

Articles

No One Owns Data

LOTHAR DETERMANN[†]

Businesses, policy makers, and scholars are calling for property rights in data. They currently focus on the vast amounts of data generated by connected cars, industrial machines, artificial intelligence, toys and other devices on the Internet of Things (IoT). This data is personal to numerous parties who are associated with the connected device, and there are many others who are also interested in this data. Various parties are actively staking their claims to data, as they are mining the fuel of the digital economy.

Stakeholders in digital markets often frame claims, negotiations and controversies regarding data access as one of ownership. Businesses regularly assert and demand that they own data. Individual data subjects also assume that they own data about themselves. Policy makers and scholars focus on how to redistribute ownership rights to data. Yet, upon closer review, it is very questionable whether data is—or should be—subject to any property rights. This Article unambiguously answers the question in the negative, both with respect to existing law and future lawmaking in the United States and the European Union, jurisdictions with notably divergent attitudes to privacy, property and individual freedoms.

Data as such, that is, the content of information, exists conceptually separate from works of authorship and databases (which can be subject to intellectual property rights), physical embodiments of information (data on a computer chip, which can be subject to personal property rights) and physical objects or intangible items to which information relates (a dangerous malfunctioning vehicle to which the warnings on road markings or a computer chip relate). Lawmakers have granted property rights to different persons regarding works of authorship, databases, land, and chattels to incentivize investments and improvements in such items. However, this purpose does not exist with respect to data.

Individual persons, businesses, governments and the public at large have different interests in data and access restrictions. These interests are protected by an intricate net of existing laws, which deliberately refrain from granting property rights in data. Indeed, new property rights in data are not suited to promote better privacy or more innovation or technological advances, but would more likely suffocate free speech, information freedom, science and technological progress. The rationales for propertizing data are thus not compelling and are outweighed by the rationales for keeping the data “open.” No new property rights need to be created for data.

[†] Lothar Determann teaches computer, internet and data privacy law at Freie Universität Berlin, University of California, Berkeley School of Law, and Hastings College of the Law, San Francisco, and he practices technology law as a partner at Baker McKenzie LLP in Palo Alto. Opinions expressed in this article are those of the Author, and not of his firm, clients or others. The Author is grateful for valuable input, research and edits by Yoon Chae, Thomas Blickwedel, Paloma Pietsch and Shemira Jeevaratnam, as well as additional suggestions from Prof. Eric Goldman, Santa Clara University School of Law, and Tony Bedel.

TABLE OF CONTENTS

| | |
|---|----|
| INTRODUCTION..... | 3 |
| I. DATA AND INFORMATION | 6 |
| II. PROPERTY RIGHTS IN DATA | 7 |
| A. OWNERSHIP AND PROPERTY RIGHTS | 7 |
| B. REAL PROPERTY | 12 |
| C. PERSONAL PROPERTY | 13 |
| D. TRADE SECRET..... | 14 |
| E. PATENT | 16 |
| F. TRADEMARK | 17 |
| G. COPYRIGHT | 17 |
| H. U.S. STATE LAWS ON MISAPPROPRIATION AND EU DATABASE DIRECTIVE | 20 |
| I. DATA PRIVACY | 22 |
| J. SUMMARY | 25 |
| III. DATA ACCESS RIGHTS AND RESTRICTIONS UNDER CURRENT LAW | 25 |
| A. RIGHTS TO DATA ACCESS, ERASURE, PORTABILITY AND USE RESTRICTIONS..... | 25 |
| B. COMPUTER INTERFERENCE LAWS..... | 26 |
| C. RIGHT TO REPAIR STATUTES AND ENVIRONMENTAL AND COMPETITION LAWS | 26 |
| D. LAWS ON CONSUMER PROTECTION, PRODUCT SAFETY, IMPLIED WARRANTIES AND SUSTAINABILITY..... | 27 |
| IV. INTERESTS IN DATA AND LEGAL PROTECTIONS UNDER CURRENT LAW ... | 28 |
| A. CAR OWNERS | 28 |
| B. DRIVERS AND PASSENGERS | 29 |
| C. OTHER TRAFFIC PARTICIPANTS | 30 |
| D. MANUFACTURERS..... | 30 |
| E. ADD-ON SERVICE PROVIDERS..... | 31 |
| F. CAR DEALERS AND DISTRIBUTORS..... | 32 |
| G. INSURANCE COMPANIES | 32 |
| H. LAW ENFORCEMENT AND GOVERNMENT INSTITUTIONS | 33 |
| V. SHOULD NEW PROPERTY RIGHTS IN DATA BE CREATED?..... | 33 |
| A. CREATIVITY AND TECHNOLOGICAL ADVANCES..... | 34 |
| B. PROTECTING PERSONAL PRIVACY | 36 |
| C. FREEDOM OF INFORMATION AND SPEECH..... | 37 |
| D. GOVERNMENT USE OF DATA | 38 |
| E. COMPETITION..... | 38 |
| F. SOCIAL JUSTICE AND FAIRNESS | 39 |
| G. NORMATIVE IMPLEMENTATION OBSTACLES | 40 |
| CONCLUSION | 41 |

Thoughts are free.
 Who can guess them right?
 They fly by me, like shadows at night.
 No one can mute them.
 No hunter can shoot them.
 It remains for all to see:
 Thoughts are free.
 (German folk song)¹

INTRODUCTION

Connected cars, industrial machines, toys, and other devices on the Internet of Things (IoT) generate vast amounts of data and information. The total amount of stored data is expected to double every two years—meaning a 50-fold growth from 2010 to 2020²—and reach 163 zettabytes by 2025.³ Autonomous vehicles, for example, can each generate as much as 4,000 gigabytes of data every day⁴ on the vehicle’s performance and maintenance, location of the car, and various aspects of the people in the car⁵ with the help of today’s advanced sensors.⁶

The explosive growth in the total amount of data will come from technologies that were both historically inside and outside of cars, fueled by the high level of forecasted interconnectivity of nearly all devices.⁷ Existing in-vehicle technologies, such as in-dash navigation systems, diagnostic systems,

1. These are the lyrics of a German folk song. The lyrics in German are: “Die Gedanken sind frei, wer kann sie erraten? Sie fliegen vorbei wie nächtliche Schatten. Kein Mensch kann sie wissen, kein Jäger erschießen es bleibet dabei: Die Gedanken sind frei!” The original lyricist and composer are unknown, but the most popular version was rendered by Hoffmann von Fallersleben in 1842. *Die Gedanken sind frei*, DEUTSCHLAND-LESE, http://www.deutschland-lese.de/index.php?article_id=110 (last visited Nov. 21, 2018) (Ger.).

2. PETER FFOULKES, INSIDEBIGDATA GUIDE TO THE INTELLIGENT USE OF BIG DATA ON AN INDUSTRIAL SCALE 2 (2017), <https://insidebigdata.com/white-paper/guide-big-data-industrial-scale>.

3. DAVID REINSEL ET AL., DATA AGE 2025: THE EVOLUTION OF DATA TO LIFE-CRITICAL 3 (2017), <https://www.seagate.com/files/www-content/our-story/trends/files/Seagate-WP-DataAge2025-March-2017.pdf>.

4. Patrick Nelson, *Just One Autonomous Car Will Use 4,000 GB of Data/Day*, NETWORK WORLD (Dec. 7, 2016, 7:39 AM), <https://www.networkworld.com/article/3147892/internet/one-autonomous-car-will-use-4000-gb-of-dataday.html>.

5. MCKINSEY & COMPANY, CAR DATA: PAVING THE WAY TO VALUE-CREATING MOBILITY 8 (2016), <https://www.mckinsey.com/~media/McKinsey/Industries/Automotive%20and%20Assembly/Our%20Insights/Creating%20value%20from%20car%20data/Creating%20value%20from%20car%20data.ashx>.

6. These sensors include global positioning systems (GPS), dedicated short-range communications devices (DSRCs), light detection and ranging (LIDAR) sensors, cameras, infrared sensors, and radio detection and ranging (RADAR) devices. UNIV. OF MICHIGAN, CTR. FOR SUSTAINABLE SYS., AUTONOMOUS VEHICLES FACTSHEET (2017), http://css.umich.edu/sites/default/files/css_doc/CSS16-18. They play evermore important roles in safety and technological advancements in vehicles and other connected devices today. See Lothar Determann & Bruce Perens, *Open Cars*, 32 BERKELEY TECH. L.J. 915, 920–21 (2017) (“Consumers select the make and model of automobiles with increasing focus on information technology feature: telematics, driver assistance, autonomous driving, connectivity, entertainment, and various safety features.”).

7. The number of devices connected to Internet of Things (IoT) will soon exceed the number of people on earth. G.V. Sam Kumar, *Survey on Process in Scalable Big Data Management Using Data Driven Model Frame Work*, 5 INT’L J. INNOVATIVE RES. COMPUTER & COMM. ENGINEERING 4468, 4469 (2017).

and virtual assistants already generate data and will continue to do so at an accelerated rate.⁸ Features such as voice controls will be used for more applications, while both video and audio will be recorded in more places.⁹ Use of biometric data will become more prevalent for authentication in various devices, including cars and other IoT devices,¹⁰ and technologies usually reserved for healthcare, such as heart rate monitors, will likely be incorporated into vehicles to assess the passengers' health risks and ride comfort.¹¹

Various parties are actively staking their claims to data on the Internet of Things, as they are mining data, the fuel of the digital economy. The data generated is valuable to various persons and entities for different reasons, including safety, risk assessments, compliance, preventive maintenance, market intelligence, development of new business models, public policy, and law enforcement, among others.¹² But much of the sought-after data will relate to personal and private information of various individuals (for example, regarding their health, travel history and speed, browsing history, and emails),¹³ which raises privacy concerns and questions of who may access and use the data generated by the various connected things. These questions are often framed as issues of *data ownership* or *property rights in data* in the popular press and political discussions.¹⁴ Businesses, politicians, and scholars assume the existence of, or call for, the creation of property rights in data.¹⁵ Yet, in the

8. See Matthew DeBord, *Big Data in Cars Could Be a \$750 Billion Business by 2030*, BUS. INSIDER (Oct. 5, 2016, 3:00 PM), <http://www.businessinsider.com/car-data-business-mckinsey-and-co-report-2016-10>.

9. Lance Ulanoff, *Nuance is About to Make Your Car a Lot Smarter*, MASHABLE (June 22, 2017), <https://mashable.com/2017/06/22/inside-nuance-next-gen-in-car-voice-assistant/#FfZi85Ms1SqO>; see also MCKINSEY & COMPANY, *MONETIZING CAR DATA: NEW SERVICE BUSINESS OPPORTUNITIES TO CREATE NEW CUSTOMER BENEFITS* 35 (2016), <https://www.mckinsey.com/~media/McKinsey/Industries/Automotive%20and%20Assembly/Our%20Insights/Monetizing%20car%20data/Monetizing-car-data.ashx>.

10. Matthew Crist, *5 Ways Biometric Technology Is Used in Everyday Life*, M2SYS: BLOG, <http://www.m2sys.com/blog/guest-blog-posts/5-ways-biometric-technology-is-used-in-everyday-life> (last visited Nov. 21, 2018); Salil Prabhakar, *Why Biometrics Are the Key to Driver Authentication in Connected Cars*, VENTURE BEAT (Feb. 7, 2017, 4:10 PM), <https://venturebeat.com/2017/02/07/why-biometrics-are-the-key-to-driver-authentication-in-connected-cars>.

11. MCKINSEY & COMPANY, *supra* note 9, at 34.

12. David Welch, *Your Car Has Been Studying You Closely and Everyone Wants the Data*, Privacy & Security L. Rep. (BNA) (July 12, 2016, 2:00 AM), <https://www.bloomberg.com/news/articles/2016-07-12/your-car-s-been-studying-you-closely-and-everyone-wants-the-data>. Data enables future business models as demonstrated by the convergence of car manufacturers, rental car companies, transportation businesses, ride share ventures and other "mobility providers."

13. See MCKINSEY & COMPANY *supra* note 5, at 7 (using a chart to discuss the types of applications that consumer are willing to receive free service, in exchange for personal data).

14. E.g., Jeffrey Ritter and Anna Mayer, *Regulating Data as Property: A New Construct for Moving Forward*, 16 DUKE L. & TECH. REV. 220, 226–27 (2018); Evgeny Morozov, *To Tackle Google's Power, Regulators Have to Go After Its Ownership of Data*, GUARDIAN (July 2, 2017, 7:05 PM), <http://www.theguardian.com/technology/2017/jul/01/google-european-commission-fine-search-engines>.

15. See Paul M. Schwartz, *Property, Privacy, and Personal Data*, 117 HARV. L. REV. 2055, 2094 (2004); Lawrence Lessig, *The Architecture of Privacy*, 1 VAND. J. ENT. L. & PRAC. 56, 63 (1999); LAWRENCE LESSIG, *CODE AND OTHER LAWS OF CYBERSPACE* 122–35 (1999); Kenneth C. Laudon, *Markets and Privacy*, COMM. ACM, Sept. 1996, at 92, 101; Catherine M. Valerio Barrad, *Genetic Information and Property Theory*, 87 NW. U. L. REV. 1037, 1062–63 (1993); Tom C.W. Lin, *Executive Trade Secrets*, 87 NOTRE DAME L. REV. 911, 968

context of this debate there is much uncertainty and ambiguity regarding the meaning of “data,” “information,” and “ownership;” little comprehensive analysis regarding how existing property laws already cover data or exclude data from protection; and relatively sparse considerations of legal and policy reasons for *not* granting property rights to data.

This Article comprehensively examines and decidedly challenges assumptions regarding the existence or policy reasons for ownership rights in data and argues that data (1) exists separately from works of authorship, databases, and media (*see infra* Part II); (2) is largely free from property rights (*see infra* Part III); (3) is subject to a complex landscape of access rights and restrictions (*see infra* Part IV); and (4) implicates various legal positions, interests, and options for parties interested in the data that are regulated in a considerate, nuanced, and balanced fashion under laws outside the property law realm (*see infra* Part V). The Article then examines current policy discussions around the creation of a right to data ownership (*see infra* Part VI) and concludes that no one does or should be able to own data (*see infra* Part VII).

The legal standards and frameworks employed in the Article are discussed from both U.S. and European perspectives to address the significant differences in transatlantic data privacy and data base protection law.¹⁶ To develop and illustrate these theses, the Article refers to the landscape of interests in data generated or processed by connected cars and other devices on the IoT, which are driving current economic developments and policy discussions, including calls from the German government for a statutory property regime assigning rights to data from cars to auto manufacturers.¹⁷

(2012); Patricia Mell, *Seeking Shade in a Land of Perpetual Sunlight: Privacy as Property in the Electronic Wilderness*, 11 BERKELEY TECH. L.J. 1, 11, 26–41 (1996); Richard S. Murphy, *Property Rights in Personal Information: An Economic Defense of Privacy*, 84 GEO. L.J. 2381, 2381–83 (1996); James B. Rule, *Toward Strong Privacy: Values, Markets, Mechanisms, and Institutions*, 54 U. TORONTO L.J. 183, 185 (2004); Herbert Zech, “Industrie 4.0”—Rechtsrahmen für eine Datenwirtschaft im digitalen Binnenmarkt, GRUR, Dec. 2015, at 1151, 1160 (Ger.); Karl-Heinz Fezer, *Dateneigentum der Bürger: Ein originäres Immaterialgüterrecht sui generis an verhaltensgenerierten Informationsdaten der Bürger*, BEITRÄGE, Mar. 2017, at 99, 99 (Ger.); Václav Janeček, *Ownership of Personal Data in the Internet of Things*, 34 COMPUTER L. & SECURITY REV. 1039 (forthcoming Oct. 2018). *But see* Pamela Samuelson, *Privacy as Intellectual Property?*, 52 STAN. L. REV. 1125, 1129 (2000) (“A property rights model for protecting personal data nevertheless presents many problems.”); Louisa Specht, *Ausschließlichkeitsrechte an Daten—Notwendigkeit, Schutzzumfang, Alternativen: Eine Erläuterung des gegenwärtigen Meinungsstands und Gedanken für eine zukünftige Ausgestaltung*, COMPUTER UND RECHT, May 2016, at 288, 296 (Ger.) (discussing exclusivity rights to data—need, scope, and alternatives).

16. *See generally* Paul M. Schwartz & Karl-Nikolaus Peifer, *Transatlantic Data Privacy Law*, 106 GEO. L.J. 115 (2017) (discussing the differences in transatlantic data privacy law and the business reasons behind those differences).

