli/fifth_generation.php). The Japanese Ministry of International Trade and Industry had set up a Fifth Generation Computer Project in 1982, although the technology was made available on an open basis with the project being closed in June 1992. Andrew Pollack, “Fifth Generation” Became Japan’s Lost Generation, N.Y. TIMES (June 5, 1992), <https://www.nytimes.com/1992/06/05/business/fifth-generation-became-japan-s-lost-generation.html>.

of possible characters and meanings.<sup>100</sup> Most digital communications are now transferred over the Internet and World Wide Web, which is based on Hypertext Markup Language (HTML) and Hypertext Transfer Protocol (HTTP) with Cascading Style Sheets (CSS) and JavaScript.<sup>101</sup> The significance of this is that most computers do not work in pure binary code but rather through hexadecimal systems that are accessed through separate sophisticated computer coding, which requires specialist knowledge and training to use and maintain.<sup>102</sup>

A series of information-related risks can accordingly be identified. These are specifically concerned with translation dependence, the separation of understanding and expression of ideas, possible inaccuracy on translation, potential security access issues, and the loss of historical records or archives of accurate information over time.<sup>103</sup> These can be summarised in terms of translation, specialism or dependence, accuracy, security, and historical integrity. It is essential to ensure the immediate accuracy of information over time, its continuing security or integrity, proper disclosure and transparency, accuracy on translation, and secure collection and storage over time.

### III. Digital Information Asset And Property Law

The law has generally only provided limited areas of remedy to protect information. Information may or may not be recognised as property,<sup>104</sup> although certain associated legal protections are conferred.<sup>105</sup> Lawyers generally consider information in terms of a relationship or reify it by

100. Hexadecimal (16 bits) allows 65,535 (2<sup>16</sup> possible values, which facilitates substantially more processing capability. See Pamela Fox, *Hexadecimal Numbers*, KHANACADEMY, <https://www.khanacademy.org/computing/ap-computer-science-principles/computers-101/digital-data-representation/a/hexadecimal-numbers> (last visited Jan. 4, 2019). See also *ASCII Code*, *supra* note 98.

101. See Tim Berners-Lee, *WWW: Past, Present, and Future*, COMPUTER, Oct. 1996, at 69.

102. See *id.*

103. See generally DAVID T. BOURGEOIS, ET AL., *INFORMATION SYSTEMS FOR BUSINESS AND BEYOND* (2019).

104. See R.G. Hammond, *The Misappropriation of Commercial Information in the Computer Age*, 64 CAN. B. REV. 342, 350, 354 – 56 (1986) [hereinafter *Misappropriation in the Computer Age*]. Information may be identifiable, separate, and arguably stable, although it loses its independence on communication and cannot have rights attached to it directly. See *id.* The conditions for forming property may be understood in terms of identification, separation, permanence or stability, continuing independence, and attachment in the sense of being able to be subject to the exercise of legal rights. See George Walker, *Digital Property Law – New Structure and New Reconciliation*, INT'L LAW. (forthcoming 2021). See also Tanya F. Aplin, *Confidential Information as Property?*, 24 KING'S L.J. 172, 190 n.138 (citing R. Grant Hammond, *Quantum Physics, Econometric Models and Property Rights to Information*, 27 MCGILL L.J. 47, 58 (1981)). See also *Nat'l Provincial Bank Ltd. v. Ainsworth* [1965] AC 1175, 1247 – 1248 (Eng.); *OBG Ltd. v. Allan* [2007] UKHL 21 (Eng.). For comment in relation to cryptoassets, see Sir Geoffrey Vos, Chancellor of the High Court, Joint Northern Chancery Bar Association and University of Liverpool Lecture: *Cryptoassets as Property* (May 2, 2019).

105. See *infra* Section IV.

turning it into a commodity or property.<sup>106</sup> Information can either be considered in terms of a thing, product, process, or procedure.<sup>107</sup> Information can specifically be defined as a process,<sup>108</sup> although the process may be more accurately considered in terms of the communication or exchange of information.<sup>109</sup>

Ideas are generally not legally protected.<sup>110</sup> Knowledge is most usually considered free for common use.<sup>111</sup> Protection has historically only been available for private information where this can be classified as confidential, sensitive, or secret in some manner.<sup>112</sup> Statutory protection has been introduced to govern the collection, storage, and use of electronically stored information and data.<sup>113</sup> New rights to obtain access to relevant public information and data have also been created to increase public transparency

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106. Hammond reviews the meaning of information across different disciplines and concludes, "Information is what it is. That is, there are many different kinds of information with people wanting it for many different purposes." *Misappropriation in the Computer Age*, *supra* note 104, at 350, 352.

107. Hammond notes, "Lawyers everywhere have demonstrated a rather naive acceptance of the utility of the term 'information' as the foundation of a legal concept. To every other intellectual discipline, information is not a thing or a commodity, it is a process." Grant Hammond, *Theft of Information*, 100 L. Q. REV. 252, 263 (1988).

108. See Hammond, *supra* note 107. Losee attempted to develop a discipline-independent definition that may be applied to all domains, from physics to epistemology, with linked hierarchies of processes providing a communication channel between each of the corresponding functions and layers. See Robert M. Losee, *A Discipline Independent Definition of Information*, 48 J. AM. SOC'Y FOR INFO. SCI. 254 (1997). Losee defines information as "the characteristics of the output of a process, these being informative about the process and the input." *Id.* at 254. Losee describes information as "the values within the outcome of any process," with value referring to "a variable's attribute or characteristic, and not to economic value unless economics is explicitly mentioned." *Id.*

109. Losee states, "Information is always informative about something, being a component of the output or result of the process." *Id.* at 258. Losee does not state that information is a process but the "characteristics" of the output of a process, with all "processes produc[ing] information." *Id.* This simply means that information is the result of something else. Losee adds, "The output is also not information by itself; the values in the output are information only in the sense that they are information *about* the process and the input, that is, information in the context of the process and its input." *Id.* at 260 (emphasis in original).

110. See Grant Hammond, *The Legal Protection of Ideas*, 29 OSGOOD HALL L. J. 93, 97 (1991). Hammond adds, "ideas are part of the seamless web of humanity," and he warns against "increasingly commodifying the self and encouraging individuals to convert every aspect of their being into a reducible, divisible, saleable commodity." *Id.*

111. *Int'l News Serv. v. Assoc. Press*, 248 U.S. 215, 250 (1918). Justice Brandeis stated, "The general rule of law is that the noblest of human productions—knowledge, truths ascertained, conceptions, and ideas—become, after voluntary communication to others, free as the air to common use." *Id.*

112. Hammond, *supra* note 110, at 94; Freedom of Information Act 2000, c. 36, § 84 (U.K.).

113. Freedom of Information Act 2000, c. 36, § 77(1) (U.K.); Public Records Act 1958, 6 & 7 Eliz. 2 c. 51 (Gr. Brit.).

and accountability.<sup>114</sup> These can be distinguished as involving controls on either the release of private or receipt of public information and data.<sup>115</sup>

Information is still not clearly specified in law.<sup>116</sup> “Information” is defined in the Freedom of Information Act 2000 only to mean information recorded in any form.<sup>117</sup> Information has otherwise been defined as communication, representation, or quantity.<sup>118</sup> Fact would include any point of physical, mathematical, or scientific output.<sup>119</sup> The terms “record” and “archive” refer to the means of holding or storage rather than the content directly.<sup>120</sup>

The term information may be restricted only to refer to something that has been recorded or communicated.<sup>121</sup> Information is more widely defined for the purposes of this paper as constituting any point of fact, opinion, or law, however created or maintained. Information law should be considered objectively rather than subjectively and without reference to the providers’ or recipients’ state of knowledge.<sup>122</sup> The material on which information is recorded is irrelevant.<sup>123</sup> It should also not be relevant whether the

114. Hammond, *supra* note 110, at 97 – 99.

115. *Id.* at 94. See Public Records Act 1958, 6 & 7 Eliz. 2 c. 51 (Gr. Brit.).

116. Coppel notes that “[o]ther fields of human endeavor have struggled to find a satisfactory definition of ‘information,’ with the impetus largely originating with telecommunications and its need to identify the limits of message degradation before that which is received ceases to be information to the recipient.” PHILIP COPPEL, INFORMATION RIGHTS 256 n.4 (Sweet & Maxwell, 2004) (citing C.E. Shannon, *A Mathematical Theory of Communication: Concluded from July 1948 Issue*, 27 BELL SYS. TECH. J. 623 (1948)). See also Losee, *supra* note 108.

117. Freedom of Information Act 2000, c. 36, §§ 51(8), 75(2), 84 (U.K.).

118. The *New Shorter Oxford Dictionary* defines information as “[c]ommunication of the knowledge of some fact or occurrence; k]nowledge of facts communicated about a particular subject, event, etc.; intelligence, news; w]ithout necessary relation to a recipient: that which inheres in or is represented by a particular arrangement, sequence, or set, that may be stored in, transferred by, and responded to by inanimate things; Math. a statistically defined quantity representing the probability of occurrence of a symbol, sequence, information, etc., as against a number of possible alternatives.” NEW SHORTER OXFORD DICTIONARY (1993).

119. Losee, *supra* note 108, at 254.

120. A public record is defined under the Freedom of Information Act with reference to the Public Records Act 1958 or Public Records Act (Northern Ireland) 1923. Freedom of Information Act of 2000, c. 36, § 84 (U.K.). It is an offence to “alter[ ], deface[ ], block[ ], erase[ ], destroy[ ] or conceal[ ] any record held by a public authority with the intention of preventing the disclosure . . . of the information to the communication of which the applicant would have been entitled.” *Id.* § 77(1). Records are defined to include “not only written records but records conveying information by any other means whatsoever” under § 10(1). Public Records Act 1958, 6 & 7 Eliz. 2 c. 51, § 10(1) (Gr. Brit.). Public records are defined with reference to the First Schedule, which lists departmental records, records of courts and tribunals, records of the Chancery of England, and records of the Public Record Office, with the sovereign being able by Order in Council to include further records. *Id.*

121. Losee states, “Information is always and only transmitted through a series of physical processes.” Losee, *supra* note 108, at 15.

122. Coppel notes, regarding the U.K. Freedom of Information Act 2000, “the fact that certain material is wholly uninformative to the applicant does not cause that material to cease to be information.” COPPEL, *supra* note 116, 257.

123. *Id.*

information is correct or accurate to constitute information.<sup>124</sup> This would cover any material that is worthless, including opinion in the form of bare observation or assertion.<sup>125</sup> Information may be extended to include any detail, however obtained or held.<sup>126</sup> Additionally, information may be understood to refer to a condition or state<sup>127</sup> and to include opinion or advice as well as factual information.<sup>128</sup> This includes trade description details.<sup>129</sup>

Property can be considered to constitute another complex, combination, or contestable concept.<sup>130</sup> Property can be understood to refer to total assets, a specific objective, legal rights in the object, or specific rights such as

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124. During the passage of the Freedom of Information Bill through the U.K. Parliament, Mr. David Lock, The Parliamentary Secretary to the Lord Chancellor's Department stated, "The public authority should not have to go to further unlimited lengths in verifying the accuracy of information." 347 Parl Deb HC (6th ser.) (2000) col. 909 (U.K.).

125. *Win v. Minister for Immigration and Multicultural Affairs* [2001] FCA 132, 17 – 21 (23 February 2001) (Austl.). Mere "observations" were held not to constitute information, although this was in relation to a determination of the reasons for affirming a decision rather than more generally. *WAGO of 2002 v. Minister for Immigration and Multicultural and Indigenous Affairs* [2002] FCAFC 437 (20 December 2002) (Austl.). See also *NAHI v. Minister for Immigration and Multicultural and Indigenous Affairs* [2004] FCA 10 (2 February 2004) (Austl.).

126. This was held to include briefs of evidence of police witnesses in New Zealand. The High Court in New Zealand stated, "Perhaps the most outstanding feature of the definition is that the word 'information' is used which dramatically broadens the scope of the whole Act. The stuff of what is held by Departments, Ministers, or organizations is not confined to the written word but embraces any knowledge, however gained or held, by the named bodies in their official capacities. The omission, undoubtedly deliberately, not to define to the word 'information' serves to emphasize the intention of the legislature to place few limits on relevant knowledge." *Commissioner of Police v. Ombudsman* [1985] 1 NZLR 578 (HC) at 586. The Court of Appeal confirmed, "Information is not defined in the Act, from this it may be inferred that the draftsman was prepared to adopt the ordinary dictionary meaning of that word. Information in its ordinary dictionary meaning is that which informs, instructs, tells or makes aware. It is reasonable to suppose that, by their very nature, the police briefs contain information pointing to the commission of offences of the kind charged against the appellant and to the involvement of the appellant in them." *Commissioner of Police v. Ombudsman* [1988] 1 NZLR 385 (HC) at 402.

127. For the purposes of EU law, information relating to the environment means "any available information in written, visual, aural or data-base form on the state of water, air, soil, fauna, flora, land and natural sites, and on activities (including those which give rights to nuisances such as noise) or measures adversely affecting, or likely so to affect these, and on activities or measures designed to protect these, including administrative measures and environmental management programmes." Council Directive 90/313, art. 2(a), 1990 O.J. (L 158) 6 (EC).

128. In relation to the Consumer Credit Advertisements Regulations 1989, see *Coventry City Council v. Lazarus* [1994] 160 J.P. 188.

129. Mileage on a car odometer constituted information for the purposes of the S24(1)(a) Trade Descriptions Act 1968. *COPPEL*, *supra* note 116, at 258 – 262 (citing *Simmons v. Potter* [1975] RTR 347 (U.K.)). The Court of Appeal has stated that the "word 'information' is as large as can be." *Re Stuart and Olivant and Seadon's Contract* [1896] 2 AC 450 at 453 (appeal taken from Eng.).

130. See *Gallie*, *supra* note 1.

ownership.<sup>131</sup> Property is generally concerned with items and things (or *res*) in law and the particular type of *res* concerned. The basic division of private law into legal persons and capacity to act, things (*res*), and actions or remedies dates from Roman juridical writing and Gaius and Justinian.<sup>132</sup> While national laws have generally identified separate types of property law—including land law, personal property, and intellectual property—many jurisdictions adopt a unitary approach to the theory of property.<sup>133</sup> Property is strictly concerned with rights in things rather than things themselves.<sup>134</sup> A general distinction is drawn between real and personal rights, with real rights being enforceable against society as a whole and personal rights against specific individuals. Real rights are then often attached to property and personal rights to obligations. Real rights may nevertheless be properly concerned with the nature of the action or remedy rather than the thing itself.<sup>135</sup>

The English courts have generally taken the position that information is not property.<sup>136</sup> Some authorities have suggested that confidential information could be treated as property in specific cases,<sup>137</sup> although this is

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131. For the purposes of this paper, property can consist of: (a) the totality of assets, wherewithal or patrimony (*patrimonium*); (b) specific objects or things; (c) rights in relation to the object or thing; (d) specific rights such as ownership; and (e) wealth more generally. See also, for example, the Scottish Jurist, Lord Kames. HENRY HOME KAMES, *HISTORICAL LAW-TRACTS: HISTORY OF PROPERTY* 88 (Lawbook Exchange 2000) (1761). For comment, see Andreas Rahmatian, *The Property Theory of Lord Kames (Henry Home)*, 2 INT'L J. L. CONTEXT 177, 180 – 81 (2006). See also Andreas Rahmatian, *Intellectual Property and the Concept of Dematerialised Property*, in 6 SUSAN BRIGHT, *MODERN STUDIES IN PROPERTY LAW* 361, 363 – 64 (2011).

132. G. INST. I.12 – 1.14. For discussion, see George L. Gretton, *Ownership and Its Objects*, 71 J. OF COMP. & INT'L PRIV. L. 802, 805 (2007).

133. For example, in Scotland, Kenneth G.C. Reid, *The Law of Property in Scotland* 5 – 8 (1996).

134. Gaius's Trinity was based on persons (*persona*), things (*res*), and actions (*actiones*). G. INST. I.8; see BARRY NICHOLAS, *AN INTRODUCTION TO ROMAN LAW* 60 (Rev. ed. 2008).

135. A distinction is also drawn between rights in relation to a person (*ius in personam*) and rights in relation to things (*ius in rem*). NICHOLAS, *supra* note 134, at 99.

136. "In general, information is not property at all. It is normally open to all who have eyes to read and ears to hear. The true test is to determine in what circumstances the information has been acquired. . . . the real truth is that [information] is not property in any normal sense but equity will restrain its transmission to another if in breach of some confidential relationship." Per Lord Upjohn in Boardman v. Phipps [1967] 2 AC 46 (HL) 35 (U.K.). This was followed by the Court of Appeal in Douglas v. Hello! Ltd. [2005] EWCA Civ 595 at 127 (Eng.).

137. MARCUS SMITH & NICO LESLIE, *THE LAW OF ASSIGNMENT* 180 – 83 (3d ed. 2018). Judge Fullagar expressed the test for determining the nature of information as to whether "a person of ordinary intelligence, in all the circumstances of the case, including, inter alia, the relationship of the parties and the nature of the information and the circumstances of its communication, recognise this information to be the property of the other person and not his own to do as he likes with." Deta Nominees Property Ltd. v. Viscount Plastics Products Ltd [1979] VR 167 at 193 (Austl.). Confidential information held by a former employee and director was held to be subject to a constructive trusteeship with equitable damages being available for misuse in Markwell Bros. Pty. Ltd. v. CPN Diesels [1983] Qld 508, 525 – 526 (Austl.). Trade secrets were a "master's property." Per Lord Shaw in Herbert Morris Ltd v.

disputed by other commentators.<sup>138</sup> Information does not constitute a good under English law,<sup>139</sup> nor can it be stolen as property under the criminal law.<sup>140</sup>

A number of decisions have supported a property analysis. This includes the areas of restraint of trade,<sup>141</sup> recipes,<sup>142</sup> partnership assets,<sup>143</sup> Stock

Saxelby [1916] 1 AC 688, 712 (U.K.). Injunctive relief was available to prevent disclosure of Stock Exchange information in which the plaintiff had a right to property. *Exchange Telegraph v. Gregory* [1896] 1 QB 147 (Eng.). Per Judge Cotton, partnership property included any information to which the partnership was entitled. *Dean v. MacDowell* [1878] 8 Ch. D. 345 at 354 (Eng.). Per Lord Sterndale, partnership property also included product manufacture formulae. *In re Keene* [1922] 2 Ch 475 (Eng.). For discussion, see LINDA CLARKE, CONFIDENTIALITY AND THE LAW 87 – 88 (1990) (citing Paul Kohler & Norman Palmer, *Information as Property, in INTERESTS IN GOODS 3* (Norman Palmer & Ewan McKendrick eds., 2d ed. 1998)). See also Federal Comm'r of Taxation v. *United Aircraft Corp.* (1943) 68 CLR 525, 534 – 35 (Austl.); *Nichtrotherm Electrical Co Ltd v. Percy* [1957] RPC 207 at 209; *North & South Trust Co v. Berkeley* [1971] 1 All ER 980 at 993; *Fraser v. Evans* [1969] 1 All ER 8 at 361 (U.K.); SMITH & LESLIE, *supra*, at 182 & n.184 (citing *R v. Department of Health ex parte Health Informatics* [2001] 1 QB 424).