17. Bundesministerium für Verkehr und digitale Infrastruktur, “Eigentumsordnung” für Mobilitätsdaten, https://www.bmvi.de/SharedDocs/DE/Publikationen/DG/eigentumsordnung-mobilitaetsdaten.pdf?__blob=publicationFile (study of the German ministry for traffic and digital infrastructure on whether data is or should be subject to property rights, concluding that property rights to data could be beneficial to create markets for data and to reward production of data and “essential investments”); Gerrit Hornung & Thilo Goeble, “Data Ownership” im vernetzten Automobil: Die rechtliche Analyse des wirtschaftlichen Werts von Automobildaten und ihr Beitrag zum besseren Verständnis der Informationsordnung, COMPUTER UND RECHT REPORT, Mar. 2015, at 265, 272 (Ger.) (examining property rights

I. DATA AND INFORMATION

In everyday parlance, the terms “data” and “information” are often used synonymously,¹⁸ referring to “facts about a situation, person, [or] event.”¹⁹ “Data” and “information” are also used interchangeably in various legal contexts.²⁰ Likewise, this Article uses “data” and “information” interchangeably, cognizant of different approaches to terminology in other academic disciplines.²¹

Information can be or relate to diverse things, such as memories, thoughts, discoveries, insights, opinions, perceptions, fictions, or answers to questions.²² Information can be stored in physical forms, such as human brains and data servers, or physically expressed in books or on road markings. It can also be communicated via smoke signals, blinking lights, measurable radio waves, digital cable connections, or writings on a wall. But the informational content, that is, data itself, exists separately from its context of a larger data base or work of authorship or its physical embodiment. For example, the informational content of a smoke or light signal, photo or painting may convey a message that “a dangerous machine is approaching,”²³ but this message exists separately from its tangible manifestation (the smoke signal, photo, or painting), any creative

and claims to data emanating from connected cars).

18. *E.g.*, *Data*, MERRIAM-WEBSTER DICTIONARY, www.merriam-webster.com/dictionary/data (last visited Nov. 21, 2018) (providing three definitions of “data” that all describe data as “information”).

19. *E.g.*, *Information*, CAMBRIDGE DICTIONARY, <https://dictionary.cambridge.org/us/dictionary/english/information> (last visited Nov. 21, 2018) (defining “information” as “facts about a situation, person, event”).

20. In the United States, for example, the Fair Credit Reporting Act defines “medical information” as “information or data, whether oral or recorded, in any form or medium, created by or derived from a health care provider or the consumer . . .” 15 U.S.C. § 1681a(i)(1) (2011). Under EU data protection laws, “personal data” refers to “any information relating to an identified or identifiable natural person.” 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), art. 4(1), 2016 O.J. (L 119) 1, 33 [hereinafter General Data Protection Regulation].

21. Some data scientists use the term “data” to refer to discrete, objective facts or observations that are unorganized, unprocessed and without any specific meaning, and the term “information” to refer to data that has been shaped into forms that are meaningful and useful to human beings. Saša Baškarada & Andy Koronios, *Data, Information, Knowledge, Wisdom (DIKW): A Semiotic Theoretical and Empirical Exploration of the Hierarchy and Its Quality Dimension*, 18 AUSTRALASIAN J. INFO. SYS. 5, 7 tbl.1 (2013). Data can thus be considered patterns with no meaning, whereas information refers to interpreted data that has meaning. *Id.* at 7; see also Mireille Hildebrandt, *Law as Computation in the Era of Artificial Legal Intelligence: Speaking Law to the Power of Statistics*, 68 U. TORONTO L.J. 1, 3 (2018) (citing Mireille Hildebrandt, *Law as Information in the Era of Data-Driven Agency*, 79 MOD. L. REV. 1, 1–33 (2016)). For a discussion on further distinctions between “data” and “information,” as well as their distinctions from “knowledge” and “wisdom,” see generally Saša Baškarada & Andy Koronios, *supra*, and the illustrated discussion of definitions at www.datenschutzbeauftragter-online.de/daten-information-definition/.

22. *Information*, DET INFORMATIONS-VIDENSKABELIGE AKADEMI, <http://www.informationsordbogen.dk/concept.php?cid=902> (last visited Nov. 21, 2018) (Ger.) (defining information as something that is “relative to a present problem or issue,” such that what is “informative in one situation does not have to be in another”).

23. This informational content further comprises a factual assertion (for example, an animal is approaching) and an assessment (for example, the animal is dangerous).

expression (the text or painting), and the physical means through which it is perceived (the human eyes, ears, or brain).

Consequently, different persons could assert different rights and interests in (1) informational content (for example that a dangerous machine is approaching), (2) expression of information in words, symbols, paintings, or other works of authorship, or compilations or data bases in which information is organized creatively or functionally, and (3) physical manifestation of information (for example the smoke signal, photo, or the painting on a wall), as well as (4) the item to which the information relates (for example a malfunctioning autonomous vehicle or other machine). Ownership and property rights in these different aspects and embodiments of data or information are explored under different property law regimes in Part III.

II. PROPERTY RIGHTS IN DATA

A. OWNERSHIP AND PROPERTY RIGHTS

“Ownership” generally refers to “[t]he right to exclusive use of an asset”²⁴ or “the full right to dispose of a thing at will.”²⁵ Ownership assigns a thing to a person or legal entity and signifies that the object belongs to that person.²⁶ We also use the term “ownership” more broadly in everyday language with respect to owning an ability or responsibility,²⁷ where one can “own up to” having done something.²⁸

In U.S. law, ownership denotes property rights, referring to a “bundle of rights allowing one to use, manage, and enjoy property, including the right to convey it to others,”²⁹ as well as the rights of “exclusive use or monopoly over the property owned.”³⁰ Similarly, German law defines “ownership” in reference to an owner’s ability to “deal with [a] thing at his discretion and exclude others from every influence,” as long as it does not come into conflict with “a statute or third-party rights.”³¹

Correspondingly, “property” refers to “everything that is owned” or that

24. JOHN BLACK ET AL., A DICTIONARY OF ECONOMICS 381 (5th ed. 2017).

25. 3 THE OXFORD DICTIONARY OF BYZANTIUM 1545 (Alexander P. Kazhdan et al. eds., 1991).

26. See OXFORD DICTIONARY OF ENGLISH 1270 (Angus Stevenson ed., 3d ed. 2010) (defining “own” as “[to] have (something) as one’s own; possess”).

27. *Ownership*, CAMBRIDGE DICTIONARY, <https://dictionary.cambridge.org/dictionary/english/ownership> (last visited Nov. 21, 2018) (defining “ownership” as “the fact of taking responsibility for an idea or problem”).

28. *Own Up*, CAMBRIDGE DICTIONARY, <https://dictionary.cambridge.org/dictionary/english/own-up> (last visited Nov. 21, 2018) (listing the English definition of “own up” as “to admit that you have done something wrong” and listing the American definition of “own up” as “to tell the truth or to admit that you are responsible for something”).

29. *Ownership*, BLACK’S LAW DICTIONARY 1280 (Bryan A. Garner ed., 10th ed. 2009).

30. *Ownership*, 2 THE WOLTERS KLUWER BOUVIER LAW DICTIONARY 1931 (Stephen Michael Sheppard ed., desk ed. 2012).

31. BÜRGERLICHES GESETZBUCH [BGB] [CIVIL CODE], § 903 (Ger.), *translation at* https://www.gesetze-im-internet.de/englisch_bgb/englisch_bgb.html (last visited Nov. 21, 2018) [hereinafter GER. CIV. CODE].

“may be the subject of ownership.”³² Three main categories of property are *real* property (land or real estate),³³ *personal* property (physical property other than real property),³⁴ and *intellectual* property³⁵ (intangible property based on ideas).³⁶

Property rights entail a set of rules that govern people’s access to and control of property,³⁷ and the “bundle of rights”³⁸ that the owner can hold against others, including (1) the right to possess, (2) the right to exclude,³⁹ and (3) the right to transfer.⁴⁰ Among the three, the right to *exclude* is described as “one of

32. *Property*, THE LAW DICTIONARY (7th ed. 2002) (online at Lexis Advance); see also *Property*, FREE DICTIONARY: LEGAL DICTIONARY, <https://legal-dictionary.thefreedictionary.com/property> (last visited Nov. 21, 2018) (defining “property” as “anything that is owned by a person or entity”).

33. *Real Property, Real Estate, or Realty*, THE LAW DICTIONARY (7th ed. 2002) (online at Lexis Advance) (“Real property includes land and any interest or estate in land.”); see also *Real Property*, BLACK’S LAW DICTIONARY 1412 (Bryan A. Garner ed., 10th ed. 2009) (defining real property as “[l]and and anything growing on, attached to, or erected on it, excluding anything that may be severed without injury to the land”).

34. *Personal Property*, THE LAW DICTIONARY (7th ed. 2002) (online at Lexis Advance) (“Anything which is subject to ownership and which is not a freehold in real property.”); see also *Moveable Property*, BLACK’S LAW DICTIONARY 1412 (Bryan A. Garner, 10th ed. 2009) (defining movable property as “any movable or intangible thing that is subject to ownership and not classified as real property”).

35. Intellectual property refers to “[a] category of intangible rights protecting commercially valuable products of the human intellect.” *Intellectual Property*, BLACK’S LAW DICTIONARY 930 (10th ed. 2009). For a discussion on how intellectual property, such as trade secrets, copyrights, patents, and trademarks, also qualify as “property,” see Brian M. Hoffstadt, *Dispossession, Intellectual Property, and the Sin of Theoretical Homogeneity*, 80 S. CAL. L. REV. 909, 936–42 (2007).

36. See *What is Intellectual Property*, WORLD INTELL. PROP. ORG., <http://www.wipo.int/about-ip/en/> (last visited Nov. 21, 2018) (“Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols . . .”); see also David Favre, *Living Property: A New Status for Animals Within the Legal System*, 93 MARQ. L. REV. 1021, 1025–1026 (2010) (“The standard discussion of property today lists three basic categories of property—real property, personal property, and intellectual property. . . . Intellectual property is a product of a human mind.”).

37. Jeremy Waldron, *Property and Ownership*, STAN. ENCYCLOPEDIA PHIL. (Sept. 6, 2004), <https://plato.stanford.edu/entries/property/>.

38. Other theories for defining property include (1) the exclusivity theory, which holds that exclusivity rights are the sole requirement for property, and (2) the integrated theory, which states that exclusivity is not enough and looks at how the asset is acquired, used, and disposed. Michael Risch, *Why Do We Have Trade Secrets?*, 11 MARQ. INTEL. PROP. L. REV. 1, 16–18 (2007). In contrast, this Article prefers the bundle of rights theory to address ownership and property rights in data, as it provides more flexibility for addressing data ownership under different property law regimes. See *id.* at 18 (“The middle ground is . . . ‘Hohfeldian’ bundle of rights.”).

39. J. E. Penner, *The “Bundle of Rights” Picture of Property*, 43 UCLA L. REV. 711, 713 (1996) (“[T]he ‘incidents’ of ownership . . . [includes] the right to possess, the right to use, the right to capital, the liability to execution, the immunity from expropriation, and so on.”); *Property Rights*, 2 THE WOLTERS KLUWER BOUVIER LAW DICTIONARY 2237 (Stephen Michael Sheppard ed., desk ed. 2012) (referring to property rights as “the rights of ownership, possession, and use of lands, things, and ideas, including intellectual property”); RICHARD A. EPSTEIN, *TAKINGS: PRIVATE PROPERTY AND THE POWER OF EMINENT DOMAIN* 35–104 (1985) (explaining that the “bundle of rights” approach has become the standard starting point for an inquiry into the nature of property); *Kaiser Aetna v. United States*, 444 U.S. 164, 176 (1979) (“[T]he owners has somehow lost one of the most essential sticks in the bundle of rights that are commonly characterized as property—the right to exclude others.”).

40. Tom W. Bell, *“Property” in the Constitution: The View from the Third Amendment*, 20 WM. & MARY BILL RTS. J. 1243, 1250 (2012) (“Unless ‘property’ comes with a limiting adjective, then, it covers anything of value subject to an owner’s exclusive rights of use and transfer.”); Thomas W. Merrill, *Property and the Right to Exclude*, 77 NEB. L. REV. 730, 730 (1998) (“Of course, those who are given the right to exclude others from

the most essential sticks in the bundle of rights that are commonly characterized as property.”⁴¹

Contracts, torts, competition, and penal laws can also convey exclusion rights, but not a complete bundle of rights that amounts to ownership. Contracts can mimic all rights typically conferred by property laws, but create rights and obligations only between contracting parties and named beneficiaries. Companies often agree in contracts that one party shall own certain data. But, such an agreement binds only other contracting parties and not anyone else, and can thus not convey actual property rights. Torts, competition, and penal laws can generally prohibit data access or use except by authorized persons and thus create *de facto* exclusion rights.⁴² But, torts, competition, and penal laws are limited to prohibitions and do not convey rights to possession, access, use, and alienability to the authorized person who is exempt from the prohibitions; such laws are intended to prohibit conduct that is harmful to society, business integrity, or individual freedoms and stop short of creating property.

Governments grant ownership and property rights primarily for utilitarian or economic incentive reasons.⁴³ Property rights are therefore granted to

a valued resource typically also are given other rights with respect to the resource—such as the right[] . . . to transfer it . . .”).

41. *Kaiser*, 444 U.S. at 176; see also Merrill, *supra* note 40, at 730 (“[T]he right to exclude others is more than just ‘one of the most essential’ constituents of property—it is the *sine qua non*.”). The United States Supreme Court has also focused on the right to exclude in its interpretation of the Fourth Amendment of the Constitution. See Thomas K. Clancy, *What Does the Fourth Amendment Protect: Property, Privacy, or Security?*, 33 WAKE FOREST L. REV. 307, 353 (2009); see also *United States v. Jones*, 565 U.S. 400, 405 (2012) (discussing that the Court’s Fourth Amendment jurisprudence used to be tied to common-law trespass, but that its later cases have deviated from that exclusively property-based approach).

42. For example, laws like the U.S. Computer Fraud and Abuse Act and other computer interference laws, unfair competition laws, data privacy laws, trade secret laws and database protection laws create a *de facto* exclusion right.

43. See ROBERT P. MERGES ET AL., *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE* 11 (6th ed. 2012) (“Utilitarian theory, and the economic framework built upon it, has long provided the dominant paradigm for analyzing and justifying the various forms of intellectual property protection.”); see also Peter Horsley, *Property Rights Viewed from Emerging Relational Perspectives*, in *PROPERTY RIGHTS AND SUSTAINABILITY: THE EVOLUTION OF PROPERTY RIGHTS TO MEET ECOLOGICAL CHALLENGES* 87, 89–90 (David Grinlinton & Prue Taylor eds., 2011) (“Property rights encourage property holders to develop their property, generate wealth, and efficiently allocate resources based on the operation of the market.”); Eric A. Posner & E. Glen Weyl, *Property Is Only Another Name for Monopoly*, 9 J. LEGAL ANALYSIS 51, 51 (2017) (“Property rights of all sorts—in real estate, in shares of corporations, and in radio spectrum, to take three diverse examples—give the owner a monopoly over a resource. It is conventional to think that this monopoly is benign. It gives the owner an incentive to invest in improving the property because she receives the entire payoff from its use or sale. This aligns social and private incentives for investment in property.”). Other theories for justifying property rights are the natural rights perspective, as advanced by John Locke in *Two Treatises on Government*, and the personhood justification, as developed by Georg Wilhelm Friedrich Hegel in *Philosophy of Right*. For further discussions on the natural rights perspective, see Donna M. Byrne, *Locke, Property, and Progressive Taxes*, 78 NEB. L. REV. 700, 705–15 (1999); Carol M. Rose, *Possession as the Origin of Property*, 52 U. CHI. L. REV. 73, 73 (1985) (analyzing the flaws in Locke’s theory that “original owner is one who mixes his or her labor with a thing and, by commingling that labor with the thing, establishes ownership of it”); and Waldron, *supra* note 37, at 10 (comparing Locke’s theory of property rights with David Hume’s theory of rights). For further discussions on the personhood justification, see Margaret Jane Radin, *Property and Personhood*, 34 STAN. L. REV. 957, 971–77 (1982).

incentivize creations or improvements of property, such as farm land (real property) and chattels (personal property),⁴⁴ as well as various intangibles,⁴⁵ including works of authorship (copyrights),⁴⁶ brands (trademarks), and inventions (patents).⁴⁷ For these types of creations, in which the real value lies in their intangible aspects, governments grant property rights to reward and incentivize the creators and inventors by allowing them to monetize their creations and exclude their competitors (or make them license the rights for a fee or rent).⁴⁸

As governments extend property rights to reward investment and innovation, they must also consider various conflicting interests of the public. Property laws need to evolve in pace with societal and technological changes.⁴⁹ The arising rights should be granted only if they do not come into conflict with

44. See GER. CIV. CODE, *supra* note 31, § 953 (stating that property rights are granted to the owner of the thing, for example in § 99, fruits of property belong to the owner of the original property); CAL. CIV. CODE § 658 (West 2018) (generally granting property rights in crops to the owner of the land).