138. Stuckey describes a property analysis as being “juridically misguided and unhelpful” in the area of breach of confidence. Stuckey considers that “The action for breach of confidence, when not based on implied or express contractual obligation, enforces purely equitable obligations arising out of a proven relationship of trust, not a property right in information.” Jennifer E. Stuckey, *The Equitable Action for Breach of Confidence: Is Information Ever Property?*, 9 SYDNEY L. REV. 402, 404 (1981). Palmer concludes that earlier authorities in this area do not establish a universal characterization of information as property, certain decisions adopt a proprietary analysis to arrive at a conclusion that can be arrived at without such an analysis and this is contradicted by other authorities. It was held that it was “by no means clear that information” acquired by brokers was property in *North & South Trust* [1971] 1 All ER 980. See also *Nichtrotherm Electrical* [1957] RPC 207 at 209. Lord Denning MR ruled that restraining the publication of confidential information was based “not so much on property or on contract as on the duty to be of good faith.” *Fraser* [1969] 1 All ER 8 at 361. Latham CJ was “unable to regard the communication of information as constituting a transfer of property” where information had been passed by an American company to an Australian company for use for a five-year period. Latham CJ stated that, “knowledge is valuable, but knowledge is neither real nor personal property. A man with a richly stored mind is not for that reason a man of property. . . . It is only in a loose metaphorical sense that any knowledge as such can be said to be property.” *United Aircraft* (1943) 68 CLR 525, 534 – 35. For discussion, see CLARKE, *supra* note 137, at 90 – 91.

139. Information does not qualify as a good under the Sale of Goods Act 1979, nor under the Torts (Interference with Goods) Act 1977. J.P. BENJAMIN, *SALE OF GOODS* 63 (Anthony Gordon Guest & J.P. Benjamin eds., 3d ed. 1987).

140. Information in the form of an examination paper that a student had gained unauthorised access to did not constitute property for the purposes of section 4 of the Theft Act 1948. See *Oxford v. Moss* [1978] 68 AC 183, 185 – 86 (U.K.).

141. The Court of Chancery granted an injunction against a trader to protect the purchaser’s use for 20 years in *Bryson v. Whitehead* (1822) 1 Sim. & St. 74, 77 (U.K.).

142. Secret information in a recipe was held to constitute property for the purposes of a trust in *Green v. Folgham* (1823) 1 Sim. & St. 398, 406 – 407 (U.K.).

143. The reference to “any property of the partnership” was held to include information “which the partnership is entitled to.” *Dean v. MacDowell* [1878] 8 Ch. D. 345 at 354.



Exchange information,<sup>144</sup> trade secrets,<sup>145</sup> bankruptcy,<sup>146</sup> know-how,<sup>147</sup> trust,<sup>148</sup> and constructive trust.<sup>149</sup> This led commentators to conclude that confidential information was a species of property.<sup>150</sup> Many of the decisions in this area are nevertheless based on specific circumstances and do not

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Approved by Bowen LJ in *Aas v. Benham* [1891] 2 Ch 244 at 255. See also *Bell Houses Ltd v. City Wall Properties Ltd* [1966] 2 WLR 1323 (per Danckwerts LJ at 1332 – 1333).

144. The Court of Appeal allowed an injunction to protect information that had been purchased from the Stock Exchange Committee. *Exchange Telegraph v. Gregory* [1896] 1 QB 147.

145. “Trade secrets may not be taken away by a servant; they are his master’s property. . . .” *Herbert Morris Ltd v. Saxelby* [1916] 1 AC 688, 712 (U.K.), (per Lord Shaw of Dunfermline at 313). See also *B.O. Morris, LD v. F. Gilman (BST) LD* [1943] 60 RPC 20 (U.K.); *Yates Circuit Foil Co. Ltd. v. Electrofoils Ltd.* [1976] FSR 345 (per Justice Whitford at 384 – 385); *Drake Personnel Ltd v. Beddison* [1979] VR 13 (per Anderson, J. at 22). “Sir Edward Boyle noted in the House of Commons on December, 13, 1968, before the court that, “Is it not too much to say that we live in a country where, in Mr. Campbell’s words, the theft of the boardroom table is punished far more severely than the theft of the boardroom secrets.” *Anna Louise Christie, Should the Law of Theft Extend to Information?*, 69 J. CRIM. L. 349, 349 & n.1 (2005). This was made during the Second Reading of the Industrial Information Bill which was subsequently abandoned with the Theft Act 1968 coming into effect 14 days later without the criminalisation of the misappropriation of trade secrets. *Id.* Mr. Alan Campbell QC had written to *The Times* on the matter in 1967. *Id.* The theft or misappropriation of trade secrets is made a federal crime in the United States under the Economic Espionage Act of 1996, 110 Stat. 3488. See generally M. Schwarz, *United States: Confidential Information*, 19 EUR. INTELL. PROP. REV. 51 (1997).

146. Formulae for the manufacture of products constituted partnership property and passed to the trustee in bankruptcy in *In re Keene* [1922] 2 Ch 475 (per Lord Sterndale 477). This nevertheless confuses a trade secret with the manufactured products. *Stuckey, supra* note 138, at 410.

147. Know-how was held to constitute a corporate asset separate from the records in which it was held. Lord Radcliffe stated, “It is intangible; but then so is good will.” *Rolls-Royce Ltd. v. Jeffrey* [1962] 1 UKHL 801, 805. See also *Evans Medical Supplies Ltd v. Moriarty* [1957] 1 AC 336; *Musker v. English Electric Co. Ltd.* [1964] 41 UKHL 556.

148. Information was held to constitute property in *Boardman* [1967] 2 AC 46 (HL) (per Viscount Dilhorne at 723, Lord Hodson at 744, and Lord Guest at 749). Lord Guest specifically stated that there was no reason why information and knowledge could not constitute the property of a trust. *Id.* at 749 – 53. See also *Surveys and Mining Ltd v. Morrison* [1969] QDR 470 (per W.B. Campbell at 473 – 474) (Austl.). The Singapore International Commercial Court has held that cryptocurrencies could constitute property for the purposes of a trust. *B2C2 Ltd v. Quoine Pte Ltd* [2019] SGHC(I) 03.

149. Employee directors of a company held confidential information on constructive trust for a previous owner who could be awarded equitable damages for misuse of the information rather than an action for account. *Markwell Bros* [1983] Qld 508 (Austl.). Confidential information created “proprietary interest” requiring protection. *Technography Printed Circuits Ltd. v. Chalwyn Ltd.* [1967] AC 307, 311 – 12 (U.K.).

150. See J.C. SHEPHERD, *THE LAW OF FIDUCIARIES* 319 (1981). See also Sam Ricketson, *Confidential Information – A New Proprietary Interest? Part I*, 11 MELBOURNE U. L. REV. 223, 225 (1977); Arnold S. Weinrib, *Information and Property*, 38 U. OF TORONTO L. J. 117, 126 – 43 (1988). William Cornish has separately proposed three tests to determine whether confidential information assumed a proprietary character: (a) whether possession would generate rights against those who misappropriated per se; (b) whether the assignee of know-how acquires the assignor’s rights to sue the direct and indirect recipients breaching confidence; and (c) whether

establish a wider classification of information as property. They can therefore be explained without a property analysis.<sup>151</sup> Specific difficulties, in particular, arise with regard to employer-employee cases which can be considered on the basis of restraint of trade,<sup>152</sup> taxation decisions (which are often *sui generis*<sup>153</sup>), and fiduciary duty situations which can be decided using conflict of duty.<sup>154</sup>

Other decisions have rejected a property examination in relation to confidential information.<sup>155</sup> The transfer of business information did not constitute a form of bailment—knowledge being neither real nor personal

two licensees or assignees of information acquire any priority over each other. WILLIAM CORNISH, *INTELLECTUAL PROPERTY* 240 (6th ed. 2007).

151. Paul Kohler & Norman Palmer, *Information as Property, in INTERESTS IN GOODS* 7 – 8 (Norman Palmer & Ewan McKendrick eds., 2d ed. 1998).

152. . Stuckey, *supra* note 138, at 411 – 12. Stuckey argues that property analysis in employer-employee situations are based on restraint of trade and cannot be transferred to equitable breach of confidence actions. *Id.* (citing *Herbert Morris Ltd. v. Saxelby* [1916] 1 A.C. 688 (HL) 714 (appeal taken from Eng.); *Drake Personnel Ltd v. Beddison* [1979] VR 13 at 22 (where Anderson J referred to the need to establish an employer's "proprietary" right to confidential information); *Yates Circuit Foil Co. v. Electrofoils Ltd.* [1976] FSR 345, 384 – 85 (Whitford, J.) (distinguishing restraint of trade and confidentiality issues but confusing legal unconscionable contracts with equitable breach of confidence).

153. *See* Stuckey, *supra* note 138, at 413 – 14. In *FCT v. United Aircraft Corporation*, Latham, C.J. rejected the argument that information constituted a species of property and that the communication of information could create a bailment. *Id.* (citing (1943) 68 CLR 525). In *Brent v. Commissioner of Taxation*, Gibbs, J. rejected English taxation authority holding that trade secrets constituted property on the basis that personal confidential information was not "property in a business sense." *Id.* (citing (1971) 45 ALJR 557 at 561). The House of Lords held that that a trade secret constituted a capital asset for taxation purposes which resulted in a disposal of property in *Evans Medical Supplies Ltd v. Moriarty*. *Id.* (citing (1956 – 57) 37 Tax. Cas. 540 at 596). Know-how agreements were nevertheless held to constitute a form of trading and to be taxable as income in *Id.* (citing *Jeffrey (HM Inspector of Taxes) v. Rolls-Royce Ltd.* (1960) 40 Tax. Cas. 433; *Musker (HM Inspector of Taxes) v. English Electric Co.* (1964) 41 Tax. Cas. 556). *Id.*

154. A chairman's knowledge of sources of development finance was held to constitute a business asset and belonged to the company in *Bell House Ltd v. City Wall Properties Ltd*. *See* Stuckey, *supra* note 138, at 414 (citing [1966] 2 WLR 1323; *Dean v. MacDowell* (1878) 8 Ch. D. 345). The House of Lords ruled that information acquired by a fiduciary constituted property held in trust. *Id.* (citing *Boardman v. Phipps* [1967] 2 AC 46 (HL)). Viscount Dilhorne considered that "some information and knowledge can properly be regarded as property." *Id.* (citing *Boardman* [1967] 2 AC 46 (HL) at 89 – 90). Lord Hodson ruled that information was property categorically. *Id.* (citing *Boardman* [1967] 2 AC 46 (HL) at 107). Lord Upjohn, nevertheless, dissented and stated that, "In general, information is not property at all. It is normally open to all who have eyes to read and ears to hear. The true test is to determine in what circumstances the information has been acquired. If it has been acquired in such circumstances that it would be a breach of confidence to disclose it to another then courts of equity will restrain the recipient from communicating it to another." *Id.* (citing *Boardman* [1967] 2 AC 46 (HL) at 127).

155. Donaldson J stated that it was "by no means clear that information is property in this context" in a decision involving information wrongly acquired by brokers. *North & South Trust v. Berkeley* [1971] QBD 470 at 485. *See also* *Nichrotherm Electrical Co. Ltd. v. Percy* [1957] AC 207 at 209.

property.<sup>156</sup> Restraint of publication of confidential information is based on good faith rather than property or contract.<sup>157</sup> Information as property was not to be confused with breach of confidence.<sup>158</sup> Information contained in an examination paper could not be stolen because information did not constitute property for criminal law purposes.<sup>159</sup> Destruction of information held in a tangible form would still constitute criminal damage.<sup>160</sup> The deletion of files by a computer hacker was held to constitute criminal damage.<sup>161</sup>

The classification of information as property may be considered to arise from the provision of legal protection. Protection does not in itself determine the nature of the underlying asset.<sup>162</sup> The classification of property can be considered to be substantive and not assumptive.<sup>163</sup> The adoption of a property analysis may still arguably provide the courts with an

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156. See *Federal Comm'r of Taxation v. United Aircraft Corp.* (1943 – 1944) 68 CLR 525 at 534 – 35 (“I am unable to regard the communication of information as constituting a transfer of property. Upon such a communication the transferor still has everything that he had before and the transferee continues to have what he has received even though the five-year period has elapsed . . . Knowledge is valuable, but knowledge is neither real nor personal property. A man with a richly stored mind is not for that reason a man of property . . . It is only in a loose metaphorical sense that any knowledge as such can be said to be property.”). See also *EI Du Pont de Nemours Powder Co. v. Masland* 244 U.S. 100, 102 (1917); *Comm'r of Taxation v. Sherritt Gordon Mines Ltd.* (1977) 137 CLR 612 at 630 (Austl.); *Smorgan v Federal Commissioner of Taxation* (1977) 51 ALJR 137 at 141.

157. *Stuckey*, *supra* note 138, at 403 n. 6 (citing *Fraser v. Evans* [1969] 1 QB 349 (HL) (Lord Denning MR at 361) (U.K.)); This concept was approved by Australian courts. *Id.*; *Forster v. Mountford* [1977] 14 ALR 71, 75 (Muirhead, J.) (Austl.); see also *Wheatley v. Bell* [1982] 2 NSWLR 544, 550 (Helsham, C.J.) (Austl.).

158. *Stuckey*, *supra* note 138, at 405, 419 (citing *Phipps*, [1967] 2 AC 46, 128 (Lord Upjohn); *Saltman Eng'g Co. Ltd. v. Campbell Eng'g Co. Ltd.* (1948) 65 R.P.C. 203 at 213 (Lord Cohen of Birkenhead)).

159. *Id.* at 415, 419 (citing *Oxford v. Moss* [1978] 68 Cr. App. Rep. 183) (“that confidential information was not ‘property’ [under section] 4 of the Theft Act 1968”). A distinct approach was adopted in America. See *Carpenter v. United States*, 108 S. Ct. 316, 320 (1987); *United States v. Thomas*, 866 F.2d 1413 (3d Cir. 1988) (unpublished table decision).

160. *Roger Bullivant v. Ellis* [1987] ICR 464; NICOLA LACEY, ET AL., *RECONSTRUCTING CRIMINAL LAW* 407 (3d ed. 2003) (citing *Cox v. Riley* [1986] Crim. L.R. 460).

161. See *R v. Whiteley* [1991] 93 Crim. App. 25.

162. *Smith Kline & French Labs. v. Sec'y to the Dep't of Cmty. Servs. & Health* [1990] 17 IPR 545, 593 (Austl.) (Gummow, J.) (“[T]he degree of protection afforded by equitable doctrines and remedies to what equity considered confidential information makes it appropriate to describe it as having a proprietary character. This is not because property is the basis upon which that protection is given, but because of the effect of that protection.”); *Breen v. Williams* [1996] 186 CLR 71, 129 (Austl.) (Gummow, J.) (adding separately that it is not “acceptable to argue that, because, in some circumstances, the restraint of an apprehended or continued breach of confidence may involve enjoining third parties . . . that the plaintiff who asserts an obligation of confidence therefore has proprietary rights in the information in question which in turn found a new species of legal right.”).

163. *Kohler & Palmer*, *supra* note 151, at 22 (“The property label is a conclusion not a premise.”).

additional jurisdiction and set of remedies.<sup>164</sup> Additional remedies—for example, conversion or trespass—may become available. Nevertheless, care has to be exercised in considering the commercial and legal consequences of such an extension in practice, especially in terms of the potential liability of third-party acquirers both from the initial proprietor and more remotely.<sup>165</sup> Difficulties also arise in extending bailment to include information.<sup>166</sup> It is further questionable whether criminal offences and theft specifically can be extended to include information, especially as there is no intent to deprive the owner of the property permanently.<sup>167</sup>

The adoption of a common-law property basis for confidential information is also generally rejected.<sup>168</sup> Effective equitable remedies are available, including injunction or compensation, in the event of breach of confidence, specifically where information has a commercial value.<sup>169</sup> Issues may arise with regard to less commercially valuable personal information where an account of profits would be inadequate and a common law action in tort more appropriate.<sup>170</sup>

164. Kohler & Palmer, *supra* note 151, at 24.

165. Kohler & Palmer, *supra* note 151, at 11 – 15.

166. Kohler & Palmer, *supra* note 151, at 15 – 17; PAUL D. FINN, *FIDUCIARY OBLIGATIONS* 131 (Federation Press, 2d ed. 2016).

167. *Oxford v. Moss* [1979] 68 Crim. App. 183 (Smith, J.) (quoting Section 4 of the Theft Act 1968: “‘Property’ includes money and all other property, real or personal, including things in action and other intangible property.”). *See also* *R. v. Absolom*, [1988] Crim. App. 748. The Supreme Court in the U.S. held that the acquirer of information in breach of confidence intended to deprive the holder of its exclusivity permanently, although Kohler and Palmer do not think that this is likely to be followed in England and Wales. *Carpenter*, 108 S. Ct. 316, at 322; *see* Kohler & Palmer, *supra* note 151, at 10, 20. The Supreme Court in Canada held that theft only applies to property capable of being taken and would not include industrial espionage. *R. v. Stewart*, [1988] 1 S.C.R. 963, 980 (Can.) (reversing the Ontario Court of Appeals which held a defendant had intended permanently to deprive the holder of property by destroying its quality of confidentiality).

168. Kohler & Palmer, *supra* note 151, at 22 – 24; Stuckey, *supra* note 138, at 414 – 33. *See also* Tanya F. Aplin, *Confidential Information as Property*, § 3.2 (King’s College London Dickson Poon School of Law Legal Studies Paper Series, Paper No 2014-20), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2436983&download=yes](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2436983&download=yes).

169. Stuckey, *supra* note 138, at 433.

170. Stuckey notes that the property analogy may still be useful in “the secondary sphere of remedy” to develop appropriate compensatory principles. *Id.* Equity has an inherent jurisdiction to “award monetary restitution for infraction of a purely equitable right in the nature of restitution” independent of the statutory right under Lord Cairns Act. *Id.* at 417. This allowed a Court of Chancery to award damages to a party injured in addition to or in substitution for an injunction or specific performance against a breach of any covenant, contract or agreement or commission or continuous of any wrongful act. *Id.* at 417. A property analysis of misappropriation of trust property may then be useful for the limited purpose of assessing appropriate compensation. *Id.* at 418. Megarry, J. distinguished commercially valuable trade secrets and more personal biographical information that may or may not be commercially valuable in *Coco v. A. N. Clark (Engineers) Ltd.* [1969] RPC 41). Stuckey, *supra* note 138, at 430. The Law Commission accepted that the law may be defective to award compensation where it was too late to obtain an injunction. *Id.* (citing THE LAW COMMISSION, *WORKING PAPER*, 1974, No. 58, ¶¶ 48, 171 (U.K.). Equity’s need to attempt to award restitution of

All of this can then be summarized with information either being private, public, or privileged and subject to legal protection. Much of this is nevertheless still essentially qualified and disconnected with no clear single theory of information, or digital information and data, having been constructed to date. One of the purposes of this text is to begin to construct a new integrated set of theories that draws all of this together into a single consistent whole.

#### IV. Digital Information Assets and Property Law

While information may not be considered to constitute property in law, it may still be subject to legal recognition and protection. A series of specific legal interests or entitlements can be identified that merit intervention. These are essentially concerned with private data protection rights and with the obverse of public information disclosure. It is not anomalous that private data should be subject to non-disclosure or use controls and public information to transparency and release in modern civil societies. These rights are distinct in that they do not strictly attach to the information but to the parties concerned.

Other forms of intellectual activity may create property rights in specific circumstances where they justify legal recognition. Original works will be protected as intellectual property rights, including under copyright, trademark, and patent laws, as well as other design rights. This requires a separate creative act that attaches additional value to the underlying idea or work product concerned and in this way transforms its nature. Intellectual property rights are property in the form of exclusionary rights, through which third parties can be prohibited from using and exploiting specific interests.<sup>171</sup> A degree of protection has also been provided for software, coding, and database stores. This is distinct in that legal protection does not attach to the original mental construct as such but only through the subsequent separate creative and inventive step involved.

While these rights create new entitlements, they are still subject to public interest derogations, exceptions, or qualifications intended to protect the public interest—in particular, with regard to criminal activity and espionage. Furthermore, general issues then arise in balancing private protections between parties as well as between private agents in terms of both freedom of expression and free use and between private and public or state interests.

These five areas of variant or constitutive rights can be summarized as either being private, public, productive, digitally parallel and precautionary, or preservative. Each of these specific instances of information and data protection can be considered in further detail in turn.

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money or specific chattels may be inadequate. *Id.* Common law principles, for example, in relation to assessing damages for defamation may be more appropriate. *Id.*

171. Michael Lehmann, *The Theory of Property Rights and the Protection of Intellectual and Industrial Property*, 16 IIC INT'L REV. INTELL. PROP. & COMPETITION L. 525, 530 (1985).

## A. PRIVATE INFORMATION AND DATA PRIVACY

Private information may be protected at common law where it is subject to some obligation of confidentiality or secrecy. A number of cases have treated confidential information as property under English law,<sup>172</sup> although these can generally be distinguished on the basis of lack of permanence, relationship dependence, the need for knowledge that the information is confidential, and the limited protection provided with any right of action being limited to the original party concerned and not any assignee.<sup>173</sup> Other writers have supported this position.<sup>174</sup> Information received by banks has

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172. Stuckey, *supra* note 138, at 413 (citing *Rolls-Royce Ltd.* [1960] 40 Tax. Cas. 492 (Lord Radcliffe) (referring to know-how as a form of corporate asset *sui generis* due to the ability of a proprietor to use it repeatedly without depleting its value but with disclosure diluting value irredeemably).

173. SMITH & LESLIE, *supra* note 137, 180 – 183.

174. The editors of *Gurry on Breach of Confidence* conclude that the jurisdictional basis of breach of confidence is not proprietary and that the concept of property is particularly difficult to apply to confidential information due to lack of definition and demarcation, lack of exclusivity, loss of protection on dissemination, and difficulties in ownership and ease of sharing. TANYA APLIN ET. AL., *GURRY ON BREACH OF CONFIDENCE: THE PROTECTION OF CONFIDENTIAL INFORMATION* 121 – 137, 311 – 12 (2d ed. 2012). The authors review cases supporting a property analysis in terms of metaphor, as well as earlier common law copyright cases, transmissibility of information, remedies, and non-confidential restraints. *Id.* at 121 – 30 (citing *Veolia ES Nottinghamshire Ltd v. Nottinghamshire County Council*, [2010] EWCA (Civ) 1214 (Eng.)). They criticized the Court of Appeal decision in which the court considered disclosure of confidential information under a waste management Private Finance Initiative (PFI) in terms of common law confidentiality, article 8 ECHR, and article 1 of the First Protocol. *Id.* at 128 – 33. The authors conclude that none of the arguments referred to support a property basis with “a wealth of dicta denying the existence of a proprietary right in confidential information” with relevant remedies being limited to breach of confidence in contract or equity. *Id.* at 133. Toulson and Phipps separately note that, “although some forms of confidential information bear some similarity to some forms of intellectual property, any broad concept of confidential information as property would be hard to encapsulate. Confidential information involves information about some fact or idea, but a mere fact or private idea is not susceptible of ownership. It would be a strange form of property which would come into existence on the confidential acquisition of information about the fact or idea and cease to exist on its wider publication.” R. G. TOULSON & C. M. PHIPPS, *CONFIDENTIALITY* 32 – 34 (3d ed. 2013). Goff and Jones consider that “information is not, in our view, property, at least not in the sense that receipt imposes a duty of enquiry on a third party.” ROBERT GOFF & GARETH JONES, *THE LAW OF RESTITUTION* 653 (3d ed. 1986). Finn refers to property “as a very slippery one in this context.” PAUL D. FINN, *EQUITY AND COMMERCIAL RELATIONSHIPS* 144 (1987). Cornish notes the lack of authority supporting a proprietor having a separate action against direct interlopers and third-party acquirers. Cornish considers that information may only amount to property where its possession generates rights against those misappropriating it, an assignee of know-how acquires the assignor’s rights to sue direct and indirect recipients in the event of breach of confidence, and where one licensee or assignee has priority over another. WILLIAM R. CORNISH, ET. AL., *INTELLECTUAL PROPERTY: PATENTS, COPYRIGHT, TRADE MARKS AND ALLIED RIGHTS* 363 – 66 (7th ed. 2010). Austin rejects the categorisation of information as property due to the difficulty in distinguishing certain types of information that should be included and others that should not, inconsistent results, the prohibition on trustees and fiduciaries from disclosing any information, and

been protected under confidentiality obligations at common law, subject to specific exemptions.<sup>175</sup> Secrecy obligations may also be imposed under statute—such as under the Official Secrets Acts in the U.K.<sup>176</sup> The English Law Commission decided in 1981 not to adopt a property based approach to the law of confidence, as this could distort existing remedies that had developed on a non-proprietary basis.<sup>177</sup> Treating information as property may nevertheless extend the range of remedies available in the event of misappropriation or misuse,<sup>178</sup> although the dominant position is that information does not constitute property for the purposes of breach of confidence and arguably under the law more generally.

The issue of privacy was examined by the Younger Committee in 1972 and confidence by the Law Commission in 1974 and 1981.<sup>179</sup> A distinction had to be drawn between information disclosed in breach of confidence and

inflexible remedy. *See generally* R. P. Austin, *Constructive Trusts*, in *ESSAYS IN EQUITY* 196, 223 – 41 (P. D. Finn ed., 1985). Palmer questions whether a property analysis is of value, in particular, with regard to priorities, bona fide acquisitions, and the *nemo dat* rule, although it is accepted that this may be of more assistance in connection with bailment and software. Palmer concludes that courts should avoid creating further unnecessary confusion and consider situations on an individual case by case basis. Kohler & Palmer, *supra* note 151, at 11 – 24.

175. The exemptions are principally concerned with release by compulsion of law, public duty, the bank's own interest, and on consent. The leading English case is *Tournier v. National Provincial and Union Bank of England* [1924] 1 KB 461 at 480 – 81. *See generally* Gwendoline Godfrey et. al., *Bank Confidentiality: A Dying Duty But Not Yet Dead?*, 17 *BUS. L. INT'L* 172 (2016).

176. Official Secrets Act 1989, c.6 (UK).

177. THE LAW COMMISSION, REPORT, 1981, Law Com. No. 110, ¶ 2.10 (U.K.).

178. Palmer refers to the possibility of awarding special damages to cover distress or injunctive relief equivalent to specific restitution available for the tort of detinue at common law. Duties may also be extended such as with regard to a finder of confidential information, involuntary possession, improvements, or actions for interference, as well as bailment and implied duties on the sale of know-how or software. Kohler & Palmer, *supra* note 151, 11 – 24.

179. COMMITTEE ON PRIVACY, REPORT, 1972, Cmnd. 5012 (U.K.) [hereinafter YOUNGER COMMITTEE ON PRIVACY]. The Law Commission concluded that the earlier law on breach of confidence should be abolished and a new statutory action in tort instated. THE LAW COMMISSION, WORKING PAPER, 1974, No. 58; THE LAW COMMISSION, REPORT, 1981, Law Com. 110, ¶¶ 6.1 – .2, 6.5. This would apply to all types of information including commercial or technical information and personal information. THE LAW COMMISSION, REPORT, 1981, Law Com. 110, ¶ 6.3. Information must not be in the public domain. *Id.* ¶ 6.74. Courts should take into account all circumstances, including the manner in which the information was acquired, in balancing the separate public interests in confidentiality and disclosure. *Id.* ¶ 6.84. The Law Commission recommended that remedies for a new statutory tort of breach of confidence should include interlocutory or final injunctions or alternatively an adjustment order or a monetary award in lieu of injunction. *Id.* ¶ 6.114. Damages could be payable in respect of loss suffered, assessed on such basis as is appropriate in all the circumstances or with an account of profits gained following the breach of confidence. *Id.* Damages may also be awarded for mental distress (and resulting mental or physical harm) suffered by the person in favour of whom the obligation of confidence was owed. *Id.*

wider breach of privacy involving some unauthorised disclosure.<sup>180</sup> A duty of confidence was created by express or implied contract or the relationship between the parties in equity.<sup>181</sup> The right to privacy arose in relation to the information itself rather than any separate breach of duty of confidence.<sup>182</sup> The action for breach of confidence is based on equitable obligations and a relationship of trust rather than any property law examination.<sup>183</sup>

A series of additional private rights have also been created more recently in relation to data privacy under law. These reflect fundamental rights classifications, as well as an increased concern for the possible abuse and exploitation of private data in new digital applications (especially in relation to social media sites, which have grown substantially in the past decade) and the extraction and aggregation of data from other online ordering or processing platforms on which personal details are released.

### 1. *Data Protection*

The right to respect private and family life, home, and correspondence was earlier protected under article 8 of the 1950 European Convention on Human Rights (ECHR) and the seven principles agreed by the 1999 OECD Recommendations Concerning Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data, which covered notice, purpose, consent, security, disclosure, access, and accountability.<sup>184</sup> Controls on automatic processing were provided for under the 1981 Council of

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180. THE LAW COMMISSION, REPORT, 1981, Law Com. 110, ¶ 2.1 – .3. The right to privacy was “based on the principle that certain kinds of information are characterised as private and for that reason alone ought not to be disclosed.” *Id.* ¶ 2.3.

181. This may arise through an employer–employee relationship, as well as relationships with craftsmen and other professionals, including barristers, solicitors, and doctors. *Id.* ¶¶ 3.9, 4.1 – .2. The banker’s duty of confidentiality was recognised in *Tournier* [1924] 1 TB 461. The equitable duty to respect confidence arises from a special relationship of trust or confidence. See Stuckey, *supra* note 138, at 403 (citing *Coco v. A. N. Clark (Engineers) Ltd.* [1969] R.P.C. 41 at 47 – 48). This may arise in the absence of a contractual relationship where: (a) the information has a necessary quality of confidence; (b) it was imparted in circumstances importing an obligation of confidence; and (c) there was unauthorised use. *Id.*

182. THE LAW COMMISSION, REPORT, 1981, Law Com. 110, ¶ 2.4. This would include family relations, as well as government relations, including Cabinet meetings. *Id.* ¶ 4.2. This would also include pre-contractual business negotiations. Stuckey, *supra* note 138, at 420 (citing *Seager v. Copydex Ltd.* [1967] RPC 349).

183. Stuckey, *supra* note 138, at 404. Stuckey states that “the action for breach of confidence when not based upon implied or expressed contractual obligation, enforces purely equitable obligations arising out of a proven relationship of trust, not property rights in information.” *Id.* “The analysis that confidential information is a species of intangible property is juristically misguided and unhelpful.” *Id.*

184. Organisation for Economic Cooperation and Development (OECD), Recommendations Concerning Guidelines Governing the Protection of Privacy and Trans-Border Flows of Personal Data, C(80)58/FINAL (July 11, 2013).



Europe Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data.<sup>185</sup>

Individuals have a separate right to personal data protection under article 8 of the EU Charter of Fundamental Rights, which reads as follows:

1. Everyone has the right to the protection of personal data concerning him or her.<sup>186</sup>
2. Such data must be processed fairly for specified purposes and on the basis of the consent of the person concerned or some other legitimate basis laid down by law. Everyone has the right to access data that has been collected concerning him or her, and the right to have it rectified.<sup>187</sup>
3. Compliance with these rules must be subject to control by an independent authority.<sup>188</sup>

## 2. *EU GDPR*

Private information was subsequently protected in the U.K. under the Data Protection Act 1998, which implemented the EU 1995 Data Protection Directive (DPD).<sup>189</sup> This has since been replaced by the EU General Data Privacy Regulation (GDPR)<sup>190</sup> when it came into effect on May 25, 2018.<sup>191</sup> Additional measures will separately be brought into effect under the Data Protection Directive for Police and Criminal Justice, which will specifically allow authorities to exchange data more efficiently and effectively.<sup>192</sup>

The GDPR adopts the same definition of personal data, although it extends the meaning of a data subject. Personal data is “any information relating to an identified or identifiable natural person,” which is the data subject. The term identifiable person is extended under the GDPR to

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185. Council of Europe Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data, Oct. 1, 1985 ETS. No. 108 (1981).

186. Art. 8(1), 2000 O.J. (364) 10.

187. *Id.*

188. *Id.* art. 8(3), at 10.

189. Data Protection Act 1998, c. 29 (U.K.); Directive 1995/46 of the European Parliament and of the Council of 24 October 1995, on the Protection of Individuals with Regard to the Processing of Personal Data and on the Free Movement of such Data, 1995 O.J. (L 281) 31.

190. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016, on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation), 2016 J.O. (L119) 1 [hereinafter GDPR].

191. The government has confirmed that commencement of the GDPR will not be affected by withdrawal from the EU. *UK: Understanding the Full Impact of Brexit on UK: EU Data Flows*, DLA PIPER: PRIVACY MATTERS (Sept. 23, 2019), <https://blogs.dlapiper.com/privacymatters/uk-gdpr-brexit-flowchart/>.

192. Directive 2016/680 of the European Parliament and of the Council of 27 April 2016, on the Protection of Natural Persons with Regard to the Processing of Personal Data by Competent Authorities for the Purposes of Prevention, Investigation, Detection or Prosecution of Criminal Offenses or the Execution of Criminal Penalties, and on the Free Movement of such Data, and Repealing Council Framework Decision 2009/977/JHA, 2016 O.J. (L 119) 89.

include anyone “who can be identified directly or indirectly, in particular by reference to an identification number or to one or more factors specific to his physical, physiological, mental, economic, cultural or social identity.”<sup>193</sup> The DPD and GDPR apply with regard to the bank accounts and other personal information held by banks and other financial institutions.

The GDPR was adopted due to changes in the collection and processing of personal data, especially through social networking sites, cloud computing, location-based services, and smart contracts and due to inconsistent national treatment that created additional complexity, legal uncertainty, and administrative costs.<sup>194</sup> The GDPR is intended to reinforce individual rights, strengthen the EU internal market, ensure stronger enforcement, streamline international transfers of personal data, and establish global data protection standards.<sup>195</sup> Firms can be fined up to two percent or four percent of total global annual turnover. The GDPR supports the European Single Digital Market Programme.<sup>196</sup>

### 3. *Data Protection Principles*

The GDPR contains eight revised data protection principles based on fair and lawful processing and legitimate purpose—with data being adequate, relevant and non-excessive, accurate and up to date, not kept for longer than necessary, processed in accordance with individual rights, secure, and properly transferred.

### 4. *Data Protection Rights*

EU data protection measures provide a number of key rights, including the right to information, access, rectification, erasure (the “right to be forgotten”),<sup>197</sup> restricted processing, data portability,<sup>198</sup> objection, and

193. GDPR, *supra* note 190, art. 4(1), at 33.

194. European Commission Memorandum, *Questions and Answers – Data Protection Reform*, EUR. COMM’N (Dec. 21, 2015), [https://ec.europa.eu/commission/presscorner/detail/en/MEMO\\_15\\_6385](https://ec.europa.eu/commission/presscorner/detail/en/MEMO_15_6385).

195. *Id.*

196. ALEXANDRE DE STREEL, PE 638.395, CONTRIBUTION TO GROWTH: EUROPEAN DIGITAL SINGLE MARKET 7 (May 2019), [https://www.europarl.europa.eu/RegData/etudes/STUD/2019/638395/IPOL\\_STU\(2019\)638395\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2019/638395/IPOL_STU(2019)638395_EN.pdf).

197. GDPR, *supra* note 190, art. 17, at 43 – 44. This follows an earlier European Court of Justice decision in May 2014 in which a Spanish citizen asked for a national newspaper and Google Spain and Google Inc to remove personal data concerning an earlier home repossession. The Court held that foreign processing companies were subject to EU law where they had a branch or a subsidiary within a member state promoting the selling of advertising space. The search engines were controllers of personal data and individuals had the right to request the removal of links containing personal data under certain conditions. Case C-131/23, *Google Spain SL and Google Inc. v. Agencia Española de Protección de Datos (AEPD) and Mario Costeja González*, <http://curia.europa.eu/juris/liste.jsf?num=C-131/12> (May 13, 2014).

198. GDPR, *supra* note 190, art. 20, at 45.

automated decision making and profiling.<sup>199</sup> The GDPR follows certain decisions such as the Spanish right to be forgotten case in 2014,<sup>200</sup> the French authority's €100,000 fine on Google for not applying the right to be forgotten globally,<sup>201</sup> and the the German Federal Cartel Office's investigation of Facebook's alleged abuse of its dominant position in harvesting users' personal information.<sup>202</sup>

### 5. *Data Protection Act 2018*

The GDPR was implemented in the U.K., inter alia, under the Data Protection Act (DPA) 2018. The definition of data under the DPA in 1998 (now DPA 2018) was extended to include recorded information held by a public authority not otherwise falling within the Act.<sup>203</sup> Public authorities are only required to provide unstructured personal data if the request contains a description of the data concerned.<sup>204</sup> Exemptions are extended to include certain manual data held by public authorities.<sup>205</sup>

The GDPR does not apply with regard to national security, police or judicial use, statistical or scientific analysis, and personal use. Security and judicial matters are dealt with under parts three and four of the DPA 2018 in the U.K., with equivalent GDPR measures being applied to other areas outside the regulation under part two. The Information Commissioner (IC) is established under part five, and enforcement is dealt with in part six.