45. See Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the Enforcement of Intellectual Property Rights, para. 1, 2004 O.J. (L 157) 45, 46 (“The protection of intellectual property is important not only for promoting innovation and creativity, but also for developing employment and improving competitiveness.”); Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the Enforcement of Intellectual Property Rights, para. 2, 2004 O.J. (L 157) 45, 46 (“The protection of intellectual property should allow the inventor or creator to derive a legitimate profit from his invention or creation. It should also allow the widest possible dissemination of works, ideas and new know-how. At the same time, it should not hamper freedom of expression, the free movement of information, or the protection of personal data, including on the Internet.”).

46. See, e.g., CAL. CIV. CODE §§ 654–1422 (West 2018); 17 U.S.C. §§ 101–1332 (2012); GER. CIV. CODE, *supra* note 31, §§ 903–1011; Urheberrechtsgesetz [UrhG] [Act on Copyright and Related Rights], Sept. 9, 1965, BGBL. I at 1273, last amended Sept. 1, 2017, BGBL. I at 3346, *translation at* https://www.gesetze-im-internet.de/englisch_urhg/englisch_urhg.html (Ger.) [hereinafter German Copyright Act].

47. 35 U.S.C. § 101 (2012) (“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”); Patentgesetz [PatG] [Patent Act], Dec. 16, 1980, BGBL. I at 1, last amended Sept. 1, 2017, BGBL. I at 3346, *translation at* http://www.wipo.int/wipolex/en/text.jsp?file_id=401424 (Ger.) (“Patents shall be granted for any inventions, in all fields of technology, provided that they are new . . .”). The four major economic justifications for patent law, according to a 1966 Report of the President’s Commission on the Patent System, are that the patent system: (1) provides an incentive to invent, (2) stimulates the investment of additional capital needed for the further development and marketing of the invention, (3) encourages early public disclosure of technological information, and (4) promotes the beneficial exchange of products, services, and technological information. ROBERT P. MERGES ET AL., *supra* note 43, at 17–18 (citing COMM. ON THE JUDICIARY OF THE U.S. SENATE, REPORT OF THE PRESIDENT’S COMMISSION ON THE PATENT SYSTEM 2 (1966)).

48. See U.S. CONST. art. I, § 8, cl. 8 (granting Congress the power to enact copyright laws in order to “promote the Progress of Science and useful Arts”); see also THOMAS JEFFERSON, THE WRITINGS OF THOMAS JEFFERSON 334 (Andrew A. Lipscomb & Albert Ellery Bergh eds., 1905) (“Society may give an exclusive right to the profits arising from them, 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.”).

49. See *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1069 (1992) (Blackmun, J., dissenting) (“Arresting the development of the common law is not only a departure from our prior decisions; it is also profoundly unwise. The human condition is one of constant learning and evolution—both moral and practical. Legislatures implement that new learning; in doing so they must often revise the definition of property and the rights of property owners.”).

existing laws and third-party rights.⁵⁰ The rights to use and exclude are thus restricted in various ways. For example, landowners' rights are limited by the right of way for neighbors under certain circumstances,⁵¹ and their rights to use are further limited by land development regulations, gun control laws, and traffic rules, among others.⁵²

Proper limits need to be established for intellectual property laws as well. Although designed to incentivize investments for the greater good, such as for stimulating scientific and technological progress or developing the fine arts, exclusivity rights that are granted too broadly or for too long can actually impair the desired progress.⁵³ This is why limitations, carve-outs, and exceptions have been set for intellectual property rights, so that a balance can be established between the interests of innovators and of the wider public. Data is typically one of the carve-outs from protectable subject matter definitions in intellectual property laws,⁵⁴ and there is no known "data property statute" in any country.

Yet, various existing property law regimes implicate data and information in different aspects, forms, and scenarios, as discussed in the subsequent sections of Part III, although none of those regimes grant any effective ownership or property rights in the data itself. The subsequent sections of Part III also explore the popular justifications and legal frameworks for property rights under each property law regime to provide the analytical framework for assessing potential policy reasons for creating new property rights in data.

50. See GER. CIV. CODE, *supra* note 31, § 903 (“[O]wner of a thing may, to the extent that a statute or third-party rights do not conflict with this, deal with the thing at his discretion and exclude others from every influence.” (emphasis added)).

51. See, e.g., GER. CIV. CODE, *supra* note 31, § 917(1) (“If a plot of land lacks the connection to a public road necessary for the due use, the owner may require of the neighbors that until the defect is removed they tolerate the use of their plots of land to create the necessary connection.”); see also CAL. CIV. CODE § 1009 (West 2018) (“It is in the best interests of the state to encourage owners of private property to continue to make their lands available for public recreational use to supplement opportunities available on tax-supported publicly owned facilities.”).

52. See GER. CIV. CODE, *supra* note 31, § 903 (“The owner of an animal must, when exercising his powers, take into account the special provisions for the protection of animals.”); see also Cal. Civ. Code § 3342(a) (“The owner of any dog is liable for the damages suffered by any person who is bitten by the dog while in a public place or lawfully in a private place.” emphasis added)).

53. See, e.g., Peter Lee, *Antiformalism at the Federal Circuit: The Jurisprudence of Chief Judge Rader*, 7 WASH. J.L. TECH. & ARTS 405, 417 (2012) (“In that context, separating protectable expression from nonprotectable idea often proceeds as a policy determination inquiring into whether an asset is so abstract that subjecting it to exclusive rights would effectively impair rather than advance creative progress.”); *Defend Innovation*, ELECTRONIC FRONTIER FOUND., <https://web.archive.org/web/20151222074452/https://defendinnovation.org/proposals> (last visited Nov. 21, 2018) (asserting that a “patent covering software should be shorter: no more than five years from the application date” so that the patent system can defend innovation, instead of hindering it).

54. Patent law excludes laws of nature, natural phenomena and abstract ideas from patentable subject matter. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 70–71 (2012). Trademark law denies protection for generic marks. *Park ‘n Fly v. Dollar Park & Fly*, 469 U.S. 189, 194 (1985). Copyright law excludes facts and ideas from copyright protection. 17 U.S.C. § 102(b) (2012).

B. REAL PROPERTY

Real property laws may grant ownership rights to physical manifestations of information that attach to real property, but do not provide any ownership rights to the underlying information itself. Real property laws are designed to protect land, anything that grows on the land, anything permanently attached to the land, or any structure erected on it, including crops, mines, roads, and machinery.⁵⁵ Owners are entitled to the real property's access, use, possession, enjoyment, disposition, and exclusion of others (trespassers),⁵⁶ as well as to harvest its crops, fruits, game, water, and minerals. These ownership rights, however, are limited in different aspects. For example, the owner must comply with building codes and obtain the required permits and approvals,⁵⁷ and may have to grant access to her neighbors or the public under certain circumstances.⁵⁸ Likewise, the law can limit an owner's ability to extract water, oil, and minerals if a use affects the environment or his neighbors.⁵⁹

Real property laws grant rights to owners with respect to *physical* manifestations of information that attach to the real property (for example

55. See CAL. CIV. CODE § 658 (West 2018) (“Real or immovable property consists of: 1. Land; 2. That which is affixed to land; 3. That which is incidental or appurtenant to land; 4. That which is immovable by law; except that for the purposes of sale, emblements, industrial growing crops and things attached to or forming part of the land, which are agreed to be severed before sale or under the contract of sale, shall be treated as goods and be governed by the provisions of the title of this code regulating the sales of goods.”); *id.* § 659 (“Land is the material of the earth, whatever may be the ingredients of which it is composed, whether soil, rock, or other substance, and includes free or occupied space for an indefinite distance upwards as well as downwards, subject to limitations upon the use of airspace imposed, and rights in the use of airspace granted, by law.”); *id.* §§ 661, 662 (discussing fixtures and appurtenances); see also GER. CIV. CODE, *supra* note 31, § 946 (“If a movable thing is combined with a plot of land in such a way that it becomes an essential part of the plot of land, the ownership of the plot of land extends to this movable thing.”); *id.* § 94 (“(1) The essential parts of a plot of land include the things firmly attached to the land, in particular buildings, and the produce of the plot of land, as long as it is connected with the land. Seed becomes an essential part of the plot of land when it is sown, and a plant when it is planted. (2) The essential parts of a building include the things inserted in order to construct the building.”); *id.* §§ 873–902 (providing general provisions on rights in land); *id.* §§ 925–928 (discussing acquisition and loss of ownership of plots of land); see also *Story v. Christin*, 95 P.2d 925, 926 (Cal. 1939) (“The ancient law rigidly applied the maxim *quicquid plantatur solo cedit* and held that whatever was attached to land in any manner whatsoever was part of the land. This rule was applied to plants and trees growing in soil and also to buildings and other products of man’s labor.”); *Kindig v. Palos Verdes Homes Ass’n*, 91 P.2d 645, 647 (Cal. Ct. App. 1939).

56. See *Nollan v. Cal. Coastal Comm.*, 483 U.S. 825, 831–32 (1987); Denise R. Johnson, *Reflections on the Bundle of Rights*, 32 VT. L. REV. 247, 253, 255, 262; see also *City of W. Bend v. Cont’l IV Fund Ltd. P’ship*, 535 N.W.2d 24, 26 (Wis. Ct. App. 1995).

57. See, e.g., *New Houses, Additions & Remodeling*, CITY OF SAN MARINO CALIFORNIA, <https://www.cityofsanmarino.org/284/New-Houses-Additions-Remodeling> (last visited Nov. 21, 2018) (requiring additions to undergo approval); GOVERNOR’S OFFICE OF PLANNING & RESEARCH, STATE OF CAL., PLANNING, ZONING, AND DEVELOPMENT LAWS 6–10 (2012), <http://www.opr.ca.gov/docs/PZD2012.pdf> (listing building requirements).

58. See CAL. CIV. CODE § 1009(a)(1) (West 2018); see also GER. CIV. CODE, *supra* note 31, § 917(1) (requiring landowners to allow their neighbors to cross their land if no other connection to a public road exists); Waldgesetz für Bayern [BayWaldG], GVBl § 313, BayRS 7902-1-L, art. 13(1) (2005) (Ger.) (creating a public right to access forest lands).

59. See generally 30 C.F.R. § 250 (2018) (discussing U.S. federal guidelines for oil, gas, and sulphur operations on the Outer Continental Shelf).

warnings carved in stone or a tree, paintings in a cave or on a house, or zebra crossing lines painted on a road), subject to the aforementioned restrictions. The owner of such physical manifestations of information would have the same rights as to the real property itself, including the rights to possess and exclude others from trespassing on the physical embodiment of information (for instance, an owner can prohibit others from parking cars on road segments marked with “no parking” lines). But, real property laws do not grant rights to possess or control data about real property.⁶⁰ A landowner cannot assert property rights to prohibit others from depicting the location of a zebra road crossing on a map or take a photo of the road markings, or demand access to maps or photos based on ownership of land depicted. Real property ownership does not extend to the informational content, and no ownership rights arise for data as such based on real property laws.

Data is thus not covered by real property laws as protectable subject matter, and real property owners do not have any right to exclude others from accessing, using, reproducing, or distributing the informational content that exists within physical items on their real property.

C. PERSONAL PROPERTY

Personal property laws can grant ownership rights to physical manifestations of information, but do not provide any ownership rights to the underlying information. This is because personal property laws cover *physical* things (other than real estate). For example, the German Civil Code expressly limits personal property law⁶¹ to tangible things.⁶² California property law defines personal property as “every kind of property that is not real [property]”⁶³ and courts have required a connection to *physical* items.⁶⁴ An owner of a physical item that embodies information—such as a book, photo, or computer chip—can thus enforce property rights to the physical item that embodies data (she can exclude others from taking a computer chip or demand return of a book),⁶⁵ but cannot exclude others from apprehending, using, reproducing,

60. See CAL. BUS. & PROF. CODE § 8774 (West 2018), for a discussion on California law granting a “right of entry” on property to collect information about borders and location of real property.

61. See GER. CIV. CODE, *supra* note 31, §§ 929–984.

62. See *id.* (limiting personal property to “moveable things”).

63. See CAL. CIV. CODE § 663 (West 2018).

64. See Estate of Puett, 1 Cal.2d 131, 134 (Cal. 1934) (citing *Bills v. Putnam*, 64 N.H. 554 (N.H. 1888) for the proposition that personal property embraced goods and chattel only); see also PERSONS, PARTS AND PROPERTY: HOW SHOULD WE REGULATE HUMAN TISSUE IN THE 21ST CENTURY? 91 (Imogen Goold et al. eds., 2014) (“All clear property rights, in addition to being exigible against the world, have a second characteristic of relating to a physical thing.”).

65. Lars S. Smith, *RFID and Other Embedded Technologies: Who Owns the Data?*, 22 SANTA CLARA COMPUTER & HIGH TECH. L.J. 695, 737–38 (2006) (“Even if the manufacturer does not own the data directly—whether because the data is not subject to ownership by anyone, or because the manufacturer is not the creator of the data or otherwise directly owner of the intangible property—the manufacturer may be able to control the data because it owns the chip in the tag. Given that the chip (and the antenna) is a piece of tangible, personal property, traditional rules regarding ownership of the chip would apply.”).

disclosing, or displaying the information contained within the physical item (that is, she cannot exclude others from the informational content).

D. TRADE SECRET

At first sight, trade secret laws may appear to come close to granting ownership rights to data, but these laws have limitations that prevent them from effectively granting property rights to data. In the United States, trade secret law originated from the common law, but has now been codified in state statutes⁶⁶ that resemble the Uniform Trade Secrets Act⁶⁷ and federal law, including the Defend Trade Secrets Act of 2016.⁶⁸ Businesses can claim protection for technical know-how, customer lists, and other information as trade secrets if that information (1) is not generally known or readily accessible, (2) derives an economic value from being secret, and (3) has been subject to reasonable steps to be kept as a secret.⁶⁹

Whether such protection falls within the property law regime is subject to controversy.⁷⁰ In the Defend Trade Secrets Act of 2016, Congress expressly stated that the Act “shall not be construed to be a law pertaining to intellectual property.”⁷¹ Trade secrets are protected against misappropriation by way of espionage or breach of contract.⁷² The goal of trade secret law is not to incentivize citizens or companies to keep information secret, but to protect business integrity from unfair misappropriation of valuable confidential information.⁷³ In Germany, trade secret protection has also historically been cast

66. Risch, *supra* note 38, at 6.

67. See Smith, *supra* note 65, at 722.

68. Defend Trade Secrets Act of 2016, Pub. L. No. 114-153, 130 Stat. 376 (2016) (codified as amended in scattered sections of 18 U.S.C.); see also Lothar Determann et al., *Trade Secret Protection Measures and New Harmonized Laws*, 17 COMPUTER L. REV. INT’L 179, 179 (2016).

69. 18 U.S.C. § 1839(3)(A)–(B) (2012); CAL. CIV. CODE §§ 3426.1(d), 3426.11 (West 2018); Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the Protection of Undisclosed Know-How and Business Information (Trade Secrets) Against Their Unlawful Acquisition, Use and Disclosure, art. 2(1), 2016 O.J. (L 157) 1, 9 (establishing a similar framework of trademark rules to be provided by the EU Member States); see also MERGES ET AL., *supra* note 43, at 25 (“The definition of subject matter eligible for protection is quite broad: business or technical information of any sort. To benefit from trade secret protection, the information must be a secret.”).

70. See, e.g., Risch, *supra* note 38, at 15 (“To many, if trade secrets are property, then laws protecting them are normatively justified. Thus, the question of whether or not trade secrets are property has raged on for many years.”).

71. Defend Trade Secrets Act of 2016, Pub. L. No. 114-153 § 2(g), 130 Stat. 376 (2016). Section 2(g) of the Defend Trade Secrets Act is apparently intended primarily to maintain the status quo under section 230 of the Communications Decency Act. Eric Goldman, *The Defend Trade Secrets Act Isn’t an “Intellectual Property” Law*, 33 SANTA CLARA HIGH TECH. L.J., 541, 541–42 (2017) (“[T]he odd and unprecedented declaration that the DTSA ‘shall not be construed to be a law pertaining to intellectual property.’ . . . preserves the status quo for 47 U.S.C. § 230” (quoting Defend Trade Secrets Act of 2016, Pub. L. No. 114-153, § 2(g), 130 Stat. 376 (2016))).