## B. PUBLIC INFORMATION AND DATA DISCLOSURE

The public disclosure of information can be separately requested in the U.K. under the Freedom of Information Act 2000. This creates a public

199. INFO. COMM'R OFFICE, GUIDE TO GENERAL DATA PROTECTION REGULATION (GDPR) 129, 137, 151, 160 (May 22, 2019), <https://ico.org.uk/media/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr-1-0.pdf>.

200. *Id.* at 121.

201. Julia Fioretti, France Fines Google for "Right to be Forgotten," REUTERS (Mar. 24, 2016), <https://www.google.co.uk/amp/uk.mobile.reuters.com/article/amp/idUKKCN0WQ1WX?client=safari>. Google was fined €100,000 by the Commission Nationale de l'Informatique (CNIL) for refusing to apply the right to be forgotten to every copy of its search results worldwide. *Id.* Google appealed that decision, with Kent Walker, Google Senior Vice President and General Counsel, issuing an open letter claiming that the demand to apply French law globally was inappropriate. Kent Walker, *A Principle that Should Not Be Forgotten*, GOOGLE IN EUROPE (May 19, 2016), <https://blog.google/topics/google-europe/a-principle-that-should-not-be-forgotten/>.

202. Friedrich Geiger & Sam Schechner, *Facebook in German Privacy-Policy Probe*, WALL ST. J. (March 3, 2016), <https://www.wsj.com/articles/facebook-faces-antitrust-investigation-in-germany-1456920796>.

203. Freedom of Information Act 2000, c. 36, § 68(2) (U.K.).

204. *Id.* § 69. Unstructured personal data means "any personal data . . . other than information which is recorded as part of, or with the intention that it should form part of, any set of information relating to individuals to the extent that the set is structured by reference to individuals or by reference to criteria relating to individuals." *Id.*

205. *Id.* § 70.

right of access upon request to specified information held by bodies that exercise functions of a public nature, including public authorities, public-owned companies, and designated bodies.<sup>206</sup> Authorities are required to confirm whether they have all the information and communicate its content.<sup>207</sup> A number of absolute, qualified, class-based, and harm-based exemptions apply, and authorities are not required to comply with vexatious requests.<sup>208</sup> A code of practice is to be issued, and parties are able to appeal to the Commissioner, who may issue information and enforcement notices.<sup>209</sup> Parties have further rights to environmental information under the Environmental Information Regulations of 2004.<sup>210</sup>

### 1. *Public Information*

The general right of access to information applies to information recorded in any form.<sup>211</sup> Information may be described as the unit of disclosure.<sup>212</sup> The term information is also used in New Zealand.<sup>213</sup> The EU GDPR and DPA 2018 in the U.K. are applied to data.<sup>214</sup> The United States, Canada, and Ireland provide a right of access to records.<sup>215</sup> The right in Australia is to documents.<sup>216</sup> The U.K. DPA uses data as the unit of disclosure.<sup>217</sup>

Information must be recorded for the purposes of the Freedom of Information Act.<sup>218</sup> This will generally not include non-permanent volatile memory on computers.<sup>219</sup> Other non-volatile, more permanent records may not include automatically, rather than intentionally, created data or material.<sup>220</sup> This is doubtful to the extent that the term record is not

206. *Id.* §§ 3 – 7.

207. *Id.* § 1(1)(a) – (b).

208. *Id.* §§ 21 – 44.

209. *Id.* §§ 45, 50 – 52.

210. The Environmental Information Regulations 2004, SI 2004/3391, ¶ 4 (U.K.).

211. Environmental Information Regulations, at ¶ 2; Freedom of Information Act 2000, c. 36, § 84, (U.K.).

212. COPPEL, *supra* note 116, at 255 n.1.

213. COPPEL, *supra* note 116, at 61.

214. GDPR, *supra* note 190, arts. 1 – 4, at 32 – 33; Data Protection Act 2018, c. 12, § 2 (U.K.).

215. In the United States, every federal agency is required to make its records promptly available to any person who makes a proper request under the Freedom of Information Act 1966 as amended. COPPEL, *supra* note 116, at 39 – 50. Canadian citizens and permanent residents have a right of access to records under the control of a government institution subject to specific exclusions and exemptions under section 4 of the Access to Information Act 1982. *Id.* at 68 – 76. In Ireland, every person has a right of access to any record held by a public authority other than exempt records under the Freedom of Information Act 1997. *Id.* at 76 – 82.

216. Every person has a legally enforceable right to obtain access to a document of an agency and to an official document of a Minister other than an exempt document under s11 of the Freedom of Information Act 1982. COPPEL, *supra* note 116, at 50 – 60.

217. Data Protection Act 2018, c. 12, § 2, (Eng.), <http://www.legislation.gov.uk/ukpga/2018/12/section/2/enacted>.

218. COPPEL, *supra* note 116, at 260 – 61.

219. *Id.*

220. *Id.* at 261 n.31 – 32.

qualified with reference to intent and would arguably include any form of retrieved material irrespective of its content, comprehensibility, or accuracy as noted. Deleted data will also constitute information insofar as it is still accessible on the programme.<sup>221</sup>

## 2. *Public Information Requests*

Individuals requesting personal information constituting personal data have to submit the request under the GDPR and DPA 2018 with personal information being exempt under the Freedom of Information Act.<sup>222</sup> Requests for any other information held by a public authority are made under the Freedom of Information Act. Corporate bodies can only make a request under the Freedom of Information Act.<sup>223</sup> Requests for information must be in writing, identify the applicant and an address for correspondence, and describe the information requested.<sup>224</sup>

## 3. *Public Information Rights*

A person making a request for information to a public authority is entitled to be informed in writing whether the public authority holds the information of the description specified and to have that information communicated to him or her.<sup>225</sup> This creates a duty to inform or acknowledge and communicate or provide. The public authority is entitled to reasonably require further information to identify and locate the information requested.<sup>226</sup> The information covered is that held at the time the request is received, excluding any amendments or deletions that would have been made irrespective of the receipt of the request.<sup>227</sup> A list of exempt types of information is set out in Part II of the Act, which consist of absolute exemptions<sup>228</sup> and qualified exemptions.<sup>229</sup> Qualified exemptions are subject to the additional determination as to whether the duty to confirm or deny

221. *Id.* at 261.

222. "Any information to which a request for information relates is exempt information if it constitutes personal data of which the applicant is the data subject." Freedom of Information Act 2000, c. 36, § 40(1), (U.K.).

223. COPPEL, *supra* note 116, at 102.

224. Freedom of Information Act 2000, c. 36, § 8, (U.K.).

225. *Id.* § 1(1)(a) – (b).

226. *Id.* § 1(3).

227. *Id.* § 1(4).

228. *See id.* §§ 21 (information accessible to the applicant by other means), 23 (information supplied by or relating to bodies dealing with security matters), 32 (court records), 34 (information subject to Parliamentary privilege), 36 (information prejudicial to the effective conduct of public affairs), 40(1) (personal information constituting personal data with the applicant the data subject), 40(5B)(a)(i) (personal data not belonging to the applicant, and not manual data, the disclosure of which would breach one of the data protection principles), 40(5B)(a)(ii) (personal data not belonging to the applicant, the disclosure of which would breach one of the data protection principles), 41 (information provided in confidence), and 44 (information subject to a prohibition on disclosure under any statute or Community obligation or which would constitute a contempt of court).

the existence and content of information is outweighed by the public interest in maintaining the exclusion or exemption.<sup>230</sup> Where a request for information is refused, the public authority must provide a notice stating that fact, the exemption, and the basis for applying the exemption.<sup>231</sup>

#### 4. *Information Commissioner*

The Data Protection Commissioner (DPC) in the U.K. has been renamed the Information Commissioner.<sup>232</sup> Every public authority must maintain a publication scheme with the Information Commissioner approving model publication schemes.<sup>233</sup> A code of practice is to be issued by the Secretary of State and Lord Chancellor to assist public authorities.<sup>234</sup> The Information Commissioner is to promote the adoption of good practice by public authorities in carrying out their functions under the Act and may make good practice recommendations to specific authorities.<sup>235</sup>

#### 5. *Information Remedies*

Any person may apply to the Information Commissioner for a decision as to whether a request for information has been dealt with in accordance with the requirements of the Act.<sup>236</sup> The Commissioner may request a public authority to provide information with an information notice.<sup>237</sup> The Commissioner may serve an enforcement notice on an authority where the Commissioner considers that the authority has failed to comply with the Act, requiring the authority to take such action as may be specified within a stated time.<sup>238</sup> Appeals are considered by the Information Tribunal.<sup>239</sup>

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229. See *id.* §§ 22 (information intended for future publication), 24 (information with exemption required for the purpose of safeguarding national security), 26 (defence), 27 (international relations), 28 (relations between U.K. institutions), 29 (the economy), 30 (public authority investigations and proceedings), 31 (law enforcement), 33 (audit functions), 35 (government policy formulation), 37 (communications with Her Majesty and honours system), 38 (health and safety), 39 (environmental protection), 42 (legal professional privilege), and 43 (commercial interest).

230. See *id.* § 2(1)(a) – (b). For comment, see COPPEL, *supra* note 116, at 363 – 73. On interpretation and the burden of proof, see *id.* at 373 – 79.

231. Freedom of Information Act 2000, c. 36, § 17(1)(a) – (c) (U.K.).

232. See *id.* § 18.

233. *Id.* §§ 19(1)(a), 20.

234. *Id.* §§ 45(1) – 46(1).

235. *Id.* §§ 47 – 48.

236. *Id.* § 50(1).

237. *Id.* § 51(1).

238. *Id.* § 52(1); see also *id.* § 53(2) (giving authorities the ability to issue a signed certificate stating that they do not consider that any failure has occurred).

239. See *infra* Section V. See generally COPPEL, *supra* note 116, at 728 – 56 (outlining the appeals process under the Freedom of Information and Data Protection Acts).

### C. INTELLECTUAL PROPERTY INFORMATION

Intellectual property rights arise as a result of creative effort or from commercial reputation or goodwill.<sup>240</sup> A number of distinct types of rights can be distinguished, including copyright, performance rights, patents, registered designs, design rights, and trademarks, with other remedies available in the U.K. in terms of breach of confidence, passing off, and libel. These are essentially based on original expression or performance content, process invention, and design production. Such rights are in the form of intangible property that can be transferred, licensed, and assigned.<sup>241</sup> Patents are specifically stated under statute to constitute personal property without being a thing in action.<sup>242</sup> Most rights are created under statute, although common law property rights have also been recognised.<sup>243</sup>

Intellectual property is justified in economic terms through the need to promote innovation and creativity with the prevention of market failure and free riders.<sup>244</sup> The award of intellectual property rights can be justified on the basis that it should reward labour and create incentives for innovation, investment, and reinvestment. It should also limit negative externalities (such as pollution), promote private bargaining, and avoid the “tragedy of commons” (such as with regard to overfishing).<sup>245</sup> Such rights can nevertheless also act as barriers to entry and limit freedom of action, as well as allow private actors to assume market control and dominance.<sup>246</sup> In so doing, they may be considered to undermine a range of other fundamental commercial and human rights.<sup>247</sup>

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240. DAVID I. BAINBRIDGE, *INTELLECTUAL PROPERTY* 3 (3d ed. 1996).

241. Intellectual property rights are recognised as property for the purposes of the European Convention on Human Rights and Fundamental Freedoms (ECHR), which was adopted in 1950 and implemented in the U.K. under the Human Rights Act 1988, which came into effect in October 2000. The Convention provides for specific protections, including fair trial (article 6), privacy (article 8), freedom of expression (article 10), and property (article 1 of the First Protocol). The European Court of Human Rights has confirmed that, “the Court would stress that intellectual property benefits from the protection afforded by art. 1 of Protocol No. 1 to the Convention.” *Neij and Kolmisoppi v. Sweden*, App. No. 40397/12, Eur. Ct. H.R. 11 (2013), <http://hudoc.echr.coe.int/eng?i=001-117513>. See also *Anheuser-Busch, Inc v. Portugal*, App. No. 73049/01, Eur. Ct. H.R. 29 (2007), <http://hudoc.echr.coe.int/eng?i=001-78981>. See generally LIONEL BENTLY ET AL., *INTELLECTUAL PROPERTY LAW* 26 – 27 (4th ed. 2014) (discussing intellectual property within the EU framework).

242. Patents Act 1977, c. 37, § 30(1) (U.K.).

243. The Court of Chancery accepted that the plaintiff had acquired property in a trademark which was recognised in equity. *Leather Cloth Co. v. American Leather Cloth Co.* (1863) 4 De GJ&S 137, 141 (Eng.).

244. See, e.g., PAUL TORREMANS & JON HOLYOAK, *INTELLECTUAL PROPERTY LAW* 7 nn.13 – 14 (8th ed. 2016).

245. See PETER DRAHOS & JOHN BRAITHWAITE, *INFORMATION FEUDALISM* 13 (2002).

246. *Id.* at 3.

247. *Id.*

Intellectual property law can be justified on a labour or incentive theory.<sup>248</sup> The English philosopher John Locke (1632 – 1704) attributed property rights to labour rather than divine command or the King's indulgence.<sup>249</sup> While this can be considered to create a new form of property, certain commentators deny that intellectual property rights constitute property.<sup>250</sup>

The protection of ideas in law can be considered as being strongest in relation to patents and moving through to property, copyright, contract, tort, and equity.<sup>251</sup> Intellectual property is a difficult subject matter which has to balance private and public interest.<sup>252</sup> Intellectual property and other areas of substantive law may have to be reconsidered together and integrated into a consolidated statement of law concerning information rights and protection.<sup>253</sup> This has to reflect the legitimate interests of individuals and creators, as well as that of the public in exchange, communication, and innovation.

### 1. *Origins*

Speech was originally controlled in England through prohibitions on sedition and libel by act of 1275. Sedition was enforced by the Star Chamber, which was a court of Privy Councillors within the Palace of Westminster.<sup>254</sup> This was replaced by a licensing system which transferred censorship from royalty to Parliament.<sup>255</sup> Patents were originally issued as

248. On Locke's labour theory of property, see Diane L. Zimmerman, *Information as Speech, Information as Goods: Some Thoughts on Marketplaces and the Bill of Rights*, 33 WM. & MARY L. REV. 665, 676, 692 – 703 (1992). The incentive theory supported publication in the public interest after a limited period although this was later used to extend the author's protection. On the incentive theory, see *id.* at 703 – 712. See also Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARVARD L. REV. 281, 284 – 93 (1970).

249. Locke stated that property rights arose through the transformation of labour rather than divine direction or the grace of kings. The social contract created between a government and its people included protection of these property rights. JOHN LOCKE, *TWO TREATISES ON CIVIL GOVERNMENT* 69 – 70 (J.M. Dent & Sons, 1924) (1689).

250. See also J.E. PENNER, *THE IDEA OF PROPERTY IN LAW* 109 – 18 (1997).

251. Hammond, *supra* note 110, at 107 – 18.

252. Hammond notes that society has "to evolve a political response to the problem of technology and the proper protection of knowledge-based assets without damaging a central facet of our human heritage—the commonality of ideas." *Id.* at 121. Hohfeld considered property as a bundle of rights. W. HOHFELD, *FUNDAMENTAL LEGAL CONCEPTIONS* 28 – 29 (1923). See generally W. Cornish, *Confidence in Ideas*, 1 INTELL. PROP. J. 3 (1990).

253. For similar comment, see Hammond, *supra* note 110, at 123 – 124.

254. This was abolished by the Habeas Corpus Act 1640 which gave prisoners the right to have the true cause of imprisonment certified. See generally Habeas Corpus Act 1640, 16 Car. I, c. 10 (Eng.).

255. Licensing was introduced under An Ordinance for the Regulating of Printing of 1643, with all works having to be approved by the Stationers' Company. This was criticised by John Milton in *Areopagitica* (1644). A Licensing of the Press Act was enacted in 1662 (14 Car II, c. c.



royal grants under royal prerogative which created a monopoly of use.<sup>256</sup> Statutory rights were introduced under the Statute of Monopolies in 1624, which granted a “true and first inventor” a patent monopoly for fourteen years on “any manner of new manufacture.”<sup>257</sup>

Copyright was introduced in 1710 and conferred on the author a right of protection for fourteen years with a fourteen year renewal.<sup>258</sup> Copyright only applied to published, rather than unpublished, works and was subject to the statutory terms specified.<sup>259</sup> Creating perpetual rights of copyright and monopolies was rejected in *Millar v. Taylor*<sup>260</sup> and *Donaldson v. Beckett*.<sup>261</sup> In *Donaldson v. Beckett*, Justice Blackstone was clearly concerned with the monopoly effects of new intellectual property rights.<sup>262</sup> Copyright was originally restricted in time and to the precise form of expression of an idea.<sup>263</sup>

## 2. *Free Speech*

Specific issues arise with regard to the relationship between freedom of speech and the proprietary effects of intellectual property rights. Information can either be considered as being a public right and public commons<sup>264</sup> or a private commodity and private wealth.<sup>265</sup> In the United

33), which was renewed until 1695, and the first Copyright Act was adopted in 1710 (8 Anne, c19). The Licensing Act was eventually repealed by the Statute Law Revision Act 1863.

256. See RICHARD MILLER ET AL., TERRELL ON THE LAW OF PATENTS § 1-04 (18th ed. 2016).

257. Statute of Monopolies 1623, 23 Jac. c. 3, § 6 (Eng.). Application procedures were formalised under the Patent Law Amendment Act 1852 and judges replaced juries in considering disputes under the Patents, Designs and Trade Marks Act 1883.

258. *Id.*

259. Pope v. Curl (1741) 26 Eng. Rep. 608 (ruling against a book publisher who had not obtained consent to publish the materials therein). Lord Mansfield noted in *Millar v. Taylor* that “it is just, that an author should reap the pecuniary profits of his own ingenuity and labour.” (1769) 98 Eng. Rep. 201 (KB) 249 – 50. This arguably follows Locke’s labour rather than natural law theory of property. LOCKE, *supra* note 249. See also Zimmerman, *supra* note 248, at 687 – 88, 690, 692 – 703.

260. Justice Yates was concerned that a permanent monopoly created through a perpetual common law right to copyright would suppress valuable works. An “entire dominion” would undermine learning. *Millar*, 98 Eng. Rep. at 231 – 32.