72. 18 U.S.C. §§ 1832, 1839(6)(A) (2012); CAL. CIV. CODE §§ 3426.1–3426.11 (West 2018).

73. See MERGES ET AL., *supra* note 43, at 25 (“Trade secret laws are state law doctrines that protect against the misappropriation of certain confidential information.”); *id.* at 37 (“On eligible subject matter, the current trend, exemplified once again by the UTSA, is to protect as a trade secret *any* valuable information so long as the information is capable of adding economic value”).

as a prohibition against unfair competition, and not as a property right.⁷⁴ Further, trade secrets do not provide “exclusive” rights,⁷⁵ and the legal protections available for trade secrets are less concrete than those for real, personal, and other intangible properties.⁷⁶ For example, information immediately loses protection under trade secret laws if it becomes public via independent discovery or reverse engineering in the interest of innovation⁷⁷—in other words, the moment the information no longer qualifies as a secret.⁷⁸ Trade secret laws are thus more akin to traditional tort law than to property law (for example, patent or copyright law).⁷⁹

The limitations of trade secret laws as a means to establish property-like rights in data are particularly evident with respect to data generated by connected cars and other devices on the Internet of Things. Device manufacturers typically cannot access information from devices without the device owners’ consent,⁸⁰ much less keep the information secret from the device owners. Device manufacturers thus generally cannot claim trade secret ownership rights in the data and information generated by the devices they sell to customers. Consumers also typically cannot claim trade secret rights in the data produced by the devices they own because they cannot substantiate a competitive advantage from keeping the data secret. Moreover, much of the data and information generated by cars and other connected devices, such as its location and environment, is

74. See Gesetz gegen den unlauteren Wettbewerb [UWG] [Act Against Unfair Competition], Mar. 3, 2010, BGBL. I at 254, last amended Feb. 17, 2016, BGBL. I at 233, translation at http://www.gesetze-im-internet.de/englisch_uwg/englisch_uwg.pdf (Ger.) (“This Act shall serve the purpose of protecting competitors, consumers and other market participants against *unfair commercial practices*.” (emphasis added)).

75. See 1 ROGER M. MILGRIM, MILGRIM ON TRADE SECRETS § 2.01 (2010).

76. See Pamela Samuelson, *Information as Property: Do Ruckelshaus and Carpenter Signal a Changing Direction in Intellectual Property Law?*, 38 CATH. U. L. REV. 365, 398 (1989) (“Clearly, the word property is a very powerful metaphor that radically changes the stakes in legal disputes. Once a property interest is established, the law provides a wide range of legal protections for it, a much wider range . . . [than for] other specific kinds of unfair conduct.”).

77. See 18 U.S.C. § 1839(6)(B) (2012); *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 476 (1974) (defining “reverse engineering” as “starting with the known product and working backward to divine the process which aided in its development or manufacture”); see also Directive on the Protection of Undisclosed Business Information, *supra* note 69, at para. 16 (“In the interest of innovation and to foster competition, the provisions of this Directive should not create any exclusive right to know-how or information protected as trade secrets. Thus, the independent discovery of the same know-how or information should remain possible. Reverse engineering of a lawfully acquired product should be considered as a lawful means of acquiring information, except when otherwise contractually agreed.”); Determann et al., *supra* note 68, at 181.

78. The qualification of trade secrets as property is controversial and determined differently for purposes of different areas of law. For example, the United States Supreme Court has recognized that if state law recognizes a trade secret as property, then for purposes of a federal “taking” analysis, it is property. MILGRAM ET AL., *supra* note 75, § 2.01.

79. MERGES ET AL., *supra* note 43, at 25; see also *id.* at 37 (“Legal protection for trade secrets is premised primarily on two theories that are only partly complementary. The first is utilitarian. Under this view, protecting against the theft of proprietary information encourages investment in such information. . . . The second theory emphasizes deterrence of wrongful acts and is therefore sometimes described as a tort theory.”).

80. The U.S. Computer Fraud and Abuse Act and other jurisdictions’ computer interference laws expressly prohibit such access. Lothar Determann, *Internet Freedom and Computer Abuse*, 35 HASTINGS COMM. & ENT. L.J. 429, 443 (2013).

generated and displayed in plain sight, depriving that information of secrecy. Thus, trade secret laws do not convey meaningful ownership in data, and instead, merely offer some level of protection against unfair misappropriation of information.

E. PATENT

Patent law provides property rights to systems or methods that involve inventive use, storage, or application of data in certain instances. But patent law does not provide any ownership rights in the underlying data itself.

Inventors can acquire patent rights to new, non-obvious and useful processes, machines, manufactures or compositions of matter, and to new and useful improvements thereof.⁸¹ Although the protection granted under patent law is generally broad, and as often cited, embraces “anything under the sun that is made by man,”⁸² the U.S. Supreme Court recognizes limitations to patent-eligible subject matter, such as laws of nature, natural phenomena, and abstract ideas.⁸³ These limitations were described as “the basic tools of scientific and technological work,” for which a monopoly through patent rights would impede innovation.⁸⁴ Although use, storage, or application of data can be patentable, the underlying data is not eligible for patent protection.⁸⁵ Patent law is thus not an

81. 35 U.S.C. § 101 (1952) (utility); 35 U.S.C. § 102 (2012) (novelty); 35 U.S.C. § 103 (2011) (nonobviousness).

82. *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (quoting S. REP. NO. 1979, at 5 (1952); H.R. REP. NO. 1923, at 6 (1952)).

83. *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354 (2014); *Diamond v. Diehr*, 450 U.S. 175, 185 (1981); *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972); *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874).

84. *MERGES ET AL.*, *supra* note 43, at 145 (quoting *Gottschalk*, 409 U.S. at 67).

85. *See Digitech Image Techs. v. Elecs. for Imaging*, 758 F.3d 1344, 1350 (Fed. Cir. 2014) (“As noted by the Supreme Court, ‘an *application* of a law of nature or mathematical formula to a known structure of process may well be deserving of patent protection.’ . . . [thus] [t]he method in the ‘415 patent claims an abstract idea because it describes a process of organizing information through mathematical correlations and is not *tied to a specific structure or machine*.” (citation omitted) (emphasis added)); *see also* W. Nicholson Price II, *Big Data, Patents, and the Future of Medicine*, 37 *CARDOZO L. REV.* 1401, 1420 (2016) (“Facts and data do not fall within one of the four categories of patentable subject matter . . . This leaves only the algorithms that actually drive black-box medicine as potential subjects of patent protection.”). In *Mayo Collaborative Servs v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012), the Supreme Court illustrated the difference between data and patent-eligible subject matter. The patent in question claimed methods for calibrating the effective dosage for certain drugs to treat autoimmune disease by correlating drug metabolites and the treatment’s likely effectiveness. *Id.* at 73. The Court held that this data correlation, with little more—telling doctors to increase or decrease the drug based on the metabolite level—was not patentable. *Id.* at 72. The Court referred to the correlation data as a “law of nature” and noted that “a law of nature is not patentable.” *Id.* at 77. The Court explained that one must do something more with the data—apply it in a meaningful way—in order to render it patent eligible. *Id.* at 71. However, a process is not unpatentable simply because it contains a law of nature of a mathematical algorithm. *Id.* (quoting *Diehr*, 450 U.S. at 187). Indeed, an “*application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.” *Id.* (quoting *Diehr*, 450 U.S. at 187)). But, the Court cautioned that “to transform an unpatentable law of nature into a patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words ‘apply it.’” *Id.* at 72. The Court provided somewhat more of an explication of what additional application would be sufficient in a later case, *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.* 569 U.S. 576 (2013). There, the PTO granted a patent claiming

effective legal framework for protecting the rights to data.

F. TRADEMARK

Trademark law, also, does not provide appropriate property rights to data. Brand names and logos used on goods and services are protected by trademark law against unauthorized use in commerce to the extent that such use could confuse consumers.⁸⁶ The purpose of trademark law has “remained constant and limited: Identification of the manufacturer or sponsor of a good or the provider of a service,”⁸⁷ with a fair use defense that “forbids a trademark registrant to appropriate a descriptive term for his exclusive use and so prevent others from accurately describing a characteristic of their goods.”⁸⁸

Informational content, such as a person’s last name used in a business, can therefore be trademarked, referring to the use in a particular branch. However, this does not grant ownership rights in the data or information itself and it only entitles the holder to prevent others from using the name in a confusing way (for example, within the same business branch for which the trademark was registered) in connection with selling similar products or services.

G. COPYRIGHT

Copyright law can provide property rights to original works of authorship that contain information, including creative compilations of data, but not to the underlying data itself. Although there are different philosophical foundations of copyright law, the predominant philosophical framework undergirding American copyright law is utilitarian.⁸⁹ “The immediate effect of our copyright law is to secure a fair return for an ‘author’s’ creative labor. But the ultimate aim is, by this incentive, to stimulate artistic creativity for the general public good.”⁹⁰

Authors of writings and other works are thus granted protection under copyright law if they are creative.⁹¹ “The subject matter protectable by copyright

the isolation of a particular DNA segment, and also the synthetically created DNA (complementary or cDNA). *Id.* at 582–83. The Court held that the DNA segment was nothing more than the product of nature and not patent eligible, but that the synthetic DNA was patent eligible because it “[d]id not present the same obstacles to patentability as naturally occurring, isolated DNA segments.” *Id.* at 594. The scientists took the data and made something new. *Id.* at 595 (“[T]he lab technician unquestionably creates something new when [synthetic DNA] is made.”).

86. See 15 U.S.C. § 1114(1) (2012); see also Gesetz über den Schutz von Marken und sonstigen Kennzeichen [MarkenG] [Trade Mark Act], Oct. 25, 1994, BGBL I at 3082, last amended Oct. 19, 2013, BGBL I at 3830, art. 3, translation at http://www.gesetze-im-internet.de/englisch_markeng/englisch_markeng.pdf (Ger.).

87. *New Kids on the Block v. News Am. Publ’g, Inc.*, 971 F.2d 302, 305 (9th Cir. 1992).

88. *Id.* at 306 (internal quotation marks omitted) (citing *Soweco, Inc. v. Shell Oil Co.*, 617 F.2d 1178, 1185 (5th Cir. 1980)).

89. *MERGES ET AL.*, *supra* note 43, at 435; see also U.S. CONST. art. I, § 8, cl. 8 (granting Congress the power to enact copyright laws in order to “promote the Progress of Science and useful Arts”).

90. *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975).

91. See 17 U.S.C. § 102(a) (2012); German Copyright Act, *supra* note 46, § 2; see also *MERGES ET AL.*, *supra* note 43, at 436 (“Creative work is to be encouraged and rewarded. . . .” (quoting *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975))).

spans the broad range of literary and artistic expression—including literature, song, dance, sculpture, graphics, painting, photography, sound, movies, and computer programming.”⁹² But copyright law protects only the creative expression of information, and not the information itself.⁹³ Copyright owners hold the exclusive right to exclude others from copying, adapting, distributing, performing, or displaying creative content,⁹⁴ but not with respect to the underlying factual information contained within. For example, an accounting book author would be able to assert her rights under copyright law against literal copying of the book’s text, but not against differently-worded descriptions of the accounting methods contained within the book.⁹⁵ As the U.S. Supreme Court pointed out, in “considering the general question of property in news matter, it is necessary to recognize its dual character, distinguishing between the substance of the information and the particular form or collocation of words in which the writer has communicated it.”⁹⁶

In certain instances, copyright law grants copyright ownership rights to compilations of data, as long as that compilation is creative. An author can creatively select or arrange the facts in a compilation, for example, by choosing “which facts to include, in what order to place them, and how to arrange the collected data.”⁹⁷ The resulting compilation then entails a degree of creativity, and may therefore possess the requisite originality for copyright protection.⁹⁸ But even in such cases, no copyright is attached to the factual data itself.⁹⁹

92. *Id.* at 434.

93. See 17 U.S.C. § 102(b) (2012) (“In no case does copyright protection . . . extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery . . .”); see also *MERGES ET AL.*, *supra* note 43, at 434 (“Ideas themselves are not copyrightable, but the author’s particular expression of an idea is protectable.”); *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co., Inc.*, 499 U.S. 340, 348 (1991) (holding that “all facts—scientific, historical, biographical, and news of the day” are part of the public domain and are not copyrightable). This also true under German copyright law, which requires a certain level of creativity (“Schoepfungshoehle”). See German Copyright Act, *supra* note 46, § 2(2).

94. 17 U.S.C. § 106 (2012); German Copyright Act, *supra* note 46, at §§ 15–23.

95. See generally *Baker v. Selden*, 101 U.S. 99 (1879) (“[B]ank account-books are not the subject of copyright; and [] the mere copyright of Selden’s book did not confer upon him the exclusive right to make and use account-books, ruled and arranged as designated by him and described and illustrated in said book.”).

96. *Int’l News Serv. v. Associated Press*, 248 U.S. 215, 234 (1918). Further, various limitations also apply to copyrightable subject matter in the interest of promoting constructive criticisms, comments, news reporting, teaching, scholarship and research. See 17 U.S.C. § 107 (2012) (discussing the fair use doctrine); German Copyright Act, *supra* note 46, §§ 49; Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society, 2001 O.J. (L 167) 10, 14 (“This Directive should seek to promote learning and culture by protecting works and other subject-matter while permitting exceptions or limitations in the public interest for the purpose of education and teaching.”).

97. *Feist Publ’ns, Inc.*, 499 U.S. at 348.

98. *Id.* at 363 (declining the copyrightability of the arrangement of data in a telephone directory because there was “nothing remotely creative about arranging names alphabetically in a white pages directory” as this was “an age-old practice, firmly rooted in tradition and so commonplace that it has come to be expected as a matter of course”). This principle is embodied in 17 U.S.C. § 101 (2012), which defines “compilation” as “a work formed by the collection and assembling of preexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship.”

99. 17 U.S.C. § 103 (2012).

Where cars and other connected devices generate and record data, the resulting compilations will often already lack human creativity, and thus an abstraction filtration test to separate facts and creative expression is not even necessary. Neither monkeys taking selfies, nor autonomous cars recording security footage, can create copyrightable works, or own copyrights.¹⁰⁰ When companies write software code to cause connected cars or other devices to generate and compile data, human creativity can manifest itself separately and apart from the compiled data, like in the coding of self-learning programs that create maps using artificial intelligence in autonomous cars. It can then be difficult to separate the creative aspects of the resulting work or compilation from the non-protectable factual information.¹⁰¹ For example, a creator of a database containing information on traffic conditions, road hazards and speed cameras may attempt to claim copyright protection for the compilation.¹⁰² Nonetheless, the database creator will typically be unable to show that the arrangement of the information has any originality.¹⁰³

Further, any protection granted to compilations would, in practice, only safeguard against a very limited scope of actions. Copyright law, again, does not extend to the facts contained in the compilation and is limited to the facts' particular selection or arrangement. This means that a subsequent compiler will be free to use the facts contained in the prior compilation, as long as the competing work does not feature the same selection and arrangement.¹⁰⁴ To be successful with copyright claims, a plaintiff thus has to prove that the defendant copied more than the merely extracted factual information.¹⁰⁵ If a developer reproduces and adapts copyrighted code for the sole purpose of extracting non-copyrightable data from expression within a work of authorship, this is permissible under the fair use doctrine.¹⁰⁶

In summary, copyright law does not create ownership rights in the data

100. U.S. COPYRIGHT OFFICE, COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES §§ 306, 313.2 (3d ed. 2017).

101. Eric Goldman, *Google Defeats Copyright Lawsuit over Waze Data*, FORBES (Dec. 16, 2015, 1:40PM), <https://www.forbes.com/sites/ericgoldman/2015/12/16/google-defeats-copyright-lawsuit-over-waze-data/#3bd2e916ff23> (noting that copyright case law regarding facts and compilations is often confusing and that questions regarding what is fact and non-fact "routinely baffle judges").

102. *See generally* PhantomALERT, Inc. v. Google, Inc., No. 15-cv-03986-JCS, 2015 U.S. Dist. LEXIS 167754 (N.D. Cal. Dec. 14, 2015) (dismissing the plaintiff's complaint alleging that the defendant infringed its copyright by copying "Points of Interest," such as traffic conditions, dangerous road segments, road hazards, and traffic enforcement monitors, from the plaintiff's database containing navigation information).

103. *See id.* at *19 (discussing PhantomALERT's argument that its map reflects creativity). *But see* PhantomALERT, Inc. v. Google Inc., No. 15-cv-03986-JCS, 2016 U.S. Dist. LEXIS 30321 (N.D. Cal. 2016). at *26 ("The Court now finds that the FAC alleges sufficient facts to support a plausible inference that at least some of the Points of Interest in its database are characterized by sufficient originality to warrant copyright protection.").

104. 17 U.S.C. § 103(b) (2012); *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., Inc.* 499 U.S. 340, 349 (1991).

105. *See* PhantomALERT, Inc. v. Google, Inc., No. 15-cv-03986-JCS, 2016 U.S. Dist. LEXIS 30321, at *24 (N.D. Cal. Mar. 8, 2016) (holding that facts are not original and not copyrightable).

106. Lothar Determann & David Nimmer, *Software Copyright's Oracle from the Cloud*, 30 BERKELEY TECH. L.J. 161, 174–75 (2015).

contained within a compilation or database. To the contrary, copyright law expressly leaves out factual information from copyrightable material, and in the U.S., precludes the states from creating copyright-like property regimes for information or data.¹⁰⁷

H. U.S. STATE LAWS ON MISAPPROPRIATION AND EU DATABASE DIRECTIVE

Companies that invest significant time and effort into the creation of databases can claim limited protection against free-riders under the European database laws¹⁰⁸ and U.S. state laws on misappropriation.¹⁰⁹

Unlike copyright law, which protects the creativity or authorship arising from a collection of facts, U.S. state laws on misappropriation and European database laws afford limited *sui generis* protection for collections of information that require *significant investments*.¹¹⁰ These protections are intended and framed as torts to safeguard business integrity and fair competition.¹¹¹ For the same reasons, news organizations can claim limited protection for “hot news items” against immediate copying by free-riders only if the factual information

107. Unlike the data generated by a device, the software used in connected cars and other devices is protected by copyright law. In the United States, source and object code of software is protected as “literary work” and thus enjoys the same protections and limitations as copies of other copyrightable works. 17 U.S.C. § 101 (2012); *see also* Whelan Assocs. v. Jaslow Dental Lab., Inc., 797 F.2d 1222, 1233 (3d. Cir. 1986). Europe grants protection to software copies in the directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the Legal Protection of Computer Programs, 2009 O.J. (L 111) 16. For a detailed discussion of tailoring legal protection for computer software, *see* Determann & Nimmer, *supra* note 106, at 165–72, and Peter S. Menell, *Tailoring Legal Protection for Computer Software*, 39 STAN. L. REV. 1329, 1354 (1987). For an overview of software copyright protection in the EU, *see* Pamela Samuelson, *Comparing U.S. and EC Copyright Protection for Computer Programs: Are They More Different than They Seem?*, 13 J.L. & COM. 279 (1994).

108. *See* Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the Legal Protection of Databases, 1996 O.J. (L 77) 20 [hereinafter EC Database Directive] (offering copyright-like protection to creators of valuable databases).

109. *See* U.S. Golf Ass’n v. Arroyo Software Corp., 81 Cal. Rptr. 2d 708, 714–15 (Cal. Ct. App. 1999) (discussing California’s common law misappropriation as applicable to the unauthorized use of golf handicap formulas that were developed through intensive data collection and analysis); *see also* Nat’l Basketball Ass’n v. Motorola, Inc., 105 F.3d 841, 852–54 (2d Cir. 1997) (discussing the merits of a “hot news” misappropriation claim in the context of unauthorized electronic delivery of near-real-time professional basketball statistics); Bd. of Trade v. Dow Jones & Co., 439 N.E.2d 526, 537 (Ill. App. Ct. 1982) (applying Illinois’s common law misappropriation to the unauthorized use of the Dow Jones Index and Averages as a trading vehicle); RESTATEMENT (THIRD) OF UNFAIR COMPETITION § 38 (AM. LAW INST. 1995); Jane C. Ginsburg, *Copyright, Common Law, and Sui Generis Protection of Databases in the United States and Abroad*, 66 U. CIN. L. REV. 151, 157 (1997) (“Misappropriation is a broad, common law anticopying doctrine. ‘The misappropriation doctrine potentially is available whenever a person imitates or duplicates a work developed at the expense of another.’” (quoting David E. Shipley, *Refusing to Rock the Boat: The Sears/Compco Preemption Doctrine Applied to Bonito Boats v. Thundercraft*, 25 WAKE FOREST L. REV. 385, 413 (1990))).

110. EC Database Directive, *supra* note 108, at art. 7; *see also* Determann et al., *supra* note 68, at 184.

111. EC Database Directive, *supra* note 109, at paras. 5–6, explains the legislative considerations and intent as follows:

[C]opyright remains an appropriate form of exclusive right for authors who have created databases . . . nevertheless, in the absence of a harmonized system of unfair-competition legislation or of case-law, other measures are required in addition to prevent the unauthorized extraction and/or reutilization of the contents of a database.

is time-sensitive and requires significant efforts to discover.¹¹² But such limited protections against freeriding by competitors are not framed as property law regimes and, like trade secret laws, constitute only narrow exceptions to the general rule that facts should be generally accessible and not subject to individual exclusivity rights.

In the EU, the financial and professional investment in an arrangement of facts is safeguarded through a *sui generis* right to enable database makers¹¹³ to protect their respective time, money, and effort;¹¹⁴ they are entitled to prevent extraction or re-utilization of the whole or a substantial part (qualitatively or quantitatively) of the database.¹¹⁵ But, full copyright-like property protections in European database protection laws apply only to the creative selection or arrangement of the factual information, which carves out the individual information elements from ownership.¹¹⁶

If a device manufacturer, software company or online service provider deliberately configures a connected device to collect and report the data for purposes of creating a database—and obtains the required consents and authorizations from the device buyers to legally create such a database—then the company may acquire limited ownership rights in that database under U.S. state laws on commercial misappropriation and EU database protection laws.¹¹⁷ Also, companies can develop, purchase, deploy and configure connected devices specifically to create a database that is valuable to their business and then claim database protection rights, for example, a weather forecast company that deploys

112. See generally *Int'l News Serv. v. Associated Press*, 248 U.S. 215 (1918) (holding that a news article may be copyrighted under the Copyright Act, but that the news itself is not copyrightable).

113. See EC Database Directive, *supra* note 108, at art. 1(2) (defining the term “database” as “a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means”).

114. *Id.* at paras. 39–40 (“[T]his Directive seeks to safeguard the position of makers of databases against misappropriation of the results of the financial and professional investment made in obtaining and collection the contents by protecting the whole or substantial parts of a database against certain acts by a user or competitor; . . . [T]he object of this *sui generis* right is to ensure protection of any investment in obtaining, verifying or presenting the contents of a database for the limited duration of the right; whereas such investment may consist in the deployment of financial resources and/or the expending of time, effort and energy . . .”).

115. *Id.* at art 7(1); see also German Copyright Act, *supra* note 46, § 97 (stating a right to require cessation of infringement and a right to damages).

116. See Malte Grützmacher, *Dateneigentum—ein Flickenteppich: Wem gehören die Daten bei Industrie 4.0, Internet der Dinge und Connected Cars?*, COMPUTER UND RECHT, Aug. 2016, at 485, 488 (Ger.) (discussing German laws that could support ownership rights in data).

117. See *Opperman v. Path, Inc.*, 84 F. Supp. 3d 962, 988–90 (N.D. Cal. 2015) (a key issue was whether plaintiffs gave their consent to allow the application to access their contact information, but if they had given such consent, then the defendant’s motion to dismiss likely would have been granted because there would be no misappropriation); *Salestraq Am., LLC v. Zyskowski*, 635 F. Supp. 2d 1178, 1184–85 (D. Nev. 2009) (defendants did not violate CFAA because they had a license to access plaintiff’s website and did not exceed the scope of the license); Case C-203/02, *The British Horseracing Bd., Ltd. & Others v. William Hill Org. Ltd.*, 2004 E.C.R. I-10415; Case C-444/02, *Fixtures Mktg., Ltd. v. Organismos Prognostikon Agonon Podosfairou AE (OPAP)*, 2004 E.C.R. I-10549; BGH, GRUR 2010, 1004 (1005) (German appellate court’s decision on ownership rights to traffic data collected by toll technologies). *But see* *Firoozye v. Earthlink Network*, 153 F. Supp. 2d 1115, 1131 (N.D. Cal. 2001) (permitting a claim of misappropriation to proceed despite the fact that the plaintiff had consented to the defendant accessing his program).

drones and sensors to collect up-to-date weather information or a traffic advisory service provider that guides drivers to find the quickest routes.

But in the absence of deliberate database creation plans and investments, neither the EU database directive nor the U.S. state laws on misappropriation offers significant property rights with respect to data generated by connected cars or other devices as mere byproducts.¹¹⁸ Even when limited exclusivity rights do attach, available remedies have limited scopes: protection is only applicable against wholesale copying of the database or substantial parts of it, typically where freeriding could have a noticeable impact on investments and competition. Individual information content elements, however, are excluded from protection under database protection laws in the interest of protecting public interests in information.

I. DATA PRIVACY

Data privacy laws are intended to protect individual freedom and human dignity.¹¹⁹ They favor data minimization and are not intended to incentivize creation or production. Privacy laws are thus generally not referred to as property laws.¹²⁰

Privacy laws give data subjects the right to exclude others from acquiring or using certain personal information about them, similar to the exclusion rights conferred by property laws.¹²¹ EU lawmakers have taken broad action to protect data privacy and have restated in the new General Data Protection Regulation (GDPR) that companies are generally prohibited from processing any personal data unless there is a statutory exception.¹²² Such strongly worded exclusion rights have been likened to property law concepts.¹²³ Yet, GDPR stops short of

118. See Gruetzmacher, *supra* note 116, at 487–488; Thomas J. Farkas, *Data Created by the Internet of Things: The New Gold Without Ownership*, 23 REV. LA PROPIEDAD INMATERIAL 5, 9 (2017) (“[I]n case of the networked car, the data generated by virtue of the sensors must rather be regarded as raw data. E.g., the data regarding location and driving behaviour [sic] is rather not in a systematic or methodical order.”); see also JOSEF DREXL ET AL., POSITION STATEMENT OF THE MAX PLANCK INSTITUTE FOR INNOVATION AND COMPETITION OF 16 AUGUST 2016 ON THE CURRENT EUROPEAN DEBATE: DATA OWNERSHIP AND ACCESS TO DATA 1, 10 (2016). For a discussion on how information generated from the collected data might be granted protection, see Lothar Determann, *Social Media Privacy: A Dozen Myths and Facts*, 2012 STAN. TECH. L. REV. 7, 3 (2012).

119. See, e.g., General Data Protection Regulation, *supra* note 20, at para. 1 (“The protection of natural persons in relation to the processing of personal data is a fundamental right. [Privacy laws] provide that everyone has the right to the protection of personal data concerning him or her.”).

120. See Schwartz, *supra* note 15, at 2058.

121. See Samuelson, *supra* note 15, at 1130 (“Because the law will sometimes protect [personal data in the hands of others] and other types of data from unauthorized uses and disclosures, this too may reinforce a sense of ownership in personal data.” (footnote omitted)).

122. General Data Protection Regulation, *supra* note 20, at art. 4(1) (defining “personal data” as “any information relating to an identified or identifiable natural person”); *id.* at art. 4(2) (defining “processing” as “any operation or set of operations which is performed on personal data or on sets of personal data, whether or not by automated means, such as collection, recording, organization, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction”).

123. Jacob M. Victor, Comment, *The EU General Data Protection Regulation: Toward a Property Regime for Protecting Data Privacy*, 123 YALE L.J. 513, 515 (2013) (“[T]he Regulation takes the unprecedented step

recognizing ownership or property rights for data subjects and refers to “ownership” and “property” only to recognize the conflicting rights that may outweigh privacy interests.¹²⁴ Even the novel right to data portability is quite limited: it applies only to personal data provided (not created or acquired by an “owner”), by the data subject (not any “owner”), based on consent or contract (not legitimate interests, law or other bases), and does not confer any exclusion, usage or alienation rights.¹²⁵

In the United States, overlapping federal and state regulations on data privacy¹²⁶ protect reasonable privacy expectations under tort laws and sector-specific regulations with even less of a property law-like character as provided in GDPR.¹²⁷

For instance, the Health Insurance Portability and Accountability Act (HIPAA), which is the federal statute governing healthcare data, protects the privacy of individually identifiable information, but does not grant any ownership rights to the individuals in their records.¹²⁸ For a few state statutes pertaining to automotive event data recorders (EDRs), which serve as “black boxes” for recording critical sensor and diagnostic data prior to collisions, legislatures have used a property law terminology and allocated “ownership” to data from EDRs to drivers or vehicle owners.¹²⁹ But the statutes make clear that their intent is to allocate ownership to the physical embodiment of data on the tangible EDR devices, and not to create property rights to the information content itself, which eye witnesses, security cameras, other traffic participants and forensic investigators are free to acquire from other sources. Similarly, California privacy laws impose security breach notification obligations on “owners” of certain computerized data,¹³⁰ but clarify in their definitional section that the “ownership” term is broadly deployed to protect any data held by a company for its own business purposes¹³¹ (as opposed to data handled by a

of, in effect, creating a property regime in personal data . . .”).

124. See General Data Protection Regulation, *supra* note 20, at para. 63 (“Where possible, the controller should be able to provide remote access . . . [but] [t]hat right should not adversely affect the rights or freedoms of others . . .”).

125. *Id.* at art. 20.

126. See Erika G. Martin & Grace M. Begany, *Opening Government Health Data to the Public: Benefits, Challenges, and Lessons Learned from Early Innovators*, 24 J. AM. MED. INFORMATICS ASS’N 345, 348 (2017).

127. LOTHAR DETERMANN, *DETERMANN’S FIELD GUIDE TO DATA PRIVACY LAW: INTERNATIONAL CORPORATE COMPLIANCE* xvii (3d ed. 2017).

128. *Who Owns Health Information?*, HEALTHINFOLAW (Aug. 2015), http://www.healthinfo.org/lb/download-document/6640/field_article_file.

129. See, e.g., ARK. CODE ANN. § 23-112-107(c), (e) (2010); OR. REV. STAT. § 105.928 (2017); see also Frederick J. Pomerantz & Aaron J. Aisen, *Auto Insurance Telematics Data Privacy and Ownership*, 1 MEALEY’S DATA PRIVACY L. REP. 1, 5 (2005) (“[T]he Arkansas, North Dakota, New Hampshire, Virginia, and Oregon statutes all refer to EDR data as property with the same ownership rights as tangible property.”).

130. CAL. CIV. CODE § 1798.82(a) (West 2018).

131. See CAL. CIV. CODE § 1798.81.5(a)(1)–(2) (West 2018) (“It is the intent of the Legislature to ensure that personal information about California residents is protected. To that end, the purpose of this section is to encourage businesses that own, license, or maintain personal information about Californians to provide reasonable security for that information. For the purpose of this section, the terms ‘own’ and ‘license’ include personal information that a business retains as part of the business’ internal customer account or for the purpose

service provider, which are subject to different notification rules).¹³² Thus, even though the California legislature uses the term “owner” in connection with “data,” it neither relies on existing property law concepts nor recognizes property rights to data.

In the California Consumer Privacy Act, which was enacted in June 2018 and becomes effective in January 2020, California imposes significant restrictions on sales of personal information: Consumers receive far-reaching rights to demand data access, erasure and portability, and prohibition of sales of their data.¹³³ Businesses must not charge or penalize consumers for exercising their rights. Consequently, companies find the value of personal information and their options with respect to the use, sharing and monetization of data greatly reduced. Thus, California protects individual privacy from alleged risks associated with data sharing and commercialization with a legal regime that inhibits trade in personal information. By creating inalienable¹³⁴ opt-out, erasure and portability rights in personal information, the California Consumer Privacy Act significantly limits the level of control that businesses can acquire or retain over personal information. As a result, the law also reduces the potential profit for consumers from selling personal information because it renders consumers legally incapable of effectively waiving rights to data access, erasure, porting or right to prohibit data sharing. Thus, the California Consumer Privacy Act goes into the opposite direction of creating property rights to data and further diminishes any potential for commercial interests in personal information.

Legal scholars, on the other hand, have proposed information property law regimes to protect privacy.¹³⁵ Data protection authorities in the EU also encourage the thought that individual persons own the personal data relating to them,¹³⁶ and popular rhetoric regarding privacy protections gives people elsewhere the idea that they “own” their personal data.¹³⁷ Yet, except for exclusion rights, data protection and privacy laws diverge from property laws.

of using that information in transactions with the person to whom the information relates. The term ‘maintain’ includes personal information that a business maintains but does not own or license.”).