261. The House of Lords rejected perpetual rights. Lord Chief Justice De Grey was concerned that perpetual copyright could create “extravagant” prices for books and allow an author or their successors “absolute control over his ideas when published.” Lord Camden stated that, “If there be anything in the world common to all mankind, science and learning are in their nature *publici juris*, and they ought to be as free and general as air or water.” He added that “Why did we enter into society at all, but to enlighten one another’s minds, and improve our faculties, for the common welfare of the species?” *Donaldson v. Beckett* (1774) 17 Parl. Hist. Eng. 953, 991, 999 (HL).

262. *Id.*

263. English copyright was initially restricted to a renewable period of 14 years. Statute of Anne 1710, 13 Ann. c. 19 (Eng.).

264. See e.g., James Buchanan, *An Economic Theory of Clubs*, 32(125) *ECONOMICA* 1, 1 (1965) (arguing for a spectrum system of ownership characterization, whereby public and private classification of activities, goods, and services was not limited solely to one or the other).

States, an individual is entitled to the free use of information where it has been acquired legitimately and with free use only being limited by a contrary powerful and unusual interest.<sup>266</sup> Freedom of information is constitutionally protected in the United States.<sup>267</sup> A separate body of law nevertheless also recognises the commercial value of information as private property,<sup>268</sup> while only limited disputes have generally arisen between these areas in practice despite the significance of the underlying conflicts involved.<sup>269</sup>

The importance of freedom of speech and property was recognised during the Enlightenment in the 1600s and 1700s,<sup>270</sup> although protecting public and private rights developed separately subsequently.<sup>271</sup> The idea of information as a common belonging to society as a whole emerged and was generally

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265. Zimmerman distinguishes between information as a public commodity and private wealth. Zimmerman, *supra* note 248, at 655 – 56.

266. See U.S. CONST. amend. I; see also *Florida Star v. B.J.F.*, 491 U.S. 524 (1989) (holding that a newspaper was entitled to publish the name of a rape victim despite a privacy claim).

267. Zimmerman notes that “Words, information, ideas, facts, and concepts—that vast array of human knowledge and expression—are not available to the public merely as a customary matter; their use is presumptively and powerfully protected by the Bill of Rights.” Zimmerman, *supra* note 248, at 665.

268. This includes copyright, trademark (Lanham Act), and common law doctrines of trade secrets, rights of privacy and publicity, and unfair trade practices. See, e.g., Zimmerman, *supra* note 248, at 665.

269. Zimmerman notes that “despite large areas of peaceful coexistence between the values protected by the Speech and Press Clauses and those defended by property doctrines, conflict between the two is serious.” *Id.* at 667. An extended array of “new or reconstructed property theories is cannibalizing speech values at the margin.” *Id.* Zimmerman states that speech claims are considered to be “inherently weaker” than property claims with courts failing to examine the proper “justifications, functions of, and limitations on property rules.” *Id.* at 667. Zimmerman adds that without “obvious bright lines to establish the limits of commodification, disputes over free versus exclusive use are often resolved mechanically rather than analytically, coming down to contests of characterization.” *Id.* at 668. He points out that the divisions are drawn vaguely and arbitrarily and that the treatment of actions is in many cases “essentially up to the discretion and sense of justice of a particular judge or jury” and refers to the results of the conflict as “clearly an untenable mess.” *Id.* at 673, 725.

270. Cato, *Of Freedom of Speech*, N.Y. WKLY. J. (1734), reprinted in FREEDOM OF THE PRESS FROM ZENGER TO JEFFERSON 11 – 12 (Leonard W. Levy ed., 1966) (“Security of Property, and the Freedom of Speech always go together; and in those wretched Countries where a Man cannot call his Tongue his own he can scarce call anything else his own.”). John Trenchard and Thomas Gordon wrote together under the pseudonym ‘Cato’ which included papers on freedom of speech and press. See generally Summary of *Cato’s Letters*, ONLINE LIBRARY OF LIBERTY, <https://oll.libertyfund.org/titles/trenchard-catos-letters-vol-1-1737-ed> (last visited Feb. 18, 2020). For discussion, see FREEDOM OF THE PRESS FROM ZENGER TO JEFFERSON 677 – 685 (Leonard W. Levy ed., 1966) [hereinafter FREEDOM OF THE PRESS].

271. See generally FREEDOM OF THE PRESS, *supra* note 270, at xix. Speech was originally controlled through laws against seditious libel in England in 1275 with a licensing system and a need for prior approval of content adopted following the advent of printing in 1476. *Id.* Licensing was abolished in 1694, although criminal libel was retained. *Id.* at lv n.95; see also Lynman R. Patterson, *Copyright in Historical Perspective*, 16 HARV. LIBR. BULL. 370 (1968); L. Ray Patterson, *Free Speech, Copyright, and Fair Use*, 40 VAND. L. REV. 1, 21 (1987); Zimmerman, *supra* note 248, at 677 – 685.

accepted by the end of the 1700s.<sup>272</sup> Thomas Jefferson was concerned with the protection of ideas.<sup>273</sup> Justice Story was separately concerned with the monopolization of thoughts and expressions.<sup>274</sup> Ideas and facts were excluded from copyright protection in the United States.<sup>275</sup> The limits of the relationship between free speech and property arguably still remain unclear.<sup>276</sup>

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272. See Zimmerman, *supra* note 248, at 678; Commissioner of Police v. Ombudsman (1998) 1 N.Z.L.R. 385 (N.Z.). Locke promoted free speech on religion, with later writers such as Trenchard and Gordon, James Alexander, David Hume, Jeremy Bentham, John Milton, and Robert Burton promoting freedom of speech. See FREEDOM OF THE PRESS, *supra* note 270; Zimmerman, *supra* note 248, at 674 – 680.

273. See discussion *supra* Section III.

274. 8 JOSEPH STORY, COMMENTARIES ON EQUITY JURISPRUDENCE AS ADMINISTERED IN ENGLAND AND AMERICA 118-119 (Isaac Redfield ed., 8th ed. 1861) (“Language is common to all . . . [t]he difficulty here is to distinguish what belongs to the exclusive labours of a single mind, from what are the common sources of the materials of the knowledge, used by all.”).

275. Baker v. Selden, 101 U.S. 99, 104 – 05 (1879); Chi. Record-Herald Co. v. Tribune Ass’n, 275 F. 797, 798 – 99 (7th Cir. 1921); Zimmerman, *supra* note 248, at 684; Copyright Act, 17 U.S.C. § 102(b) (United States copyright protection excludes “any idea, procedure, process, system, method or operation, concept, principle, or discovery.”).

276. Zimmerman recommends that property rules are made content neutral and that they should only apply where some “formal embodiment of expression” is involved and a “serious claim of concrete economic harm” can be established. Zimmerman, *supra* note 248, at 725 – 40. The law created economic incentives to promote creation which would benefit the author and public. For discussion, see BENJAMIN KAPLAN, AN UNHURRIED VIEW OF COPYRIGHT LAW 22 – 25 (1966). While the House of Lords in Donaldson v. Beckett based their decision on statutory copyright they accepted a creator’s natural right to the exclusive possession of intangible ideas. (1774) 1 Eng. Rep. 837 (HL) 997. Lord Camden stated that, “Most certainly, every man who thinks has a right to his thoughts while they continue his; but here the question again returns; when does he part with them? When do they become *publici juris*? While they are in his brain no one indeed can purloin them; but what if he speaks, and lets them fly out in private or public discourse? Will he claim the breath, the air, the words in which his thoughts are clothed?” *Id.* Copyright can be justified on the basis of natural law and natural rights or Locke’s labour theory and value or an incentive theory that rewards creation. See *id.*; see also Abernethy v. Hutchinson 47 Eng. Rep. 1313 (Ch. 1825) (conjunctive relief was granted to prevent the publishing of lecture notes in the medical journal, *Lancet*, which notes had been prepared following extemporaneous spoken lectures without separate copyright protection); Prince Albert v. Strange (1849) 41 ER 1171 (a publisher was prevented from describing pictorial engravings made by Queen Victoria and Prince Albert in addition to protecting copyright in the copy engravings). It was unclear whether there was a common law right to copyright before the Act of 1710. Lord Camden in *Donaldson* stated that prior rights had been founded on “patents, privileges, Star Chamber Decrease and the bylaws of the Stationers’ Company.” *Donaldson* 1 Eng. Rep. 837 (HL). A thirty year “Battle of the Booksellers” began in 1743 as the Stationers’ Company attempted to protect their privileges, in particular, against Scottish booksellers when copyrights granted before the Act of 1710 started to expire in 1731. The Stationers’ Company argued that there was a common law right to copyright before the act. Lord Mansfield confirmed that copyright common law existed “upon Principles before and independent” of the 1710 Act with an author having the right to “reap the pecuniary Profits of his Ingenuity and Labour” in *Millar v. Taylor* (1769) 98 Eng. Rep. 201. Justice Yates dissented arguing that a virtual monopoly would have prejudiced “the rest of mankind.” The House of Lords subsequently ruled that copyright was not perpetual and restricted by statute under the

### 3. *U.K. Intellectual Property Law*

Trade marking in the form of embossing dates from Roman times. This was brought within statutory control in England under the Trade Marks Registration Act 1875, which was consolidated into the Patents, Designs and Trade Marks Act 1883. The definition of a trade mark was clarified under the Trade Marks Act 1905, with the trade mark register being divided into a part A and B under the Trade Marks Act 1919. This was followed by the Trade Marks Act 1938, with service marks also being included under the Trade Marks (Amendment) Act 1984.<sup>277</sup>

Patents were originally conferred in the form of monopoly rights by royal prerogative, with this subsequently being challenged before the courts.<sup>278</sup> Crown licensing ended in 1694 with publishers looking for protection in the law of libel and new statutory copyright with the ending of licensing in 1694.<sup>279</sup> Lord Mansfield, Lord Chief Justice of the King's Bench, followed Blackstone's *Millar v. Taylor* in holding that a plaintiff had a common law copyright which was not lost on publication, and the Copyright Act did not abrogate this.<sup>280</sup>

### 4. *EU Intellectual Property Law*

European institutions have attempted to harmonise laws relating to intellectual property across the EU to limit trade barriers and secure effective rights protections, as well as promote innovation and creativity, develop employment, and improve competitiveness.<sup>281</sup> Intellectual property rights constitute intangible assets and allow firms to benefit from their

1710 Act in *Donaldson v. Beckett* (1774) 1 Eng Rep 837 (HL). Scottish printers, Alexander and Donaldson, had attempted to publish an unlicensed edition of James Thomson's poem cycle *The Seasons* published in 1726 and 1730. The dispute began with *Midwinter v. Hamilton* (1743 – 1748) with the Scottish booksellers arguing that there was no common law copyright. Other cases included *Millar v. Cincaid* (1749 – 1751) and *Tonson v. Collins* (1761). RONALD DEAZLEY, *RETHINKING COPYRIGHT: HISTORY, THEORY, LANGUAGE* 14 – 25 (2006). See generally RONAN DEAZLEY, *ON THE ORIGIN OF THE RIGHT TO COPY* (2004). The U.S. Supreme Court held that an author had an unpublished common law right to protection until first publication in *Wheaton v. Peters*, 33 U.S. 591 (1834). See generally Samuel D. Warren & Louis D. Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193 (1890).

277. See, e.g., *TORREMANS & HOLYOAK*, *supra* note 244, at 8.

278. *Darcy v. Allin* (1602) 74 Eng. Rep. 1131, 1140 (holding invalid Queen Elizabeth I's grant of a monopoly to import and distribute playing cards in England).

279. Hammond, *supra* note 110, at 101.

280. *Millar*, 98 Eng. Rep. at 257. William Blackstone was working on his treatise on the Laws of England and adopted a natural law theory of literary property which followed Locke in allowing a man to enjoy the fruits of his labour. S. Milsom, *The Nature of Blackstone's Achievement*, 1 OXFORD J. LEGAL STUD. 1, 1 (1981). For comment, see Hammond, *supra* note 110, at 102 – 105. Lord Mansfield referred to copyright being “a property in notion,” which appeared to follow from Locke's reference to ideas being “notions.” JOHN LOCKE, 2 AN ESSAY CONCERNING HUMAN UNDERSTANDING 206 (P. Nidditch ed, 1975).

281. *Intellectual Property*, EUR. COMM'N, [https://ec.europa.eu/growth/industry/intellectual-property\\_en](https://ec.europa.eu/growth/industry/intellectual-property_en) (last visited Dec. 22, 2019).

creative and innovative work, and with such assets representing more than half the value of companies.<sup>282</sup> The Commission adopted a package of measures in November 2017 to strengthen intellectual property rights as part of its Single Market Strategy and Digital Single Market (DSM) Strategy.<sup>283</sup> The DSM is referred to as one in which the free movement of goods, persons, services, and capital can be secured, with individuals and businesses being able to access and exercise online activities seamlessly under conditions of fair competition and with a high degree of consumer and personal data protection.<sup>284</sup> The Commission consulted on the establishment of a Single Digital Gateway in July 2016 to improve information access across the EU. The Digital Single Market Strategy is based on three pillars of access, environment, and economy in society, with achievements assessed in terms of digital culture, future, life, trust, shopping, and connectivity.<sup>285</sup>

A number of measures have been adopted within Europe and the EU to promote competition in the intellectual property area. A European Patent Convention (EPC) was entered into in Munich in 1973 to create a single application and search procedure, with a European Patent Office being created in Munich.<sup>286</sup> A European Community Patent Convention was adopted in Luxembourg in 1975 without coming into effect.<sup>287</sup> The new system was to come into effect with the Unified Patent Court Agreement, which was signed in February 2013. Trademarks have been subject to EU harmonisation through a first Directive in 1989 and a Regulation in 1994.<sup>288</sup>

It was not possible to agree to general copyright terms within the EU until recently, with the Directive on Copyright in the Digital Single Market being adopted in April 2019.<sup>289</sup> Certain rights had been harmonised under the Copyright Directive 2001/29/EC, which was adopted to implement the 1996 WIPO Treaties on copyright and performances. The objective is to provide better choice and access to content online and across borders;

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282. *Id.*

283. European Commission, *Upgrading the Single Market: More Opportunities for People and Business*, at 1, COM (2015) 550 final (Oct. 28, 2015); European Commission, *A Digital Single Market Strategy for Europe*, at 3, COM (2015) 192 (final) (May 6, 2015).

284. European Commission, *A Digital Single Market Strategy*, at 3, COM (2015) 192 final (May 6, 2015).

285. *Policies*, EUR. COMM'N, <https://ec.europa.eu/digital-single-market/en/policies/shaping-digital-single-market> (last visited Dec. 22, 2019).

286. *The History of the EPO*, EUR. PATENT OFF., <https://www.epo.org/about-us/timeline.html> (last visited Dec. 22, 2019).

287. Two EU regulations were adopted in 2012 under the enhanced cooperation procedure to establish a unitary patent system with a European Patent with unitary effect (EPUE). See Council Regulation 1257/2012, 2012 O.J. (L 361) 1 (EU); Council Regulation 1260/2012, 2012 O.J. (L 361) 89 (EU).

288. Council Directive 2008/95, 2008 O.J. (L 299) 25 (EC); Council Regulation No. 207/200, 2009 O.J. (L 78) 1 (EC).

289. Directive 2019/790, of the European Parliament and of the Council of 17 April 2019 on Copyright and Related Rights in the Digital Single Market and Amending Directives 96/9/EC; 2001/29/EC, 2019 O.J. (L 130) 92.

improve copyright rules on research, education, and cultural heritage; and secure a well-functioning marketplace for copyright.<sup>290</sup> The 2019 Directive strengthens the specific provisions set out in the 2001 Directive by creating a copyright exception for text and data mining (TDM), an exemption for digital and cross-border teaching activities, and a limited protection for visual or reproductions to original creative works, as well as by conferring on publishers copyright over online use of press publications by information society service providers, replacing the mere conduit exemption with an effective and proportionate conditional exemption, and strengthening the rights of authors and performers.

An Intellectual Property Enforcement Directive (IPRED) was adopted in 2004 to strengthen civil enforcement mechanisms within member states.<sup>291</sup> The Commission published a Communication on the adoption of a balanced IP enforcement system in response to societal challenges.<sup>292</sup>

### 5. *International Intellectual Property Law*

International patent protection was provided for under the Paris Convention for the Protection of Industrial Property in 1883. This established a national treatment provision, priority rights system, and common rules for patents, trademarks, industrial designs, utility models, service marks, trade names, and geographical indications. A Patent Cooperation Treaty (PCT) was enacted in 1970 to allow for the filing of international applications under a single unified procedure, although patent awards remained at the discretion of individual countries.

A Madrid Agreement concerning the International Registration of Marks was signed in 1892 to create a single registration system, with the U.K. joining the system through a separate Protocol signed in Madrid in 1989.<sup>293</sup> Application procedures were harmonised under the Trade Mark Law Treaty in Geneva in 1994 and the Treaty on the Law of Trademarks entered into in Singapore in 2006. A uniform international classification system has also been adopted.<sup>294</sup>

A Berne Convention for the Protection of Literary and Artistic Works was entered into in 1886, which establishes national treatment in relation to copyright, as with patents under the Paris Convention. A WIPO Copyright Treaty was adopted in Geneva in 1996 to protect internet communication

290. *Modernisation of the EU Copyright Rules*, EUR. COMM'N, <https://ec.europa.eu/digital-single-market/en/modernisation-eu-copyright-rules> (last visited Dec. 22, 2019).

291. Council Directive 2004/48, 2004 O.J. (L 195) 16 (EC).

292. European Commission, *A Balanced IP Enforcement System Responding to Today's Societal Challenges*, COM (2017) 707 final (Nov. 29, 2017).

293. TORREMANS & HOLYOAK, *supra* note 244, at 33 – 34.

294. Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks, June 15, 1957, 23 U.S.T. 1353; WIPO Performances and Phonograms Treaty, Dec. 20, 1996, <https://wipolex.wipo.int/en/text/295477>; Vienna Agreement Establishing an International Classification of the Figurative Elements of Marks, Oct. 1, 1985, <https://wipolex.wipo.int/en/text/294836>.

rights as part of the Berne Convention process. A separate Universal Copyright Convention (UCC) was entered into in Geneva in 1952 under the United Nations Educational, Scientific and Cultural Organisation (UNESCO), although the U.S. has adhered to the Berne Convention rather than the UCC. Other measures were adopted in relation to performers, performance rights, and disabled persons.<sup>295</sup>

International treaties and conventions on intellectual property are supplemented by the Trade Related Aspects of Intellectual Property Rights (TRIPS) initiative adopted as part of the Uruguay Round of world trade negotiations conducted by the World Trade Organisation (WTO) in 1995. This incorporates intellectual property into the international multilateral trading system and requires countries to adopt minimum intellectual property protections where they have not already done so under the other treaties and conventions in place. It also contains remedy provisions and enforcement and dispute resolution procedures.<sup>296</sup>

#### D. AGGREGATE INFORMATION, BIG DATA, AND DATA BASE PROTECTION

The law must also recognise new forms of creative construction, including coding, programming, and databases. The effect of this is to extend the degree of protection provided for creative works into the digital realm. One of the most interesting underlying issues that arises is whether computer code of itself can create separate new property interests or assets apart from the code itself, such as with digital or cryptographic coin generation on a blockchain or other form of distributed ledger technology (DLT).<sup>297</sup>

##### 1. *Software Protection*

Only limited rights were originally available to protect computer programs, although these have been extended over time. Software copyright is available in the United States, with the definition of literary works including computer programs.<sup>298</sup> Copyright is available in the United States to

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295. Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organisations, Oct. 26, 1961, 496 U.N.T.S. 43; World Intellectual Property Organization Copyright Treaty, Dec. 20, 1996, 112 Stat. 2860, 2186 U.N.T.S. 121; World Intellectual Property Organization Performances and Phonograms Treaty, Dec. 20, 1996, 112 Stat. 2860, 2186 U.N.T.S. 203; Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired, or Otherwise Print Disabled, Jun. 27, 2013, 52 I.L.M. 1312. See also TORREMANS & HOLYOAK, *supra* note 244, at 34 – 36.