132. LOTHAR DETERMANN, CALIFORNIA PRIVACY LAW—PRACTICAL GUIDE AND COMMENTARY, Ch. 2–15, 1.3(g) (3d ed. 2018).

133. Lothar Determann, *Analysis: The California Consumer Privacy Act of 2018*, INT’L ASS’N PRIVACY PROF. (July 2, 2018), <https://iapp.org/news/a/analysis-the-california-consumer-privacy-act-of-2018/>.

134. See CAL. CIV. CODE § 1798.192 (West 2018) (effective Jan. 1, 2020) (the rights are inalienable because this section voids any contract or agreement that purports to waive or limit in any way a consumer’s rights under the title).

135. See generally Lawrence Lessig, *Privacy as Property*, 69 SOC. RES.: AN INT’L Q. 247 (2002); see also Schwartz, *supra* note 15, at 2056–60.

136. See, e.g., ICO Warns Data Broking Industry After Issuing £80,000 Fine to Unlawful Data Supplier, INFO. COMMISSIONER’S OFF. (Nov. 2, 2017), <https://ico.org.uk/about-the-ico/news-and-events/news-and-blogs/2017/11/ico-warns-data-broking-industry-after-issuing-80-000-fine-to-unlawful-data-supplier/> (quoting an ICO representative as saying: “Businesses need to understand they don’t own personal data—people do”).

137. Cf. Samuelson, *supra* note 15, at 1130 (discussing and refuting the possible reasons why individuals might naturally assume they own data about themselves); see also *Datenschutz ist kein Selbstzweck*, DER TAGESSPIEGEL (Feb. 16, 2017, 2:31 PM), <http://www.tagesspiegel.de/politik/data-debates-datenschutz-ist-kein-selbstzweck/19391956.html> (stating that the people’s assumption of data ownership is mistaken).

Privacy laws do not incentivize or reward creation or investment, do not regulate the acquisition or transfer of ownership rights to others, and do not apply against everyone. Instead, EU data protection laws confer exclusion rights against governments and businesses, but not against individuals acting for personal or household purposes.¹³⁸ Further, most U.S. data privacy laws tend to be sector-specific and apply to certain types of businesses, organizations or individuals,¹³⁹ unlike property laws, which tend to apply to everyone.¹⁴⁰

J. SUMMARY

Real and personal property laws may protect physical embodiments of information—including data on storage disks within computers, stationary server farms, or event data recorders (popularly known as “black boxes”) in cars, or as warning signs on walls or roads—but such protection does not extend to the informational content. Intellectual property laws (notably in copyright and patent laws) tend to carve out factual content from protected subject matter to preserve public access to such factual information. Creative information collection schemes and valuable databases that are subject to significant investments enjoy some limited protection against copying and freeriding, but individual information elements are still not protected. Trade secret law can protect factual information, but only if the information is kept secret and provides economic value from being a secret. U.S. data privacy and EU data protection laws do not greatly resemble property law regimes, but afford important exclusion rights to data subjects, which are further examined in Parts III, IV, and V. Thus, the answer to the question “*who owns the data generated from connected cars and other Internet of Things devices?*” is “*no one, really.*”

III. DATA ACCESS RIGHTS AND RESTRICTIONS UNDER CURRENT LAW

No one owns property rights in data, as shown in Part II, but the complex landscape of data access rights and restrictions, summarized in this Part, created by legislatures and courts for various purposes and interests, serves as a basis for a discussion in Part IV and V of this Article, which addresses whether additional property rights in data are needed, helpful or harmful.

A. RIGHTS TO DATA ACCESS, ERASURE, PORTABILITY AND USE

138. General Data Protection Regulation, *supra* note 20, at art. 2(2)(c).

139. See DETERMANN, *supra* note 132, at 1.3(g); *see also* Lothar Determann, *New California Law Against Data Sharing*, 35 COMPUTER INTERNET LAW., Sept. 2018, at 1, 4–8; Lothar Determann & Chetan Gupta, *INSIGHT: Impact of the California Consumer Privacy Act on Employers*, BLOOMBERG L. (July 27, 2018), <https://www.bna.com/insight-impact-california-n73014481141/>; Lothar Determann, *INSIGHT: Be Wary of Liability for Statutory Damages Under California Consumer Privacy Act* (July 6, 2018), <https://www.bna.com/insight-wary-liability-n73014477131/>.

140. See Herbert Zech, *Daten als Wirtschaftsgut—Überlegungen zu einem Recht des Datenerzeugers: Gibt es für Anwenderdaten ein eigenes Vermögensrecht bzw. ein übertragbares Ausschließlichkeitsrecht?*, 31 COMPUTER UND RECHT 137, 139 (2015) (Ger.) (arguing in favor of property rights to data).

RESTRICTIONS

Data subjects (drivers, patients, cellphone owners) do not generally own data about them,¹⁴¹ but are entitled to certain restrictions regarding the use of their data by companies and governments under data privacy laws.¹⁴² And they are further entitled to access, erasure, and portability of their personal data processed by companies under data protection laws in the EU and other jurisdictions.¹⁴³

B. COMPUTER INTERFERENCE LAWS

Owners of data-generating devices (cars, heart monitors, phones and other connected devices) are protected from access to data and information stored on their devices under computer interference laws such as the U.S. Computer Fraud and Abuse Act (CFAA), which prohibits people from accessing a computer to obtain information without or beyond the scope of authorization.¹⁴⁴ Computer and software manufacturers thus have to obtain authorization from end-users before any error report is sent back or any device is accessed for repair and maintenance purposes. The same applies to manufacturers of connected cars—manufacturers are prohibited from designing cars that automatically send data back to them without authorization from the car owner. Although the car owners will likely provide such authorization in consideration for various services, such as for navigation, traffic updates, accident reports, entertainment, and telematics services, those authorizations will be provided only when something of value is offered by the service providers.

C. RIGHT TO REPAIR STATUTES AND ENVIRONMENTAL AND COMPETITION LAWS

Car manufacturers need to design cars with prescribed degrees of openness under the “right to repair” statutes, environmental laws requiring independent emission tests, and general competition laws.¹⁴⁵ Any device, software, or online

141. As mentioned, restrictions from data privacy do not just lead to property rights. *See supra* Part III.A.; Determann, *supra* note 118, at 3 (“Talk about informational self-determination and proposals for property law regimes to protect privacy sometimes gives people the idea that they own personal data about themselves. Fact is that no one owns facts.”).

142. For a comprehensive review of this issue, see generally DETERMANN, *supra* note 127.

143. *See, e.g.*, General Data Protection Regulation, *supra* note 20, at art. 15 (right of access); *id.* at art. 17 (right to erasure); *id.* at art. 20 (right to data portability).

144. 18 U.S.C. § 1030(a)(2)(c) (2012). *But see id.* § 1030(e)(2) (2012) (defining “protected computer” as practically including any ordinary computer and cellphone connected to the internet, as the internet is regarded as an instrumentality of interstate commerce as required by the definition).

145. To protect consumers, lawmakers have proposed or passed various statutes on the “right to repair” doctrine, requiring automakers to provide the same information to independent repair shops as they do to their authorized dealer network. *See generally* THE REPAIR ASS’N, <http://repair.org/association> (last visited Nov. 21, 2018). The lawmakers are therefore directly focusing on protecting a basic level of openness in cars. *See On-Board Diagnostic II (OBD II) Systems—Fact Sheet/FAQs*, CAL. AIR RESOURCES BOARD, <https://www.arb.ca.gov/msprog/obdprog/obdfaq.htm> (last updated Oct. 28, 2015) (showing that California Air Resource Board developed On-Board Diagnostic (OBD) requirements to monitor nearly every component that

service provider that designs technical restrictions on its own products to favor its own spare parts, add-on products, or services can be subject to serious sanctions under antitrust laws, as recently demonstrated by a €2.4 billion fine against an online search provider for offering an internet search service that allegedly favors its own content.¹⁴⁶ Given that device manufacturers naturally have market power for spares and add-on services,¹⁴⁷ their level of discretion on adding restraints on interfaces, ports and other data access means with regard to device owners and spare part providers is limited by these statutes and laws.

D. LAWS ON CONSUMER PROTECTION, PRODUCT SAFETY, IMPLIED WARRANTIES AND SUSTAINABILITY

Consumers are protected against threats posed by connected cars and other devices under product safety, product liability, and contract laws,¹⁴⁸ which require manufacturers, distributors, and add-on service providers to ensure that any of the connected devices and services that they sell are designed to function in a safe and functional manner.¹⁴⁹ Safety considerations warrant interfaces and access means that are sufficiently “open” to allow device owners to update, upgrade, and secure products over time.¹⁵⁰ Depending on how consumer expectations and laws develop around the openness of cars, in the future, a connected car with insufficient interoperability or upgradability may become legally declared as defective under the product safety, product liability, and

could affect the emissions performance of a vehicle). Thus, requirements originating from California environmental legislation already establish an important degree of openness. The U.S. Environmental Protection Agency (EPA), along with state agencies such as the California Air Resources Board, continue to regulate emission-related parts. *See EPA Emission Standards Reference Guide for On-road and Nonroad Vehicles and Engines*, U.S. ENVTL. PROTECTION AGENCY, <https://www.epa.gov/emission-standards-reference-guide> (last visited Nov. 21, 2018). Under antitrust and competition laws, as well as self-regulatory undertakings, car manufacturers cannot monopolize aftermarkets for parts and add-on products.

146. European Commission Press Release IP/17/1784, Antitrust: Commission Fines Google €2.42 Billion for Abusing Dominance as Search Engine by Giving Illegal Advantage to Own Comparison Shopping Service (June 27, 2017).

147. So long as several strong car manufacturers remain present on international markets, competition remains sufficiently strong. Monopolization challenges will therefore focus on aftermarket products for a particular brand, arguing that automotive manufacturers have monopoly power in the aftermarket for their own cars and willfully maintain such power through anticompetitive means. *Cf. Eastman Kodak Co. v. Image Tech. Servs.*, 504 U.S. 451, 481 (1992) (citing *United States v. Grinnell Corp.*, 384 U.S. 563, 570–571 (1966)). Some courts have included an explicit third factor that the plaintiff suffer an antitrust injury as a result. *In re Indep. Serv. Orgs. Antitrust Litig.*, 114 F. Supp. 2d 1070, 1087 (D. Kan. 2000).

148. 15 U.S.C. § 2056 (2012); 49 U.S.C. § 301 (2012); 49 C.F.R. § 501 (2016); National Highway Traffic Safety Administration, Department of Transportation, Request for Public Comments NHTSA Enforcement Guidance Bulletin 2016–02: Safety-Related Defects and Emerging Automotive Technologies, 81 Fed. Reg. 18,935 (Apr. 1, 2016); RESTATEMENT (THIRD) OF TORTS: PRODUCT LIABILITY §1 (AM. LAW INST. 1998).

149. The most recent restatement on product liability states that “a product is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the alternative design renders the product not reasonably safe.” RESTATEMENT (THIRD) OF TORTS: PRODUCT LIABILITY § 2(b) (AM. LAW INST. 1998).

150. *Cf. Determann & Perens, supra* note 6, at 934–936 (discussing the perils of lawmakers tendency to discourage openness and independence).

warranty laws, and run afoul of environmental sustainability requirements, because of its unnecessarily short life cycle.¹⁵¹

IV. INTERESTS IN DATA AND LEGAL PROTECTIONS UNDER CURRENT LAW

Persons, businesses, and governments have different interests in data. This Part examines such interests in the context of an entire ecosystem of persons and entities involved with the Internet of Things—instead of selectively citing to anecdotal scenarios and unconnected interests. The interests of parties concerned are identified and associated with existing legal protections available under current law (summarized in Part III) to lay the ground work for identifying any potential gaps that could warrant ownership rights in data, which do not yet exist (as discussed in Part II) but are contemplated (as discussed in Part V). For illustration purposes, this Part specifically refers to data generated by cars as an example for a data interest landscape that has recently given rise to demands for a data ownership regime by the German government.

A. CAR OWNERS

Most car buyers will be interested in data accessibility, safety features and interoperability to ensure competitive pricing and availability of data-driven services (navigation, autonomous driving, and entertainment), spare parts, updates, upgrades, and maintenance services.¹⁵² Car owners will need open ports in their cars to install brand-agnostics telematics and fleet management technologies, trackers required by insurance companies for individual tariffs, software, and devices to participate in ride-sharing models, and other add-ons, updates, and upgrades.¹⁵³ Buyers will pursue their interests primarily by expressing preferences in the marketplace by buying cars that best meet their needs on data accessibility and interoperability. If manufacturers are overly restrictive or not upfront about the technological restraints on data access or interoperability, they may be penalized through complaints that get filed to consumer and competition supervisory bodies.

151. *See id.* at 924 (discussing the lifecycle autonomous vehicles, their need for software updating, and that the openness in updating “places an end-date on the occurrence of events that would lead to liability of the manufacturer for a particular software and hardware version”).

152. *See generally* Simon Ninan et al., *Who Owns the Road? The IoT-Connected Car of Today—and Tomorrow*, DELOITTE INSIGHTS (Aug. 18 2015), <https://www.deloitte.com/insights/us/en/focus/internet-of-things/iot-in-automotive-industry.html> (“[D]rivers of the next generation want their cars to act as smartphones on wheels, like to remain connected and productive on the go, consider fully connected vehicles among the most beneficial futuristic technologies, and are ready to pay a sizeable amount for a vehicle that meets all their technology wants and needs.”); *see also* Determann & Perens, *supra* note 150, at 934–936 (stating that the car might otherwise become unsafe or unusable and be subject to obsolescence).

153. *See* Masa Hasegawa, *Connected Vehicles Enter the Mainstream—Trends and Strategic Implications*, DELOITTE, <https://www2.deloitte.com/us/en/pages/manufacturing/articles/connected-vehicles-enter-the-mainstream.html> (last visited Nov. 21, 2018) (stating that vehicle consumers will likely expect their vehicle systems to maintain compatibility with newly purchased consumer electronics for five to six years, the average length of new vehicle ownership in the United States). Thus, given the length of time that vehicle consumers expect to own their cars, they will need to allow openness for routine technological updates.

With respect to data privacy, consumers and business owners will be in slightly different situations. For example, when a consumer owns a car, much of the data generated by the car will qualify as “personal data” because of its relationship with the individual owner. Consequently, the consumer will be able to rely on data privacy, consumer protection, and computer interference laws to object to unwanted data access and usage by the manufacturer, distributor, add-on service providers, and others. Business owners on the other hand can take “data privacy by design” measures to sever the relationship between the vehicles and their individual drivers by keeping the individual names out of the telematics systems, but the drivers will be able to rely on computer interference laws to object to unwanted data access by manufacturers and others.¹⁵⁴ Owners of large vehicle fleets (car rental companies, transportation businesses, ride sharing ventures, logistics providers, and other enterprises) have more pressing needs for brand-agonistic and interoperable data access to optimize fleet management, operation, and maintenance.¹⁵⁵ Such owners will want various information, such as the location of each car, any need for maintenance, differences in fuel consumptions between different vehicle models, whether maximum working hour limits are being followed by the drivers, and ways in which their return on investment can be maximized from the vehicles.

B. DRIVERS AND PASSENGERS

Drivers and passengers will generally be most interested in privacy and safety. Under current law, they are entitled to the provision of notice and choices regarding location-tracking and monitoring by the car owner, manufacturer, or others.¹⁵⁶ Employee drivers can be advised of the employer’s data processing activities in accordance with the relevant laws.¹⁵⁷ Car rental customers and taxicab passengers can be reached by pop-up notices in the car to enable their decision-making on whether to permit a certain functionality—like security cameras in the car, entertainment solutions, navigation systems, or location tracking—or to refrain from using a particular vehicle if not configurable.

154. See *supra* Subpart III.C. (referring to 18 U.S.C. § 1030(a)(2)(c) (2012)).

155. See JAMES MANYIKA ET AL., MCKINSEY GLOBAL INST., *BIG DATA: THE NEXT FRONTIER FOR INNOVATION, COMPETITION, AND PRODUCTIVITY 1*, (2011), https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Big%20data%20The%20next%20frontier%20or%20innovation/MGI_big_data_exec_summary.ashx/.

156. See *supra* Subparts III.A, IV.A.

157. See Lothar Determann & Robert Sprague, *Intrusive Monitoring: Employee Privacy Expectations Are Reasonable in Europe, Destroyed in the United States*, 26 *BERKELEY TECH. L.J.* 979, 1004–05 (2011) (“Employers can—and often do—destroy any actual expectation of privacy by notifying employees in painstaking detail about the existence and intrusiveness of monitoring and surveillance technologies deployed.”). But employers have successfully defended against privacy claims when the tracked vehicles were company-owned, particularly in cases where the tracking was to determine employee misconduct. See Karla Grossenbacher, *Employee GPS Tracking—Is It Legal?*, *LEXOLOGY: GLOBAL PRIVACY WATCH BLOG* (Jan. 26, 2016), <http://www.lexology.com/library/detail.aspx?g=a94fd053-3106-4836-bc9c-a25d05340ed5>.

C. OTHER TRAFFIC PARTICIPANTS

Connected cars will communicate with other traffic participants, including other cars and their drivers, as well as cyclists, pedestrians, and bystanders, for safety reasons.¹⁵⁸ Opportunities for providing proper notice and giving choices on data access will be limited, however, and standardization through legislation may thus be required. In the meantime, car manufacturers and owners will need to ensure that connected cars are constructed with “data privacy by design” principles in mind, so that there will be no illegal data collection or usage.¹⁵⁹

D. MANUFACTURERS

Manufacturers can use data generated from connected cars to monitor maintenance status, anticipate and prevent failures, improve products, develop new products, and/or offer add-on services, updates, and upgrades.¹⁶⁰ These manufacturers’ interests will be largely aligned with the interests of car owners so long as the manufacturers do not use the data against the interests of the car owners (for example by selling information on speeding violations to law enforcement agencies).¹⁶¹ Car owners will then remain informed about the manufacturers’ use of the car owners’ data and data access ports will remain open enough to allow the car owners to choose alternatives to the manufacturers’ offered updates, upgrades, and add-on services.¹⁶²

158. See European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A European Strategy on Cooperative Intelligent Transport Systems, a Milestone Towards Cooperative, Connected and Automated Mobility*, COM (2016) 766 final (Nov. 30, 2016).

159. Pushing for “privacy by design” requirements, the U.S. FTC has brought a number of cases against product manufacturers that did not sufficiently consider data security in the design of their products, which have included network cameras, home routers, and software platforms. Press Release, Fed. Trade Comm’n, *Marketer of Internet-Connected Home Security Video Cameras Settles FTC Charges It Failed to Protect Consumers’ Privacy* (Sept. 4, 2013), <https://www.ftc.gov/news-events/press-releases/2013/09/marketer-internet-connected-home-security-video-cameras-settles>; Press Release, Fed. Trade Comm’n, *ASUS Settles FTC Charges that Insecure Home Routers and “Cloud” Services Put Consumers’ Privacy At Risk* (Feb. 23, 2016), <https://www.ftc.gov/news-events/press-releases/2016/02/asus-settles-ftc-charges-insecure-home-routers-cloud-services-put/>; Press Release, Fed. Trade Comm’n, *Oracle Agrees to Settle FTC Charges It Deceived Consumers About Java Software Updates* (Dec. 21, 2015), <https://www.ftc.gov/news-events/press-releases/2015/12/oracle-agrees-settle-ftc-charges-it-deceived-consumers-about-java>. Under the General Data Protection Regulation, companies will be expressly required to consider data protection by design and by default and implement appropriate technical and organizational measures. General Data Protection Regulation, *supra* note 20, at art. 25. For a discussion on technical principles and implementation of IT security regarding the mentioned communications, see Thomas Strubbe et al., *IT-Sicherheit in Kooperativen Intelligenten Verkehrssystemen*, 41 DATENSCHUTZ UND DATENSICHERHEIT 223, 223 (2017) (Ger.).

160. See Thilo Weichert, *Datenschutz im Auto—Teil 1: Das Kfz als großes Smartphone mit Rädern*, SVR, June 2016, at 201, 202 (Ger.) (analogizing cars to large smartphones on wheels); see also Welch, *supra* note 12 (noting the convenience of the connected car and its ability to self-run vehicle diagnostics).

161. This example may seem farfetched at first glance, but some concerns have surfaced regarding sharing navigation system information with government agencies. Archibald Preuschat, *TomTom Drives into Speed Camera Scandal*, WALL ST. J. (Apr. 28, 2011, 6:33 PM), <https://blogs.wsj.com/tech-europe/2011/04/28/tomtom-drives-into-speed-camera-scandal/>.

162. Determann & Perens, *supra* note 150, at 947; Carol Sledge & Douglas C. Schmidt, *A Discussion on Open-Systems Architecture*, CARNEGIE MELLON U. SOFTWARE ENGINEERING INST.: SEI BLOG (Nov. 23, 2015),

Manufacturers will not be legally entitled to receive any data from their sold cars, but they may design the cars in ways that automatically report the collected data back to their makers, as long as they obtain authorization from car owners (as required under computer interference laws)¹⁶³ and provide sufficient notice and choices to car owners, drivers, passengers, and others regarding any personal data collected by the car manufacturers.¹⁶⁴

Manufacturers will also have interests in restraining access to technical data, primarily for three reasons: to (1) guard trade secrets on their manufacturing processes and technologies installed in the cars; (2) reduce potential product liability and reputational harm resulting from aftermarket parts and manipulations, including cybersecurity weaknesses; and (3) reduce competition for spare parts, add-ons, updates, and upgrades in favor of the manufacturer's own offerings. These interests of car manufacturers to restrain data access can come into conflict with competition laws and data access interests of car owners, who may reverse-engineer their products under trade secret law and are generally free to modify and upgrade their products, so long as they comply with the applicable laws.¹⁶⁵ Due to market forces and reverse-engineering possibilities, manufacturers will be incentivized to offer reasonable compromises on data access to buyers. Manufacturers can decide to offer more open (as opposed to closed or locked-in) products at different price-points, similarly to how DVD player manufacturers market region-free players¹⁶⁶ or how mobile phone makers and service providers market unlocked phones and month-to-month contracts.

E. ADD-ON SERVICE PROVIDERS

Add-on or “aftermarket” providers of services, parts, and features will have similar needs and interests as the manufacturers in collecting and processing relevant data.¹⁶⁷ And similar to manufacturers, add-on service providers are not entitled to access any data, except with the authorization from the car owners and when in compliance with applicable data privacy laws.¹⁶⁸ Companies that offer products or services competing with the manufacturer may be entitled to fair and non-discriminatory access to data from the cars under antitrust laws.¹⁶⁹ If a car owner chooses a service, the provider will typically need some data to

https://insights.sei.cmu.edu/sei_blog/2015/11/a-discussion-on-open-systems-architecture.html; cf. Masa Hasegawa, *Acceleration of the Connected Experience—Vehicle Connectivity and Evolving Customer Expectations*, DELOITTE, <https://www2.deloitte.com/us/en/pages/manufacturing/articles/acceleration-of-the-connected-experience-automotive-manufacturing.html> (last visited Nov. 21, 2018) (noting that customer expectations have evolved as a result of the technical evolution and that they expect more).

163. See *supra* Subpart III.C. (referring to 18 U.S.C. § 1030(a)(2)(c) (2012)).

164. See *supra* Subparts III.A, IV.A.

165. See *supra* Subparts III.D, IV.C.

166. See, e.g., Robert Silva, *DVD Region Codes—What You Need to Know*, LIFEWIRE (June 3, 2018), <https://www.lifewire.com/dvd-region-codes-1845720> (discussing the Code-Free DVD).

167. See *supra* Subpart V.D.

168. See *supra* Subparts III.A, IV.A, IV.B.

169. See *supra* Subpart IV.C.

perform the service (for example location data for GPS), in which case the request for an authorization needs to be spelled out in the applicable contract.¹⁷⁰ In turn, the data generated by the services will also attract the interests of various entities, such as government institutions.¹⁷¹

F. CAR DEALERS AND DISTRIBUTORS

Car dealers and distributors of spare parts, add-on products, updates, and upgrades will be interested in information relating to customer-relationship management, so that they can market additional products and services to car owners. Car dealers and distributors are usually permitted to use transaction information to market similar products and services, and they can obtain the customers' consent to direct marketing in connection with the initial sale. For any access to data generated by cars, distributors will need to obtain authorizations from the car owners and possibly provide notice and choices to other data subjects involved, similar to the car manufacturers and add-on service providers,¹⁷² as discussed above.

G. INSURANCE COMPANIES

Insurance companies will be interested in information on driving patterns so that they can assess and reduce risks, for example, through individual tariffs, which reward good driving and punish bad driving.¹⁷³ They will need voluntary consent from the car owners for any data access and must comply with the data privacy laws that protect the privacies of drivers, passengers, and others, if and to the extent data is gathered indirectly from them.¹⁷⁴ Where insurance companies offer individual tariffs as a discount, consumers and regulators can raise the question on whether consent is truly voluntary, given that a policyholder's discount is another policyholder's penalty.¹⁷⁵ A significant penalty for failure to agree to tracking of driving patterns could be deemed as

170. For discussions on the requirements arising from data privacy laws and computer interference laws, see *supra* Subparts III.A, IV.A, and IV.B.

171. See Cheryl Miller, *Uber and Lyft Resist Regulators' Appeal for Data Sharing*, RECORDER (Oct. 10, 2017, 7:03 PM), <https://www.law.com/therecorder/almlD/1202800099561/?slreturn=20180804191454> (stating that Uber and Lyft are required by law to submit confidential annual reports to governmental institutions about "the types of service they provide, what neighborhoods they serve and how many miles their drivers log" and that "cities and local transportation planning agencies are eager to get access to that data to study traffic patterns and the fast-growing industry's effect on roads and the environment," but that the companies refuse to share this data with public agencies due to the privacy of both riders and drivers).

172. See *supra* Subparts V.D, V.E.

173. AALA SANTHOSH REDDY, COGNIZANT, THE NEW AUTO INSURANCE ECOSYSTEM: TELEMATICS, MOBILITY AND THE CONNECTED CAR 2 (2012), <https://www.cognizant.com/InsightsWhitepapers/The-New-Auto-Insurance-Ecosystem-Telematics-Mobility-and-the-Connected-Car.pdf>; see also Welch, *supra* note 12; Hornung & Goeble, *supra* note 17, at 268.

174. See *supra* Subparts III.A, IV.A.

175. Patrick R. Mueller, *Every Time You Brake, Every Turn You Make—I'll Be Watching You: Protecting Driver Privacy in Event Data Recorder Information*, 2006 WIS. L. REV. 135, 158–159 (2006).

being coercive, depending on the circumstances.¹⁷⁶

H. LAW ENFORCEMENT AND GOVERNMENT INSTITUTIONS

Law enforcement agencies and civil litigants will be interested in data generated by cars, in connection with accidents and traffic law violations.¹⁷⁷ Under the applicable laws, they will typically need a court order or a voluntary consent from the car owner to access the data stored on a particular car. But they may be permitted to observe cars that are on public roads without limitations, as long as they do not interfere with the physical possession and property rights of the car owner.¹⁷⁸ If manufacturers, service providers, insurance companies, and others have custody of data, law enforcement agencies and civil litigants can try to compel those entities to release the requisite data.¹⁷⁹ This in turn creates a need for those parties to carefully plan and protect their positions.¹⁸⁰

V. SHOULD NEW PROPERTY RIGHTS IN DATA BE CREATED?

Politicians in Germany have recently started a debate about the possibility of allocating property rights in data through new legislation.¹⁸¹ Similar demands have been made in the United States and elsewhere in the past.¹⁸² This brings us to the question of whether new property rights should be created for data. One methodology to answer would be to weigh “the reasons why information should be controlled by an owner (locked up)” against “the reasons why information should be not under an owner’s control (open for use by others).”¹⁸³

Specifically, this Part analyzes data propertization’s effects on the

176. *Cf. id.* at 159 & n.154 (noting that a driver’s agreement to monitoring is permissible as long as it is voluntary, in other words as long as it is not coerced).

177. Vince Bond Jr., *Lawyers Reaching for In-Car Data*, AUTOMOTIVE NEWS, (Sept. 14, 2014, 12:01 AM), <http://www.autonews.com/article/20140914/OEM11/309159952/lawyers-reaching-for-in-car-data>.

178. *See generally* United States v. Jones, 565 U.S. 400 (2012) (holding that the government’s installation of a GPS device on a target’s vehicle and its use of that device to monitor the vehicle’s movements is a physical intrusion upon the car, constituting a “search” under the Fourth Amendment).

179. *See supra* Subpart IV.H (discussing the interests of governmental institutions, cities and local transportation planning agencies against ride-hailing companies).

180. *See* Lothar Determann, *Views on Global Surveillance Laws from Lothar Determann of Baker & McKenzie*, BLOOMBERG BNA (May 23, 2016), <https://www.bna.com/views-global-surveillance-n57982072794/>.

181. *See, e.g., Video-Podcast der Bundeskanzlerin #10/2017*, PREISTRÄGER BEIM GRÜNDERWETTBEWERB IKT INNOVATIV 2015 (Mar. 18, 2017) (transcribed and available for download at https://www.bundeskanzlerin.de/Content/DE/Podcast/2017/2017-03-18-Video-Podcast/links/download-PDF.pdf?jsessionid=E48EE1966F5251A9B5832229E0D5ED0B.s6t1?__blob=publicationFile&v=4 (last visited Nov. 21, 2018) (Ger.) (featuring Chancellor Angela Merkel); Bundesministerium für Verkehr und digitale Infrastruktur, *supra* note 17, at Part 4.4 (study of German ministry for traffic and infrastructure on benefits and needs regarding property rights for data).

182. *See, e.g.,* Lin, *supra* note 15, at 964 (“The conceptualization of executive private facts as economically valuable trade secrets further expands on the macroeconomic trend of privacy commoditization.”); Rule, *supra* note 15, at 183; Samuelson, *supra* note 15, at 1125.

183. This balancing model is discussed in the context of propertizing information, particularly as intellectual property, in Margaret Jane Radin, *A Comment on Information Propertization and Its Legal Milieu*, 54 CLEV. ST. L. REV. 23, 25 (2006).

protection of creativity and technological advances and of personal privacy, which are often posited as rationales for “locking” information, and the enablement of freedom of expression and of competition, which are often advanced as bases for keeping “open” the information.¹⁸⁴

A. CREATIVITY AND TECHNOLOGICAL ADVANCES

As explained in Subpart II.A, the most widely adopted justification for granting property rights is utilitarian and economic, particularly to incentivize creations and improvements of things that advance technology or science. In a study published in August 2017, the German Federal Ministry of Transportation and Digital Infrastructure called for the creation of “data ownership” as a means to create “data markets” and “data value harvesting.”¹⁸⁵ Without property rights in data, companies are less willing to license or share data with other market participants, more likely to hold on to data that they possess and control and less likely to collect data in the first place.¹⁸⁶

But as shown in Part I, data has grown—and will continue to grow—at an exponential rate, and companies are racing to *create* ever more data, without any “incentivizing” through data propertization. “Open” data, completely without any property rights, has brought revolutionary advances for companies, scientific researchers, medical practitioners, intelligence operations, and many others,¹⁸⁷ ranging countless industries and uses.¹⁸⁸ In recent years, companies have developed various business models that do not rely on property rights (for example in the “sharing economy”)¹⁸⁹ or rely on intellectual property laws to secure openness and turn their effects on their head (for example open source code licensing subject to “copyleft”).¹⁹⁰ Companies hardly seem to need any further incentives to continue hoarding data.

184. *Id.* at 25–26.

185. Bundesministerium für Verkehr und digitale Infrastruktur, *supra* note 17, at Part 4.

186. *Id.* at Parts 4, 5.1.3.

187. Randal E. Bryant et al., *Big-Data Computing: Creating Revolutionary Breakthroughs in Commerce, Science, and Society*, COMPUTING RES. ASS'N (Dec. 22, 2008), http://www.cra.org/ccc/docs/init/Big_Data.pdf (discussing how big data computing can and will transform various sectors).

188. Chloé Margulis, Note, *The Application of Big Data Analytics to Patent Litigation*, 99 J. PAT. & TRADEMARK OFF. SOC'Y 305, 305, 340 (2017) (discussing the benefits of big data analytics to the patent industry); Pamela Metzger & Andrew Guthrie Ferguson, *Defending Data*, 88 S. CAL. L. REV. 1057, 1061 (2015) (“[A] data-driven systems approach has revolutionized other high-risk practices, from trauma surgery to space travel.”); Neil M. Richards & Jonathan H. King, *Big Data Ethics*, 49 WAKE FOREST L. REV. 393, 393 (2014) (“We are on the cusp of a ‘Big Data’ Revolution. Increasingly large datasets are being mined for important predictions and often surprising insights. . . . The scale of the Big Data Revolution is such that all kinds of human activities and decisions are beginning to be influenced by big data predictions, including dating, shopping, medicine, education, voting, law enforcement, terrorism prevention, and cybersecurity. This transformation is comparable to the Industrial Revolution in the ways our pre-big data society will be left radically changed.”).