296. TRIPS covers copyright and related rights, trademarks, geographical indications, industrial designs, patents, integrated circuit layout designs, and undisclosed information, including trade secrets and test data. See, e.g., *Overview: The TRIPS Agreement*, WORLD TRADE ORG., [https://www.wto.org/english/tratop\\_e/trips\\_e/intel2e.html](https://www.wto.org/english/tratop_e/trips_e/intel2e.html) (last visited Dec. 22, 2019).

297. See *infra* Section VI.

298. Copyright Act, 17 U.S.C. § 102. Literary works are “works, other than audio visual works, expressed in words, numbers, or other verbal or numerical symbols or indicia, regardless

original works of “authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.”<sup>299</sup> Evading copyright protection was made a criminal offence under the Digital Millennium Copyright Act (DMCA) 1998, which implemented the 1996 WIPO treaties in the United States.<sup>300</sup>

## 2. *Computer Programmes*

Computer programs are protected as copyright in the EU under the Computer Programs Directive, which was originally adopted in 1991, with a codified version published in 2009.<sup>301</sup> This protects programs as literary works under the 1886 Berne Convention.<sup>302</sup> Programmers are given exclusive rights subject to specific limitations.<sup>303</sup> The Directive was implemented in the U.K. under the Copyright (Computer Programs) Regulations 1992 as amended.<sup>304</sup>

## 3. *Databases*

Copyright is extended to include databases under Directive 96/9/EC.<sup>305</sup> Copyright is extended to databases where the selection or arrangement of their contents constitute the author’s own intellectual creation.<sup>306</sup> General rights and limitations apply, with the duration being sixty years after the

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of the nature of the material objects, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks, or cards, in which they are embodied.” 17 U.S.C. § 101. A computer program is a “set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.” *Id.*

299. *Id.* § 102.

300. Digital Millennium Copyright Act, 17 U.S.C. § 512.

301. Council Directive 91/250/EEC, 1991 O.J. (L 122) 42 (EC); Council Directive 2009/24/EC, 2009 O.J. (L 111) 16 (EC).

302. Council Directive 2009/24/EC, 2009 O.J. (L 111) 16 (EC).

303. Copyright owners have the exclusive right to authorise the temporary or permanent copying of the program, its translation, adaptation or alteration, or distribution to the public, including rental, subject to the first sale doctrine, which allows the acquirer to transfer the program on without limitation. Many programmers attempt to license rather than sell works for this reason, although the legal effectiveness of this varies. The resale of software licences was upheld by the ECJ in *UsedSoft GmbH v. Oracle Int’l Corp.*, Case c-128/11, *UsedSoft GmbH v. Oracle Int’l Corp.*, 2012 E.C.R. I-0000 (Jul. 3, 2012). Owners may make copies necessary to use the program, make back-up copies for personal use, and decompile to ensure its effective operation. WIPO Copyright Treaty, arts. 5 – 6, Dec. 20, 1996, <https://wipolex.wipo.int/en/text/295157>. Copyright duration was 50 years under the Berne Convention, although this was extended to the life of the author plus 70 years under Directive 93/98/EEC of 29 October 1993. Council Directive 93/98/EEC, 1993 O.J. (L 290) 9 (EC). TORREMANS & HOLYOAK, *supra* note 244, at 34 – 36

304. The Copyright (Computer Programs) Regulations, 1992 (No. 3233) (U.K.).

305. A database is a “collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means.” Council Directive 96/9/EC, art. 1(2), 1993 O.J. (L 77) 24 (EC).

306. *Id.* art. 3, at 25.



death of the author. This was implemented in the U.K. under the Database Regulations 1997.<sup>307</sup>

#### 4. *Criminal Extensions*

Further protection is provided by creating criminal offences in relation to the abuse of digital measures and machinery. This operates by prohibiting specific instances of misconduct rather than creating property interests as such, which creates its own difficulties and inconsistencies.<sup>308</sup> EU cyber security is dealt with under the Network Information Systems (NIS) Directive 2016/1148/EU, which came into effect in August 2016 and was to be implemented by May 9, 2018.<sup>309</sup>

#### 5. *Big Data*

The term “Big Data” is used to refer to large pools of data information that can be captured, communicated, aggregated, stored, and analysed using advanced modern processing software systems.<sup>310</sup> Specific challenges arise in curation, which refers to the collection, creation, maintenance, management, and dissemination of aggregate data collections.<sup>311</sup> The big data industry was expected to grow from around \$5 billion in 2014 to \$50 billion by 2017.<sup>312</sup>

Big data analytics involves the inferring of actionable information from large quantities of data using computational, mathematical, and statistical models.<sup>313</sup> Big data analysis can be considered in terms of volume, variety, velocity, variability, and veracity.<sup>314</sup> This should nevertheless be supported by a critical examination of the collection environment because use of alternative support measures with raw data has never been sufficient by itself.<sup>315</sup>

307. The Copyright and Rights in Databases Regulations, 1997 (No. 3032) (U.K.).

308. *Id.* § 4(5)(a).

309. Council Directive 2016/1148, 2016 O.J. (L 194) 1 (EU).

310. James Manyika et al., *Big Data: The Next Frontier for Innovation, Competition, and Productivity*, MCKINSEY GLOBAL INST. (2011), [http://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Big%20data%20The%20next%20frontier%20for%20innovation/MGI\\_big\\_data\\_exec\\_summary.ashx](http://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Big%20data%20The%20next%20frontier%20for%20innovation/MGI_big_data_exec_summary.ashx).

311. See, e.g., Renée Miller, Professor, Dep't of Computer Science, Univ. Toronto, Keynote Address, 20th International Conference on Management of Data (COMAD): *Big Data Curation* (Dec. 17 – 19, 2014), <http://comad.in/comad2014/Proceedings/Keynote2.pdf>.

312. *Id.*

313. *Id.*

314. Martin Hibert, *Big Data for Development: A Review of Promises and Challenges*, MARTINHIBERT.NET, <http://www.martinhibert.net/big-data-for-development/> (last visited Dec. 22, 2019).

315. On data analysis, Craig Dalton and Jim Thatcher focus on seven points for a critical approach to “big data.” Craig M. Dalton & Jim Thatcher, *What Does a Critical Data Studies Look Like, and Why Do We Care?*, SOC'Y & SPACE (May 12, 2014), <https://societyandspace.org/2014/05/12/what-does-a-critical-data-studies-look-like-and-why-do-we-care-craig-dalton-and->

Issues still arise in terms of what is subject to intellectual property protection. Some commentators consider that the collection and storage of data and processors should involve patentable hardware, with patent and copyright protection being available in organising and analysing the data. The data produced may be protectable as a propriety trade secret, at least, in the U.S., with reports and interpretations being copyrightable.<sup>316</sup> The EU has adopted a specific Directive on the legal protection of databases in February 1996, with fifteen years protection provided.<sup>317</sup>

## E. INFORMATION SECURITY, ENFORCEMENT, AND SURVEILLANCE

A number of separate issues arise with regard to the unauthorised and authorised use of information without the consent of the person concerned. Difficulties are produced in determining the extent to which information may be subject to criminal law, in particular, if it is not considered to constitute property more generally. Particular problems arise in relation to trade secrets and industrial espionage. State confidentiality must also be maintained through Official Secrets law. A proper legal basis must be provided to conduct government surveillance of state and non-state nationals. Private data protection and public information disclosure legislation must incorporate appropriate concessions for judicial, investigatory, and legitimate surveillance purposes.

### 1. *Criminal Law*

Criminal laws generally do not apply to intangible items, including information. The Theft Act in England requires the dishonest appropriation of property with intention to deprive.<sup>318</sup> Theft in Scotland requires appropriation and deprivation of possessory rights.<sup>319</sup> Some commentators have argued that theft should be applied to include

jim-thatcher/; see also David Bholat, *Big Data and Central Banks*, *BIG DATA & SOC'Y*, Jan. – June 2015, <http://journals.sagepub.com/doi/full/10.1177/2053951715579469>.

316. Steven Tepp, *Big Data and Intellectual Property Go hand in Hand*, U.S. CHAMBER OF COMMERCE FOUND. (Apr. 25, 2014), <https://www.uschamberfoundation.org/blog/post/big-data-and-intellectual-property-go-hand-hand/34384>; see also Bjorn Lundqvist, *Big Data, Open Data, Privacy Regulations, Intellectual Property and Competition Law in an Internet of Things World*, U. OF STOCKHOLM RES. PAPER NO. 1 (Dec. 31, 2016), [https://papers.ssrn.com/sol3/papers2.cfm?abstract\\_id=2891484](https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=2891484).

317. Council Directive 96/9/EC, art. 10, 1996 O.J. (L 77) 26.

318. “A person is guilty of theft if he dishonestly appropriates property belonging to another with the intention of permanently depriving the other of it.” Theft Act 1968, c. 60, § 1 (U.K.).

319. Theft requires appropriation which deprives the complainer temporarily or permanently of possessory rights in property with the intention of so doing. SIR GERALD H. GORDON, 2 *THE CRIMINAL LAW OF SCOTLAND* ¶ 14.01 (M.C.A. Christie ed., 3d ed. 2001). Stealing a book containing recipes constitutes theft. See *HMA v. Mackenzie*, (1913) 2 SLT 48 (Scot.). Stealing a pocket book to copy information and returning it would not constitute theft. *RV Dewar in BURNETT*, *TREATISES ON CRIMINAL LAW* 115 (1777). Misuse of confidential information is not a crime under Scots Law. *Grant v. Allen* (1988) 1988 SLT 11 (Scot.); Christie, *supra* note 145, at 349 – 60.

information,<sup>320</sup> although this may extend the limits of property unnecessarily to include information. It is arguable that adequate protections already exist, including in relation to confidential information and trade secrets. The law in this area would nevertheless be improved if the recommendations of the English Law Commission in these areas were reconsidered.<sup>321</sup>

## 2. *Misuse of Private Information*

Issues of misuse or misappropriation of information under the criminal law are generally based on establishing some form of interest or entitlement with reference to such factors as nature, value, relationship, control or transfer, and location or containment.<sup>322</sup>

## 3. *Official Secrets*

Information is protected under the Official Secrets Acts in the U.K. in terms of acquisition and disclosure.<sup>323</sup> These consist of four statutes, the Official Secrets Acts 1911, 1920 and 1989, which followed the original Official Secrets Act 1889. It is an offence under section 1(1) of the 1989 Act to disclose information, documents, or other articles relating to security or intelligence, and it is an offence under section 2(1) to disclose information, documents, or articles relating to defence.<sup>324</sup> A parallel offence is created in relation to international relations under section 3(1)(a) and to assist a criminal or the commission of a crime under section 4(1). The 1989 Act removed the earlier public interest defence under section 2 of the 1911 Act.<sup>325</sup>

## 4. *Surveillance*

Individuals have a right to protection against unlawful surveillance. Surveillance in the U.K. is generally carried out through the Government Communications Headquarters (GCHQ), with the intelligence services being subject to oversight by the Investigatory Powers Tribunal (IPT). Warrants are available under the Regulation of Investigatory Powers Act

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320. Christie, *supra* note 145, at 360.

321. The Law Commission recommended that the law should criminalise the use or disclosure of another's trade secret where the owner does not consent to its use or disclosure. LAW COMMISSION, CONSULTATION PAPER, LEGISLATING THE CRIMINAL CODE: MISUSE OF TRADE SECRETS, 1997, No. 145, ¶¶ 1.30, 5.3 (U.K.). The Law Commission also recommended that a full law reform project be undertaken to establish a principled and clear legal structure for data sharing to secure efficient and effective government, the delivery of public services and protection of privacy. LAW COMMISSION, REPORT, DATA SHARING BETWEEN PUBLIC BODIES, 2014, Law Com. No. 351 (U.K.).

322. Guido Calabresi & A. Douglas Melamud, *Property Rules, Liability Rules and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1089 – 90 (1972).

323. Official Secrets Act 1911, 1 & 2 Geo 5 c. 28, § 1 (U.K.); Official Secrets Act 1989, c. 6, § 5 (U.K.).

324. Official Secrets Act 1989, c. 6, §§ 1(1), 2(1).

325. See Official Secrets Act 1911, 1 & 2 Geo 5 c. 28, § 2.

2000, with information storage being dealt with under the Data Retention and Investigatory Powers Act 2014. Data may also be collected under the Telecommunications Act 1984. Government information is subject to the controls provided for under the Protection of Freedoms Act 2012, with individuals having separate claims under the Human Rights Act 1998.

### 5. *Interceptions*

Additional powers were conferred under the Investigatory Powers Act 2016, which was enacted on December 30, 2016. This *inter alia* allowed law enforcement agencies to carry out targeted interception of communications and the bulk collection and interception of communications data.<sup>326</sup> It also provided for the establishment of the Investigatory Powers Commission (IPC) to monitor the exercise of powers under the statute.

### 6. *Innovation, Competition, and Social Balance*

Most forms of intellectual property protection are granted for limited periods to balance individual reward and wider political and economic development.<sup>327</sup> Intellectual property creates a type of legal exclusivity in markets.<sup>328</sup> This creates a further form of intellectual commons which must be protected over time. Adjustments must necessarily be made in applying property law protections in the intellectual area, with information being open to a form of divided use and without limit by other persons.<sup>329</sup> Intellectual property protects original exploitation by the creator, although difficult issues arise in terms of balancing private property and public use with open competition and innovation. Intellectual property can still be distinguished from monopoly power, provided that there is some substitution or alternative use or market access.<sup>330</sup> More significant difficulties arise where this is not possible. The danger is that modern forms of intellectual property right can be abused and used to create new forms of technological mercantilism, servitude, or slavery based on the exclusive rights to communication and expression of innovation.

Thomas Jefferson stressed the need to protect intellectual activity and private property.<sup>331</sup> Jefferson advocated the protection of ideas.<sup>332</sup> Jefferson

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326. Investigatory Powers Act 2016, c. 25 (U.K.).

327. W. R. Cornish, *Intellectual Property: Patents, Copyright, Trademarks and Allied Rights* 11 (4th ed. 1999).

328. *Id.* at 34.

329. *Id.*

330. *Id.* at 34 – 40.

331. Jefferson noted that, “Stable ownership is the gift of social law, and is given late in the progress of society. It would be curious then, if an idea, the fugitive fermentation of an individual brain, could, of natural right, be claimed in exclusive and stable property.” Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813), *in* THOMAS JEFFERSON 333 – 334 (Merrill D. Peterson ed., Library of America 1984).

332. “If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as

nevertheless accepted that inventions may be subject to temporary public protection in the common good.<sup>333</sup> Justice Brandeis was separately concerned about the need to protect access to ideas.<sup>334</sup>

American academic Lawrence Lessig warns against the dangers of allowing overly restrictive rights in the areas of copyright, trademarks, and radio-frequency spectrum usage, which can damage communication and innovation.<sup>335</sup> Lessig advocates free culture and the free exchange of ideas and distribution of creative works through free content and open content channels and to support the adoption of a permission culture.<sup>336</sup> Lessig criticizes increased levels of concentration in the media and communications industries and argues against the creation of an information society based on feudal rather than free rights.<sup>337</sup>

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he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispose himself of it. Its peculiar character, too, is that no one possess the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Inventions then cannot, in nature, be a subject of property.” *Id.* at 333 – 334.

333. “Society may give an exclusive right to the profits arising from [inventions], as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint from anybody. Accordingly, it is a fact, as far as I am informed, that England was, until we copied her, the only country on Earth which ever, by a general law, gave a legal right to the exclusive use of an idea. In some other countries it is sometimes done, in a great case, and by a special and personal act, but, generally speaking, other nations have thought that these monopolies produce more embarrassment than advantage to society; and it may be observed that the nations which refuse monopolies of invention, are as fruitful as England in new and useful devices.” *Id.*

334. “The general rule of law is, that the noblest of human productions – knowledge, truths ascertained, conceptions, and ideas – they come, after voluntary communication to others, free as the air to common use.” *International News Service v. Associated Press*, 248 U.S. 215, 250 (1918) (Brandeis, J., dissenting); see also Yochi Benkler, *Free as the Air to Common Use: First Amendment Constraints on Enclosure of the Public Domain*, 74 N.Y.U. L. REV. 354, 355 (1999).

335. Lessig criticizes extensions in U.S. copyright protection especially in terms of duration (average 32.2 years to 95 years), scope (publishers and all users as well as derivative use), reach (multiple computer copying), control (prosecutions on interference) and increased concentration and integration (including control over political content and cultural evolution). LAWRENCE LESSIG, *THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD* 103 – 134 (2001). Five companies control 85 percent of media sources, four controlled 90 percent of radio advertising revenues, ten controlled half of the newspapers in the U.S., ten film studios received 99 percent of film revenue, and the ten largest cable companies received 85 percent of cable revenues. *Id.* at 125 – 134. Lessig discusses the regulation of ideas in terms of the code layer, the content layer and the physical layer. LAWRENCE LESSIG, *FREE CULTURE: HOW BIG MEDIA USES TECHNOLOGY AND THE LAW TO LOCK DOWN CULTURE AND CONTROL CREATIVITY* 161 – 63 (2004) [hereinafter *FREE CULTURE*].

336. See *FREE CULTURE*, *supra* note 335, at xiv.

337. *Id.* at xvi, 275.

Scottish legal academic, James Boyle, attempts to reassess the information society and information revolution in terms of rhetorical and interpretive construction to create a new social theory of the information society.<sup>338</sup> Genetic, electronic, and proprietary information had become the main sources and forms of wealth. Boyle criticizes the conferment of generous intellectual property rights and stresses the need to consider the interest of the sources of an audience for the information that is commodified.<sup>339</sup> Boyle examines the nature of property and the scope of non-property in terms of “public domain” and the “commons” separately and the difficulties in avoiding “the tragedy of the commons” and mismanagement of collective resources.<sup>340</sup> The information age requires that society preserve the public domain, including art, culture, and science. Boyle supports the warnings advocated by Thomas Jefferson, writing in 1813, on intellectual property rights.<sup>341</sup> Boyle advocates a form of information or cultural environmentalism or possibly environmental informationalism.<sup>342</sup>

The law can be considered to have a significant impact on market development, innovation, and market structure, and especially in the digital arena over time. Secrecy laws, intellectual property rights, and intermediate liability rules can restrict market growth and development. These factors can, for example, be used to explain the difference between the speed of computer and Internet innovation in the U.S. and Europe and Asia. This replaces motivational analysis based on high levels of relevant financial and human capital.<sup>343</sup>

Intellectual property rights allow private control over market information.<sup>344</sup> Market prices are generally dependent on market demand and substitutability.<sup>345</sup> A number of large businesses accumulate huge portfolios of intellectual property rights, which can prevent distribution and impose exorbitant use costs or penalties on other parties.<sup>346</sup> This allows these companies to become massive exporters of intellectual property rights for which other countries and companies have to pay.<sup>347</sup>

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338. JAMES BOYLE, *SHAMANS, SOFTWARE, AND SPLEENS – LAW AND THE CONSTRUCTION OF THE INFORMATION SOCIETY* ix – x (1996).

339. *Id.*

340. JAMES BOYLE, *THE PUBLIC DOMAIN – ENCLOSING THE COMMONS OF THE MIND* xiv – xv (2008).

341. *Id.* at xv.

342. *Id.* at 21 – 22.

343. It has been argued that American companies and, in particular, those in Silicon Valley, were able to take advantage of generous regulatory regimes to develop new programs and services that may not have been available in other jurisdictions. Chander claims that U.S. judges and legislators adjusted the law at the beginning of the new millennium to promote internet enterprise in the same manner that they had supported industrial development in the 19th Century. Anupam Chander, *How Law Made Silicon Valley*, 63 *EMORY L.J.* 639, 639 (forthcoming 2014).

344. See PETER DRAHOS & JOHN BRAITHWAITE, *INFORMATION FEUDALISM* 5 (2002).

345. *Id.*

346. *Id.* at 11.

347. *Id.*

An appropriate balance has to be achieved in providing legal protection to specific information rights and, particularly, intellectual property assets, especially where this can limit future innovation and market access, growth, and development. It is necessary to balance appropriation and individual reward with diffusion and collective benefit.<sup>348</sup>

## V. Digital Information Risk and Regulation

Technology can bring substantial advantage, although it can also generate significant potential risk and exposure. A number of specific vulnerabilities arise in relation to technology and information and information and data technology. This is an area that has not been subject to separate examination in detail to date.<sup>349</sup> It is accordingly of use to attempt to identify some of the specific exposures and challenges that firms and authorities may have to deal with over time. All of these can be considered to constitute a specific form of operational risk as opposed to financial, conduct, legal, or wider management or environmental risks. This only constitutes a provisional examination of the possible issues involved.

### A. TECHNOLOGY RISK

A number of potential exposures can be considered with regard to technology. These can, for example, be classified in terms of operations risk,<sup>350</sup> project risk,<sup>351</sup> compliance risk,<sup>352</sup> contract or execution risk,<sup>353</sup> and impact risk.<sup>354</sup> The significance and effect of each of these would depend upon the specific technology used and acts concerned. Firms and regulatory authorities will have to devote increasing attention to managing these

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348. *Id.* at 13.

349. *Id.*

350. For this paper, technology operations risk would include model or design risk, software risk, hardware risk, network or connection risk, and system or systems risk. *See also* John Spacey, *36 Types of Technology Risk*, SIMPLICABLE (April 16, 2016), <https://simplicable.com/new/technology-risk>.

351. Technology project risk would, for example, correspond with the full range of exposures that have to be taken into consideration in constructing major infrastructure projects and containing all relevant risks.

352. Technology compliance risk would reflect necessary adjustments to ensure that specific technology complied with current relevant regulatory, supervisory, resolution, market support, and macro prudential conditions.

353. Technology contract risk arises where legal contracts are entered into using new forms of interaction or technological device. Specific difficulties arise with contracts entered into online without any face-to-face contact or separate verification. This would include party identification risk, legal capacity or authority risk, content (or terms and conditions) risk, signature or execution risk, and enforcement risk.

354. Wider technology impact or implementation risk could include business or product supply chain disruption risk, regulatory fragmentation and supervisory dilution risk, technological dependence, exposure and vulnerability risk, complex loss transmission, causation and emergence risk, and the possibility of systems and systemic collapse.

potential exposures. Important new practices have already been adopted such as with the compliance by design principle adopted under GDPR.<sup>355</sup>

## B. INFORMATION RISK

Separate issues arise with regard to information. This can be considered in terms of definition risk and the need to attach clear and consistent meaning to relevant terms to determine associated legal rights and obligations.<sup>356</sup> This will specifically apply with regard to such terms as information, data, knowledge, ideas, and possibly archives. A number of specific possible exposures can then be considered with regard to information processing and content, as well as data risk, knowledge risk, and archives risk. Information processing risk is principally concerned with translation accuracy, communication,<sup>357</sup> volume management,<sup>358</sup> security, and integrity.<sup>359</sup>

Further exposures have arisen more recently with regard to information content and, in particular, where people act on partial or incomplete information or only take decisions on emotive rather than purely rational grounds. This has become a specific problem with online news and social media websites.<sup>360</sup> This has been referred to as “post-truth”<sup>361</sup> analysis in modern politics and has been associated with a growth of social media platforms<sup>362</sup> and in populism, which Hayek understood in terms of post-fact (without factual basis), post-source (without an identified source), post-verification (without verification), and post-control (without oversight or correction) issues. This is then concerned with the supply of overtly erroneous information (post-truth) through multiple sources or delivery

355. *Data Protection by Design and Default*, ICO., <https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/accountability-and-governance/data-protection-by-design-and-default/>.

356. Spacey, *supra* note 350.

357. C. E. Shannon, *A Mathematical Theory of Communication*, 27 BELL SYS. TECH. J. 379, 379 (1948).

358. Specific issues arise with regard to the increased volume of information and data produced in modern society and the natural limits of individuals to observe, process, and analyze information. This was highlighted by Hayek. See generally *The Use of Knowledge in Society*, *supra* note 59.

359. Security is concerned with non-interference and integrity with regard to the accuracy of the historical records kept. F.A. HAYEK, 3 LAW, LEGISLATION AND LIBERTY 131 (Routledge 1982).

360. Alison Flood, ‘Post-Truth’ Named Word of the Year by Oxford Dictionaries, THE GUARDIAN (November 15, 2016), <https://www.theguardian.com/books/2016/nov/15/post-truth-named-word-of-the-year-by-oxford-dictionaries>.

361. Post-truth was originally referred to by Steve Tesich in *The Nation* magazine in 1992 and later incorporated into the Oxford English dictionary. *Id.*; Richard Kreitner, *Post-Truth and Its Consequences: What a 25-Year-Old Essay Tells Us About the Current Moment*, THE NATION (Nov. 30, 2016), <https://www.thenation.com/article/post-truth-and-its-consequences-what-a-25-year-old-essay-tells-us-about-the-current-moment>.

362. Flood, *supra* note 360.



channels (post-source), the validity of which cannot be confirmed (post-verification) or managed over time (post-control). This is an increasingly important area of modern social policy and control.

### C. DATA RISK

Data risk can generally be understood in terms of information processing and content risk, as well as knowledge and archive risk and aspects of technology risk more generally. Specific additional issues arise in regard to data terms of potential liability risk and, in particular, under relevant legislation such as the EU GDPR and U.K. DPA.<sup>363</sup> This may be specifically understood in terms of data scope risk, data design, data rights risk, data management risk, and data liability risk.

### D. KNOWLEDGE RISK

Knowledge risk can be understood in terms of comprehension risk, policy risk, application or implementation risk, bias or distortion risk, and revision or correction risk.<sup>364</sup>

### E. ARCHIVE RISK

Archive risk can be examined in terms of record risk, access risk, security risk, correction risk, and permanence or continuity risk.<sup>365</sup>

## VI. Digital Information and Data Comment

Information is of natural importance as forming the basis of language and communication. Ideas are expressed and exchanged in the form of points of information. Information can be considered to carry out a number of functions in terms of the expression of ideas, understanding or communication, use, application or development, and the recording or archiving of information for future use purposes. The formation and

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363. See *supra* Section IV.A. See also Gary Stoneburner et al., *Risk Management Guide for Information Technology Systems: Recommendations of the National Institute of Standards and Technology*, at 1 (Nat'l Inst. Standards & Tech., Special Publication 800-30), <https://www.nist.gov/sites/default/files/ocr/privacy/hipaa/administrative/securityrule/nist800-30.pdf>.

364. Comprehension risk can be considered to be concerned with the accuracy of the initial understanding of the information data or idea involved. Policy risk requires the correct policy to be used and adopted. Application or implementation risk would arise when the policy has not been properly used. Bias or distortion risk involves an intentional or unintentional misapplication of the policy. Revision or correction risk is concerned with the failure to review and remove any implementation or policy defects.

365. Record risk is concerned with the legitimacy and accuracy of the initial record. Access risk requires continuing availability. Security risk requires safety from non-interference. Correction risk allows records to be revised over time with an appropriate record of the revision also being kept. Permanence or continuity risk is concerned with ensuring that an ongoing or perpetual record is always kept, with copies or continuity measures being in place in the event of the failure of one record.

exchange of information in the form of pricing and valuation is essential for markets. The exchange, circulation, and communication of information is essential for social purposes and to the operation of democracy and good democratic processes more generally.<sup>366</sup>

Information is essential in supporting expression, understanding, and communication for market, social, and political purposes.<sup>367</sup> It is necessary to price formation or discovery and asset valuation.<sup>368</sup> It allows people to manage their environment and facilitates social engagement and control. It supports action, production, innovation, development, and growth, with the total volume of information available increasing incrementally over time.<sup>369</sup> Information can further support longer term market and social order and balance.

Information has then become of even more importance with the substantial growth in modern telecommunications, telephony, and mobile telephony, as well as associated advances in the speed and capacity of computer hardware and software systems.<sup>370</sup> This is connected with the more general expansion of the Internet and E-commerce and the more recent attempt to create new digital communities and societies in many countries and parts of the world.<sup>371</sup> The overall significance of this is the need to recognize and protect information in the form of a record or confirmation of underlying legal rights and to have a complete and accurate articulation and record of these over time.

The following provisional comments and conclusions can be drawn at this stage in the evolution of this new digital ecosystem.

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366. DRAHOS & BRAITHWAITE, *supra* note 344, at 4.

367. CESAR HIDALGO, WHY INFORMATION GROWS: THE EVOLUTION OF ORDER, FROM ATOMS TO ECONOMIES 84 (2005).

368. *Id.*

369. *Id.* at 84.

370. See generally Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on Certain Legal Aspects of Information Society Services, in Particular Electronic Commerce, in the Internal Market (Directive on Electronic Commerce) 2000 O.J. (L 178) 1–8.

371. This includes the EU Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on Certain Legal Aspects of Information Society Services, in Particular Electronic Commerce, in the Internal Market (Directive on Electronic Commerce), 2000 O.J. (L 178) 1. The objective is to establish an internal market regime for information society services, including online service providers, commercial communications, and electronic contracts, with limitations on liability being provided for intermediary service providers. *Id.* art. 1, at 8. The Directive contains a core internal market clause which ensures that service providers are regulated on a country of establishment basis, with rules on mandatory consumer information, contracting, and communications. *Id.* art. 3, at 9–10. This contains exclusion of liability for conduit only services, caching (automatic, intermediate or temporary storage of transmitted information) and hosting. *Id.* arts. 12–14, at 12–13. The Directive was implemented in the U.K. under the Electronic Commerce (EC Directive) Regulations 2002. The Electronic Commerce (EC Directive) Regulations 2002, SI 2002/2013 (U.K.). The European Commission launched two public consultations in September 2015 as part of its Digital Single Market strategy with a view to revising the Directive.

## A. DEPENDENT DEFINITIONS

Information is a complex, combination, and contestable concept.<sup>372</sup> This creates a series of dependent definitions. A number of new connected definitions has been constructed for the purposes of this paper to attempt to clarify the meaning of information, data, knowledge, ideas, and archives, as well as such related terms as legal rights, language, communication, and meaning.<sup>373</sup> This is necessary to clarify the scope and application of law and regulation in this area. Different types of information have been identified, with separate forms of information value.<sup>374</sup>

## B. RIGHTS AND ENTITLEMENTS

Information and data cannot be considered to constitute property directly in law.<sup>375</sup> These nevertheless constitute significant economic or social assets, resources, or facilities. These represent substance or content. Communication can be considered to constitute a process or tool rather than information or data as such.<sup>376</sup>

While information is not property in law, information holders and subjects acquire a range of specific legal rights and protections.<sup>377</sup> A legal right is an entitlement to act or to receive which is subject to legal recognition and judicial protection.<sup>378</sup> Private rights can be summarized in terms of property, contractual performance, and payment, which corresponds with property and obligations, as well as other remedies in compensation, tort, and restitution.<sup>379</sup>

Personal rights attach to and are exercised by the legal persons concerned rather than to the information or data as such.<sup>380</sup> These do not adhere to the information or data as such but are acquired by the persons holding the information and data or to whom they relate.<sup>381</sup> A core set of interests can be identified in terms of core private information or data protection, including confidentiality, trade secrets, and personal data rights, as well as

372. See *supra* notes 1, 27, and accompanying text.

373. See *supra* Section III.

374. See *supra* Sections III, IV.

375. *Information Held in Electronic Databases Not Property Which Can Be Possessed*, Rules UK court, OUT-LAW NEWS (Mar. 20, 2014), <https://www.pinsentmasons.com/out-law/news/information-held-in-electronic-databases-not-property-which-can-be-possessed-rules-uk-court>.

376. See *supra* Section III and discussion in note 108.

377. *Information Held in Electronic Databases Not Property Which Can Be Possessed*, Rules UK Court, *supra* note 375.

378. *Legal Right Law and Legal Definition*, US LEGAL, <https://definitions.uslegal.com/l/legal-right/>.

379. *Private Right of Action: When Someone Other than the State has the Right to Enforce Rights Under a Statute*, US LAW ESSENTIALS, <https://uslawessentials.com/20141116what-is-an-implied-private-right-of-action/>.

380. *Definition of Personal Rights*, MERRIAM WEBSTER DICTIONARY ONLINE, <https://www.merriam-webster.com/dictionary/personal%20rights>.

381. *Id.*

public information disclosure.<sup>382</sup> Additional property rights in the form of intellectual property can be created through creative input and can be extended to include other computer and digital protections.<sup>383</sup> All of this is subject to public interest and surveillance exemptions or protections.<sup>384</sup>

### C. DIGITAL PROPERTY AND ASSETS

While information and data are not considered to constitute property as such, they can create property in particular cases.<sup>385</sup> This generally occurs in relation to intellectual property where some creative act transforms an intellectual idea into a separately identifiable item of property.<sup>386</sup> The classification of an item as property then creates a bundle of corresponding rights, interests, and entitlements, which protect its security and use.<sup>387</sup> These attach to and move with the item rather than the holder as with personal rights.<sup>388</sup> Property can be considered to constitute an identifiable, separate, independent, and permanent item to which certain ownership title rights are attached consisting of the right to hold, encumber, bequest, transfer (by gift or sale), or deliver.

While computer code only represents a specific form of machine language, it can be used to create simple legal rights and collections of more complex rights.<sup>389</sup> It can arguably also create new forms of digital property to the extent that they satisfy the relevant property conditions and to which the title rights referred to can be extended.<sup>390</sup> This would include, for example, a Bitcoin or other digital coin or token. Title rights attach to the property and move with the item.<sup>391</sup> Code can in this way create private property by party action alone.<sup>392</sup> This may then receive legal protection and form public property to the extent that it receives wider third party or market or community recognition and use.<sup>393</sup> This will, in turn, be dependent on the confidence and credibility placed in the item or the extent to which the item represents real assets or entitlements extraneous to the code itself.<sup>394</sup> This can be assessed in terms of the referred to property conditions and title rights.

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382. *Id.*

383. See generally WIPO, *WHAT IS INTELLECTUAL PROPERTY?* 2 – 3 (2004).

384. *Id.*

385. *Digital Property and Assets*, STAY IN BUSINESS (2019), <https://www.stayinbusiness.com/resource/digital-property-and-assets/>.

386. *Id.*

387. *Id.*

388. *Id.*

389. Lee A. Hollaar, *Copyright of Digital Information: IV.E.7.e. Code as Speech*, LEGAL PROT. DIG. INFO. (2002), <http://digital-law-online.info/lpdi1.0/treatise50.html>.

390. *Id.*

391. Will Keeton, *Bundle of Rights*, INVESTOPEDIA (May 19, 2019), <https://www.investopedia.com/terms/b/bundle-of-rights.asp>.

392. *Id.*

393. *Id.*

394. *Id.*

#### D. PRIVATE INFORMATION AND DATA PROTECTION

Private individuals generally have a right to control their ideas until publicly released. Private individuals can under most legal systems have a right to privacy and confidentiality which is created by contract, relationship, or law. These are based on party relationship and duty rather than property.<sup>395</sup> Individuals may also acquire further additional personal data rights, such as under the EU GDPR and U.K. DPA 2018.<sup>396</sup> These rights do not convert data into property but provide protections to control the use of personal data by other parties.

Companies may acquire separate confidentiality rights with regard to trade secrets.<sup>397</sup> Unfortunately, the English Law Commission recommendations in this area have not been fully adopted.<sup>398</sup> Information and data may be subject to separate government or Official Secrets Act protection which prevents disclosure.<sup>399</sup>

Various reforms are being considered to attempt to allow parties to protect private data at the same time as allow its widest possible use across commercial, government, and social websites.<sup>400</sup> Two of the most interesting current initiatives include *Solid*, launched by Sir Tim Berners-Lee, and *Data Trusts* under development in the U.K.<sup>401</sup> The *Solid* (Social Linked Data) initiative was announced by Berners-Lee in a paper on “Socially Aware Cloud Storage” in 2009.<sup>402</sup> *Solid* operates through the use of *Pods* (Personal

395. See *supra* Section III.

396. See *supra* Section IV.

397. See *supra* Section III and notes 137, 145, and 153.

398. See discussion *supra* note 321.

399. See *supra* Section IV.

400. *Welcome to Solid*, SOLID (2019), <https://solid.inrupt.com>.

401. *Id.*; *What is a Data Trust?*, ODI (2018), <https://theodi.org/article/what-is-a-data-trust/>.

402. Berners-Lee had become disillusioned with the over centralization and abuse of personal data on the World Wide Web which he had created in 1989. He later established the World Wide Web Foundation in 2009 to protect human rights on the internet. The objective was to “re-decentralize” the World Wide Web and to protect data for the benefit of humanity. Berners-Lee received funding from the American financial services company, Mastercard, in 2015 and support from the Qatar Computing Research Institute and Oxford University. Berners-Lee established a separate company, Inrupt, to develop the Solid project on sabbatical from MIT in 2018. Berners-Lee set out the early design parameters in project papers published for the World Wide Web Consortium. Tim Berners-Lee, *Socially Aware Cloud Storage*, WORLD WIDE WEB CONSORTIUM (2009), <https://www.w3.org/DesignIssues/CloudStorage.html>; Tim Berners-Lee, *Read-Write Linked Data*, WORLD WIDE WEB CONSORTIUM (2009), <https://www.w3.org/DesignIssues/ReadWriteLinkedData.html>. See also Katrina Brooker, “I Was Devastated”: Tim Berners-Lee, the Man who Created the World Wide Web, Has Some Regrets, VANITY FAIR (2018), <https://www.vanityfair.com/news/2018/07/the-man-who-created-the-world-wide-web-has-some-regrets>; Klint Finley, *Tim Berners-Lee, Inventor of the Web, Plots a Radical Overhaul of His Creation*, WIRED (2017), <https://www.wired.com/2017/04/tim-berners-lee-inventor-web-plots-radical-overhaul-creation/>; *Web Inventor Tim Berners-Lee’s Next Project: A Platform That Gives Users Control of Their Data*, MIT CSAIL (2015), <https://www.csail.mit.edu/news/web-inventor-tim-berners-lees-next-project-platform-gives-users-control-their-data>.

Online Data Stores), which allow access and use following *Solid* authentication.<sup>403</sup> The use of data trusts was recommended by Professor Dame Wendy Hall and Gerome Pesenti in a U.K. Artificial Intelligence (AI) Report<sup>404</sup> on October 2017, although this has already received wider international attention.<sup>405</sup> It is accepted that a data trust could be of specific value in assisting the development of AI systems, especially in providing training data sets, in particular, in the areas of healthcare, social care, and public services.<sup>406</sup> A number of challenges nevertheless remain in terms of technical, legal, ethical, and human rights issues.<sup>407</sup>

A number of difficulties remain in this area which have still to be resolved. The underlying objective must be to support innovation and advance while at the same time protecting all relevant interests and entitlements.<sup>408</sup> The potential value of extensive data use and dissemination has to operate within an effective new global control regime that respects all relevant private and public interests and ensures a fair and proportionate allocation of the benefits and new income or wealth generated in the process.<sup>409</sup>

## E. PUBLIC INFORMATION DISCLOSURE AND ACCOUNTABILITY

Public information disclosure is essential to ensure public transparency and government accountability.<sup>410</sup> This, in turn, supports democracy and control of public agents and executive government in modern economies. Public information rights are important although these are necessarily statutorily circumscribed.<sup>411</sup> The availability of specific rights depends upon

403. Personal data is stored in Solid on one or more PODs, with people providing World Wide Web applications permission to read or write to parts of this data. Data always remains within the POD. *Solid Explained*, SOLID (2019), <https://solid.inrupt.com/how-it-works>.

404. The Report made a number of recommendations to improve access to data to support AI development within the U.K. It was estimated that AI could add £630 billion to the U.K. economy by 2035 and increasing gross value added (GVA) from 2.5 to 3.9 percent. Eighteen recommendations were made to improve data access, skills supply, maximize U.K. AI research, and support uptake. Data Trusts would be used to exchange data in a controlled manner through a Data Trusts Support Organization (DTSO), which would develop relevant tools, templates, and guidance for data owners and users. This included creating a Data Trusts development program. PROF. DAME WENDY HALL & JÉRÔME PESENTI, *GROWING THE ARTIFICIAL INTELLIGENCE INDUSTRY IN THE UK 2* (2017), [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/652097/Growing\\_the\\_artificial\\_intelligence\\_industry\\_in\\_the\\_UK.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/652097/Growing_the_artificial_intelligence_industry_in_the_UK.pdf).

405. Data Trusts may be considered either as a repeatable framework of terms and mechanisms; mutual organizations; legal structure; data store; or public oversight of data access. *What Is a Data Trust?*, *supra* note 401.

406. Dr. Aida Mehonic, *Can Data Trusts Be the Backbone of our Future AI Ecosystem?*, THE ALAN TURING INST. (2018), <https://www.turing.ac.uk/research/research-programmes/artificial-intelligence-ai/programme-articles/can-data-trusts-be-backbone-our-future-ai-ecosystem>.

407. *Id.*

408. *Id.*

409. *Id.*

410. Freedom of Information Act, 5 U.S.C. § 552.

411. *See supra* Section IV.

relevant definitions, conditions, and scope, as well as the operational and territorial rules attached.<sup>412</sup> Particular limitations arise in terms of available exceptions and any more generic public interest tests.<sup>413</sup> This nevertheless creates an important counterbalance to executive authority and complement to private data privacy protection.<sup>414</sup>

#### F. CREATIVE CONVERSION

Property rights are created in the information sphere within the intellectual property area where sufficient additional creativity or labor has been expended to merit recognition and protection.<sup>415</sup> Proprietary remedies are provided where additional amounts of expression or use and application merit legal recognition.<sup>416</sup> Intellectual ideas are then transformed into legal property entitlements such as in the areas of copyright, patent, trademark law, and performance and design rights.<sup>417</sup> These are essentially based on expression, process and design. Modern interests were based on earlier historical common law remedies in this area which were later codified and then revised and extended subsequently. A full range of protections may then be available to protect these new property interests.

#### G. DIGITAL EXTENSIONS

The model for intellectual property protections can then be extended into other areas of new technology, such as in relation to computer software and database protection. Increased rights, including through property law, are recognized while courts consider whether wider protections should be provided with regard to the abuse of software and other digital systems.<sup>418</sup> Specific protections are in place, such as in relation to computer misuse—specifically with regard to hacking and other attacks, including phishing. Such protections are expected to increase in the future, with a range of penalties and protections being created under criminal and civil law.<sup>419</sup>

#### H. SURVEILLANCE RIGHTS

Private information rights have to be considered against public and state interests, including specifically official monitoring and surveillance regimes adopted in the public interest.<sup>420</sup> Many private protections, including common law and statutory entitlements, are qualified by public interest

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412. *Id.*

413. *About the Freedom of Information Act*, U.S. DEP'T OF JUSTICE, <https://www.foia.gov/about.html> (last visited Feb. 22, 2020).

414. *Id.*

415. WIPO, *supra* note 383.

416. *Id.*

417. *See supra* Section IV.

418. Hollaar, *supra* note 389.

419. *Private Right of Action*, *supra* note 379.

420. *About the Freedom of Information Act*, *supra* note 413.

derogations where this is considered necessary in such areas as in relation to criminal and terrorist activity and tax avoidance and espionage.<sup>421</sup> Specific entitlements have been created in the U.K., U.S., and other countries.<sup>422</sup> These act as important limitations on private rights which are justifiable by the need to balance the availability of these protections and the wider public security, public and state interest, and integrity of civil society more generally.<sup>423</sup>

## I. INFORMATION AND DATA RISK AND REGULATION

Modern technology creates substantial benefit and advantage essentially in terms of massively increased speed and efficiency, accessibility, and security.<sup>424</sup> This applies across the spectrum of commercial, government, and banking and financial services activities, as well as personal communication and social networking website operations. Banking and financial services have, in particular, benefitted significantly through continuing improvements in technology across history.<sup>425</sup> New digital information and data systems are still nevertheless prone to interference, failure, and attack. A range of new technology, information, and data risks accordingly arise that have to be properly identified, measured, and managed.<sup>426</sup> This is an important new area of study and necessary industry response.

The speed of technological change and advance, as well as the complexity and interdependence of modern systems and the possible speed of causal effects, has also required further change in terms of the nature of underlying official supervisory and regulatory systems. Traditional financial supervision and regulation has had to be reconsidered to allow it to be capable of responding to modern threats. The banking and financial industry is benefiting from improvements generated through the use of technology, especially for modern regulatory technology (RegTech) and compliance technology (CompTech) purposes.<sup>427</sup> Corresponding improvements are required in terms of necessary revisions in supervisory and regulatory practice and the development of new supervisory (SuperTech) and RegTech systems.<sup>428</sup>

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421. *Id.*

422. *See supra* Section IV.

423. *About the Freedom of Information Act*, *supra* note 413.

424. Stoneburner et al., *supra* note 363.

425. UK TRADE & INV., LANDSCAPING UK FINTECH (2014), [http://www.spainfinancialcentre.com/sites/default/files/landscaping\\_uk\\_fintech.\\_uk\\_trade\\_investment.pdf](http://www.spainfinancialcentre.com/sites/default/files/landscaping_uk_fintech._uk_trade_investment.pdf).

426. *Id.*

427. HM TREASURY, UK FINTECH: ON THE CUTTING EDGE (2016), [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/502995/UK\\_FinTech\\_-\\_On\\_the\\_cutting\\_edge\\_-\\_Full\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/502995/UK_FinTech_-_On_the_cutting_edge_-_Full_Report.pdf).

428. *Id.*



The effect of this is to necessitate a wider reconsideration of the nature of modern financial supervision and regulation.<sup>429</sup> A series of new principles have to be constructed to respond to the new challenges created. Modern control systems will generally have to be more adaptive and reflexive,<sup>430</sup> responsive and supportive,<sup>431</sup> objective and innovative,<sup>432</sup> reflective and focused,<sup>433</sup> and cooperative and collective.<sup>434</sup> This is an important and exciting area of future development.

## J. LEGAL AND SOCIAL BALANCE

Language and communication are essential social technologies, and everyone has an interest in their continued use and protection.<sup>435</sup> Care must nevertheless be undertaken to avoid undue limitation or restriction for general free speech purposes as well as creative, artistic, cultural, scientific, and commercial and industrial re-use and innovation.<sup>436</sup> Intellectual property rights must, in particular, not be overly extended, which could create a new form of digital or technological constraint in the form of a new information or data feudalism or servitude.<sup>437</sup> A substantial and flexible body of intellectual commons or common interest and use must be created to

429. See Walker on RegTech, *supra* note 9. See also William D. Eggers et al., *The Future of Regulation: Principles for Regulating Emerging Technologies*, DELOITTE (June 19, 2018), <https://www2.deloitte.com/us/en/insights/industry/public-sector/future-of-regulation/regulating-emerging-technology.html>.

430. Regulation must be able to respond to changes in technology in a flexible and timely manner. Regulatory design should ensure that specific requirements are adaptable.

431. Regulation and supervision must be able to respond to important key changes at the same time as supporting innovation and transformation. Systems must not simply be reactive and follow crises. Experimentation can be, for example, facilitated through the use of regulatory sandboxes as with the UK FCA's project Innovate. This was established to bring a number of FinTech platform cohorts within the regulatory sandbox each year to provide regulatory guidance and allow them to operate within a time and risk limited protective field. Around nineteen regulatory sandboxes have been created internationally with five others proposed. *Id.* (Figure 5: "Map of regulatory sandboxes"); *Global Financial Innovation Network (GFIN)*, FCA (2019), <https://www.fca.org.uk/firms/global-financial-innovation-network>.

432. Supervision and regulation should be objective or outcomes based. It should avoid rigidity, formality and "box-ticking" policies and consider the primary objectives involved which should include protecting market stability and efficiency as well as promoting innovation and competition. See Walker on RegTech, *supra* note 9.

433. Policies should be risk based and respond in an effective manner to different levels of risk activity and higher and low risk generating institutions. The approach should be layered and iterative to ensure maximum overall efficiency. This may include using different forms of pre-certification of devices or systems. *Id.*

434. Supervision and regulation is most effective where authorities work closely with industry and with other authorities within the same country and abroad. This might be considered to create a form of co-supervision or co-regulation. Appropriate regulatory guidelines and legal gateways must nevertheless be in place to allow the effective exchange of information. *Id.*

435. WIPO, *supra* note 383.

436. *Id.*

437. DRAHOS & BRAITHWAITE, *supra* note 344, at 1 – 2.

offset private proprietary control.<sup>438</sup> Law and regulation must respect and protect all of the relevant interests concerned, although this must be adjusted to attempt to secure a fair and responsible balance and reconciliation over time.

## K. INFORMATION RIGHTS AND DATA LAW REFORM

All of the complex issues that arise in the information and data areas must be reflected in future relevant law and regulation. All existing measures should be revised to ensure that they create a coherent, complete, and comprehensive framework for information and data rights protection. The existing law and *lex lata*, or written *lex scripta*, has to be updated and replaced by a new, more sophisticated and responsive *lex ferenda digitalis* or *lex ferenda technologica*.

## L. GLOBAL BALANCE, RESPONSE AND REFORM

The establishment of an online virtual commercial market and social world based on the internet and World Wide Web necessitates that national and international standards on information and data law should be coordinated insofar as possible.<sup>439</sup> Important initiatives have already been undertaken, such as with the EU GDPR, that can act as models for adoption in other countries with appropriate amendment and revision.<sup>440</sup> Specific corrections may, for example, be considered in relation to the holding of private data on blockchain and other forms of distributed ledger technology (DLT), the implications of which were not taken into account in drafting the earlier DPD and replacement GDPR within the EU.<sup>441</sup>

The overall objective should be to attempt to move towards core minimum international standards in terms of the treatment of digital information and digital data and protection of associated rights. The entering into of international treaties and conventions may be attempted, although this may not be considered appropriate, as these require lengthy negotiation and the inevitable incorporation of various domestic exceptions and derogations. Relevant standards in particular sector areas may still be produced, such as by the Financial Stability Board (FSB) and connected committees in the banking and financial area, with other work being carried out by other bodies in other commercial and utility sectors.<sup>442</sup>

Private sector bodies or trade associations could also attempt to develop dedicated standards such as through the adoption of technical standards or protocols in particular areas. Possible models include, for example, the earlier Open Source Initiative, which creates measures governing the use of

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438. *Id.* at 2 – 3.

439. *Data Protection by Design and Default*, *supra* note 355.

440. *Id.*

441. Keeton, *supra* note 391.

442. DRAHOS & BRAITHWAITE, *supra* note 344, at 73.

source code, design, and content on a permissioned basis.<sup>443</sup> A more specific and targeted collection of dedicated technical standards or protocols could be built up over time to create a form of new global *codex digitalis* or *lex digitalis technologica*.<sup>444</sup>

## VII. Digital Information and Data Close

The nature of information and data have become of increasing importance in modern markets and societies. This has become of further significance in a new technology-driven world. This nevertheless remains a difficult idea and area of study. A substantial amount of uncertainty and confusion has arisen and continues to dominate and confuse discussion. Significant issues remain with regard to definition; meaning; and nature protection, risk, and regulation. The purpose of this paper has been to attempt to clarify the meaning of information and key connected terms and to begin to construct a new theory of information based on a larger examination of related rights for future consideration and revision. This remains provisional and experimental.

The nature of information and data in law remain unclear.<sup>445</sup> It is arguable that they do not constitute property as such, although they are valuable assets, resources, or facilities.<sup>446</sup> Information and data are essential economic and social items and arguably *sui generis* interests in law.<sup>447</sup> Law does not recognize information and data as property but confers or attaches a series of variant rights on relevant interested parties depending upon their content, source, value, use, and form.<sup>448</sup> A number of rights and entitlements have been identified in terms of private data privacy and protection, public information disclosure, intellectual property creation, and new computer and digital rights protection and surveillance rights management.<sup>449</sup> These can be summarized as either being private, public, productive, parallel and precautionary, or preservative. It is necessary to monitor the interaction and impact of these over time.

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443. The GNU General Public License and Free Software Movement (FSM) was established by American programmer Richard Stallman in 1983. Stallman had earlier established the GNU Project to develop programming and software on a collaborative basis (GNU is a recursive or self-reflective acronym to refer to "GNU's not UNIX!"). *Id.* Initiative (OSI) in California was established by Eric S. Raymond and Bruce Perens in February 1998. Richard Stallman, Lecture, *The Free Software Movement and the Future of Freedom*, (March 9, 2006), <https://fsfe.org/freesoftware/transcripts/rms-fs-2006-03-09.en.html>.

444. See sources cited *supra* note 9. See also *Lex Digitalis: The Regulation of the Internet*, TRANSNATIONAL FORCE OF LAW, <https://www.tfl.uni-bremen.de/en/teilprojekte/lex-digitalis/> (last visited Feb. 23, 2020).

445. *Information Held in Electronic Databases Not Property Which Can Be Possessed*, Rules UK court, *supra* note 375.

446. *Id.*

447. *Id.*

448. *Id.*

449. *Id.*

The effect of this paper has been to create a new theory of information and data in law. This is a composite, combination, complex or compound, and dependent theory. It is made up of several layers or sub-theories and dependent to the extent that the key terms are defined off each other, including information, data, knowledge, and archives, as well as language, communication, and meaning. This has a legal right or entitlement rather than property basis in law. While information is not considered to constitute property, such rights may still be acquired where an intellectual idea or process is constituted through an intervening creative act.<sup>450</sup> Private rights are defined in terms of confidentiality, trade secrets, and data protection, with additional public rights to information release.<sup>451</sup> Property creation is based on original expressive or performance content, process invention, or design production.<sup>452</sup>

All of this is subject to a complex overlapping set of public interest exceptions and derogations and social balance considerations.<sup>453</sup> This is also subject to an embryonic new risk identification and management framework which attempts to measure exposures, vulnerabilities, and possible loss.<sup>454</sup>

Information and data are essential aspects or conditions within modern society closely tied to scientific study, language, and communication.<sup>455</sup> These have become of even more importance and relevance in the new digital age under construction, with mankind's ability to collect, record, and disseminate massive amounts of new digital information and data in any form becoming of even more importance and significance.<sup>456</sup> This ability has become of even more relevance with the powerful new digital tools and storage and transfer techniques increasingly made available.<sup>457</sup> Understanding all of the core underlying elements of information law and theory remains an essential activity within this journey.

The ultimate goal must be to support the new digital societies and communities under construction and respect and protect proper market processes and new digital assets and wealth. The law must continue to safeguard all relevant interests and entitlements. In so doing, an appropriate balance must be achieved between evolving technological innovation and core market stability and social and individual rights protection.<sup>458</sup>

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450. *Id.*

451. *Private Right of Action*, *supra* note 379.

452. *Information Held in Electronic Databases Not Property Which Can Be Possessed*, Rules UK court, *supra* note 375.

453. BOYLE, *supra* note 340, at 34.

454. Stoneburner et al., *supra* note 363.

455. HIDALGO, *supra* note 367, at 84.

456. *Digital Property and Assets*, *supra* note 385.

457. *Id.*

458. BOYLE, *supra* note 340, at 34.