189. See Yochai Benkler, *Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production*, 114 YALE L.J. 273, 279–80 (2004).

190. See Lothar Determann, *Dangerous Liaisons—Software Combinations as Derivative Works? Distribution, Installation, and Execution of Linked Programs Under Copyright Law, Commercial Licenses, and the GPL*, 21 BERKELEY TECH. L.J. 1437–41, 1481 (2006) (“Programmers invented “copyleft” to fight copyright law, published a manifesto, and created a new set of license terms intended to free software . . .”).

Whether the creation of property rights in data would encourage companies to share and trade data is far from certain. If global businesses had to deal with individual property rights (which would be national and territorial) on top of privacy and data protection regulations, this would further complicate legal compliance and cooperation arrangements. Data propertization would mean that individual data subjects and owners will have rights to exclude others from using or accessing that data, which will generally complicate and restrict the free flow of information. Individual data subjects may in many cases be identifiable more or less easily, but “data owners” could hold vague and nontransparent claims to information that would burden the administration of any “data market” apparently considered by the German government. Based on experiences with patent and copyright trolls,¹⁹¹ businesses can expect data trolls to get in line to include data they own into studies and data bases to later extract ransoms and nuisance fees based on potential property rights in data.

An example of where vesting property rights has slowed down the pace of research occurred in India when, in response to Western pharmaceutical companies’ patenting of products developed from natural resources, the Indian government enacted the Biological Diversity Act, requiring non-citizens and foreign corporate bodies not registered in India to obtain approvals from the National Biodiversity Authority before obtaining any biological resources in India.¹⁹² This had an unintended effect of “retarding the potential of [India] to reap the full rewards of biotechnology,” as well as “impeding conservation science.”¹⁹³

Data propertization may have negative effects on incentivizing creativity or technological advancements, which is why current property laws generally carve out data from protectable subject matter definitions, as shown in Part III. The U.S. Supreme Court explained in *Graham v. John Deere Co.* that the constitutional authority for Congress to grant patent rights¹⁹⁴ is “limited to the promotion of advances in the ‘useful arts,’”¹⁹⁵ which was interpreted as requiring “[i]nnovation, advancement, and things which add to the sum of useful knowledge.”¹⁹⁶ The Court held that *existent knowledge* is none of those things and does not promote the advances in the useful arts, and that free access to materials that are *already available* should not be restricted.¹⁹⁷ Similarly, in *Feist Publications, Inc. v. Rural Telephone Service Co., Inc.*, the U.S. Supreme Court explained that no originality, which is a constitutional requirement for a

191. See e.g., Mark A. Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117, 2118–19 (2013).

192. Biological Diversity Act, No. 18 of 2003, INDIA CODE (2002), vol. 18.

193. Rohan Pethiyagoda, *Biodiversity Law Has Had Some Unintended Effects*, 429 NATURE 129, 129 (2004); see also VANDANA SHIVA, PROTECT OR PLUNDER?: UNDERSTANDING INTELLECTUAL PROPERTY RIGHTS 28 (2001).

194. U.S. CONST. art. 1, § 8, cl. 8 (“To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”).

195. *Graham v. John Deere Co.*, 383 U.S. 1, 5 (1966).

196. *Id.* at 6.

197. *Id.* at 5–6.

copyright, can exist for any *fact*—whether it’s scientific, historical, biographical, or news of the day¹⁹⁸—and that copyright law is meant to encourage “others to build freely upon the ideas and information conveyed by a work.”¹⁹⁹ These seminal decisions suggest that granting new property rights akin to patent rights or copyrights (for example, granting rights to exclude others for a specified period of time) to data, which is *factual* and at best *existent knowledge*, would not promote innovation, advancement of useful knowledge, or public access to information.

B. PROTECTING PERSONAL PRIVACY

The second posited rationale—protection of personal privacy—will also not be advanced by data propertization. Data privacy laws already afford individuals with a nuanced exclusion right, which lawmakers have structured to reflect policy interests in freedom of information and personal privacy with notice and consent requirements, a right to be forgotten, rights against international data transfers, and various other partial or complete exclusion rights. Data subjects could not benefit from an additional data collection or usage exclusion right under property laws, because such a right would be duplicative at best. Companies that acquire ownership to personal data from data subjects like other property could exclude the previous owner—the data subject—from using data about himself or herself. Such an exclusion right would be diametrically opposed to the policy objectives of data privacy laws, which seek to protect human dignity and personal privacy.

Besides exclusionary rights, property laws typically also confer a right to possession, usage, and free disposition.²⁰⁰ Granting such rights with respect to personal data would also be highly counterproductive to the policy objectives of privacy laws. If data subjects could sell and transfer personal data like other property, the buyers could use and resell their data as they see fit. Individuals already benefit today from their ability to oppose data collection and usage under data privacy laws: companies have to offer attractive services, applications, or other items to gain access to user data in a highly competitive market for users on the Internet of Things. European policy makers bemoan that individuals are not compensated fairly enough for their data by “free” services and apps and want to strengthen individual data sovereignty by mandating that companies pay cash to individuals for their data.²⁰¹ But, the administration (and surely taxation) of individual data compensation systems will inevitably create a need for even more data collection, processing, and bureaucracy. If law makers start mandating minimum wages for data subjects, companies will have to charge for formerly-free services and the individuals are unlikely to benefit from the theoretical option to refrain from selling their data. In many circumstances, a

198. *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 347, 348 (1991).

199. *Id.* at 349–50.

200. *See supra* Subpart III.A.

201. Bundesministerium für Verkehr und digitale Infrastruktur, *supra* note 17, at Part 4.

property owner will only be able to receive liability-rule protection—which means that the owner can be forced to give up her property (and privacy) in return for an externally-set compensation (often by a court, legislature, or administrative agency)²⁰²—and her properties may also be subject to government confiscation or interference without any compensation.²⁰³

Further, if data can be sold, licensed, and traded like commodities, this would inevitably have negative effects on the protection of personal privacy. In fact, the ability to own and trade personal data can clash with other policies and jurisprudence on ownership relating to humans. Psychologist Raymond Cattell, defines personality as “that which permits a prediction of what a person will do in a given situation.”²⁰⁴ Personal data allows companies, individuals and algorithms to *predict* many aspects of a person’s actions, such as where that person wants to go or what that person wants to eat. Proponents of property rights to data at the core of an individual’s personality to encourage trade invokes policy arguments against the propertization of humans as discussed in the jurisprudence surrounding ownership of human bodily tissue²⁰⁵ as well as in human rights and international humanitarian law discourse.²⁰⁶

Protection of personal privacy is and can be sufficiently, if not better, achieved with data privacy laws, which are designed specifically to address personal privacy issues.²⁰⁷ For example, in the EU, as discussed in Subpart II.A, the legislature put into effect the new GDPR to strengthen individual information self-determination by requiring companies to minimize the collection, use, and retention of personal data and by broadly defining “personal data” to cover most categories of data generated by connected devices. Personal privacy is and can be better protected with data privacy laws demanding data minimization, deletion, and protection—as opposed to property laws, incentivizing investment and maximization of profits from data collection, sharing, and trading.

C. FREEDOM OF INFORMATION AND SPEECH

Granting property rights to data undermines the freedom of expression. As explained by the U.S. Supreme Court in *Sorrell v. IMS Health Inc.*, information qualifies as *speech* within the meaning of the First Amendment.²⁰⁸ The Court

202. Barbara J. Evans, *Much Ado About Data Ownership*, 25 HARV. J. L. & TECH. 69, 79 (2011).

203. *See id.*

204. RAYMOND B. CATTELL, PERSONALITY: A SYSTEMATIC THEORETICAL AND FACTUAL STUDY 2 (1950) (emphasis removed).

205. *See generally* Moore v. Regents of Univ. of Cal., 793 P.2d 479 (1990) (holding that a person does not retain ownership interest in his spleen as it was a naturally occurring organism).

206. Press Release, Secretary General, Abolition of Slavery in All Its Forms Remains Major United Nations Priority, Says Secretary General, U.N. Press Release SG/SM/8519-HR/4629-OBV/309 (Nov. 22, 2002), <http://www.un.org/press/en/2002/SGSM8519.doc.htm> (“Human beings are not property.”).

207. Many scholars debate whether data privacy laws need to be reformed, but that is not a topic considered in this Article. But data privacy laws, whether in their current or amended form, are designed for protecting personal privacy and are more suitable for protecting personal privacy.

208. *See Sorrell v. IMS Health Inc.*, 564 U.S. 552, 570–71 (2011) (“There is a strong presumption that

stated, “Facts, after all, are the beginning point for much of the speech that is most essential to advance human knowledge and to conduct human affairs.”²⁰⁹ Data propertization—which would allow individuals or companies to control access to their data—would restrict data collection and thus hamper the free flow of information.²¹⁰ Thus, “putting a fact into the ownership of only one person, or allowing an entity who generates a fact . . . to control how it is used” creates “pernicious dangers” against the freedom of expression.²¹¹

D. GOVERNMENT USE OF DATA

Restricting information flows could also significantly hinder public governance and law enforcement. As a particularly illustrative and recent example, police officers in a number of U.S. states are required to wear body cameras while on duty, where the recordings are available for inspection as public records.²¹² This is part of an important public policy move to enhance transparency within law enforcement bodies and reduce risks of abusive police practices or unjustified complaints against the police. If police officers and citizens had property rights to the body camera footage, the usage of such cameras would be greatly complicated. Individual could exclude the public from such data, impeding the basic precepts of transparency and accountability that underline this public policy. Many other government uses of data would similarly be impeded by the creation of property rights in data for individuals and potentially companies that buy data from individuals, including census, statistics, taxes, licenses, etc.

E. COMPETITION

Likewise, “information propertization is designed to restrict competition, if not always by creating economic ‘monopolies,’ at least by enhancing the position of one competitor vis-à-vis others.”²¹³ For example, ownership in data means that potential users of that data must either purchase access rights from

prescriber-identifying information *is speech* for First Amendment purposes.” (emphasis added); see also Jane Baubauer, *Is Data Speech?*, 66 STAN. L. REV. 57, 57 (2014) (“Privacy laws rely on the unexamined assumption that the collection of data is not speech. That assumption is incorrect.”).

209. *Sorrell*, 564 U.S. at 570.

210. See *id.* at 580 (holding that a state regulation violated the First Amendment because it “burdened a form of protected expression that it found too persuasive,” while leaving “unburdened those speakers whose messages are in accord with [the statute]”); Adam D. Thierer, *The Internet of Things and Wearable Technology: Addressing Privacy and Security Concerns Without Derailing Innovation*, 21 RICH. J.L. & TECH. 6, 75 (2015) (“[O]ther scholars recognize that restrictions on data collection are restrictions on the free flow of information, which implicate the First Amendment.” (footnote omitted)).

211. Symposium, *Data Protection Statutes and Bioinformatic Databases*, 8 B.U. J. SCI. & TECH. L. 171, 182 (2002).

212. See *Body-Worn Camera Laws Database: State Body-Worn Camera Laws*, NAT’L CONF. ST. LEGISLATURES (Feb. 28, 2018), <http://www.ncsl.org/research/civil-and-criminal-justice/body-worn-cameras-interactive-graphic.aspx#/> (providing a clickable diagram detailing various states’ body camera laws).

213. Margaret Jane Radin, *A Comment on Information Propertization and Its Legal Milieu*, 54 CLEV. ST. L. REV. 23, 28 (2006).

the owner or attempt to gather the desired information themselves.²¹⁴ Under the second scenario, if the data is a “sole-source data,” the owner will not be limited by a price ceiling, which can foreclose all other persons from the possibility of gathering the data independently.²¹⁵ This can result in monopolies in data and hurt competition. In fact, there are already attempts to monopolize data, which would only get worse with data propertization. For example, “sports leagues increasingly seek to control the dissemination of real-time data in conjunction with lucrative distribution agreements,”²¹⁶ given that real-time information on sporting events are disseminated through several media,²¹⁷ sports leagues’ ownership in the real-time information will further undermine the competition from those other mediums.

F. SOCIAL JUSTICE AND FAIRNESS

Some proponents for data propertization argue that individuals should be able to economically benefit from their data (for example, by receiving monetary compensation).²¹⁸ But, consent requirements under privacy and publicity laws already create opportunities for individuals to monetize their statutory choice (by withholding consent except in consideration for valuable services or other benefits), without incentivizing an outright market where individuals transfer ownership to their data to companies, which could then exclude anyone—including the data subjects and their friends and families—from using data to which the companies have acquired property rights.

Even if some individuals were able to demand better consideration for their data, most people will likely lose out. Businesses would have to find alternative sources of funding to pay data subjects and this could ultimately result in disadvantages for consumers. Companies developed many innovative services based on advertising and data-based business models, such as Internet search engines, mobile maps, social networks, video sharing, and consumer reviews, which would never have been able to gain critical mass based on for-pay models. If companies have to switch to for-pay models, because they become unable to run service-for-data models, large parts of the population may lose access to services because they cannot afford them anymore or find the time to focus on personal data monetization to generate additional income.

The present discussion in Germany regarding data propertization also

214. Symposium, *supra* note 211, at 182.

215. *Id.*

216. Ryan M. Rodenbert et al., *Real-Time Sports Data and the First Amendment*, 11 WASH. J.L. TECH. & ARTS 63, 63 (2015).

217. *Id.* at 65.

218. See Laudon, *supra* note 15 at 93 (“[I]n which individuals can receive fair compensation for the use of information about themselves. This step is necessary because of the continued erosion of privacy brought about by technological change, institutional forces, and the increasingly outdated legal foundation of privacy protection.”). The notion that individuals should have the right to own and control data about themselves may have become more popular in reaction to the Snowden disclosures relating to mass data collections around the world.

provides valuable insight. As developing countries have made attempts to protect natural resources from exploitation by European explorers in the past, European countries seem now intent on protecting personal data as the “fuel of the digital economy” for European enterprises today.²¹⁹ In this context, data ownership rights are not claimed for data subjects, but for companies *ab initio*.²²⁰ German scholars have noted that the present movements for data proprietization are thinly-disguised attempts to protect the German car manufacturing industry from being disrupted by U.S. technology companies and likened the situation to the previously unsuccessful efforts made by German newspapers and public broadcasting institutions against search engine aggregators.²²¹ In 2013, the German Parliament passed an ancillary copyright law aimed at search engine aggregators, in which news and magazine publishers were given exclusive property rights to make press products available to the public unless they qualified as short text excerpts.²²² In response, leading search providers “rendered the legislation all but meaningless” by carrying only the news of publishers who agreed to waive those exclusive property rights,²²³ ultimately causing more disruptions in the German market. The possibility of any legislation on data ownership being similarly circumvented and making a negative impact is another consideration that should be taken into account when determining whether there should be property rights in data.

G. NORMATIVE IMPLEMENTATION OBSTACLES

Besides the lack of compelling reasons for property rights, and the significant policy concerns against creating property rights, any new data

219. In the EU, politicians debate whether a special right in data should be created as part of the EU’s Digital Single Market project. European Commission, *supra* note 158, at 2–3.

220. For example, German Chancellor Angela Merkel raised the question whether vehicle manufacturers or software developers own data generated by connected cars, but not considering that car owners, drivers or passengers could instead be entitled to own such data. *See* Video-Podcast, *supra* note 181. In contrast, the German Federal Ministry of Transport and Digital Infrastructure (BMVI) released a strategy paper in March 2017, according to which an individual person should have sovereignty over her own data. *Wir brauchen ein Datengesetz in Deutschland!: Strategiepapier Digitale Souveränität*, BUNDESMINISTERIUM FÜR VERKEHR UND DIGITALE INFRASTRUKTUR, <http://www.bmvi.de/SharedDocs/DE/Artikel/DG/datengesetz.html> (last visited Nov. 21, 2018) (Ger.) (stating that data is not a “thing” and thus cannot be “owned” in the legal sense under current German property law, but that BMVI wants to develop a solution that leads to an equal treatment of data and things by creating a legal environment in which data can be strictly allocated to an individual or a company as the “owner” of such data). German Interior Minister, Thomas de Maizière, on the other hand stated that he is against a concept of data ownership in general. Guest Commentary Thomas de Maizière, *DER TAGESSPIEGEL* (Feb. 16, 2017), <http://www.tagesspiegel.de/politik/data-debates-datenschutz-ist-kein-selbstzweck/19391956.html>.

221. Hornung & Goeble, *supra* note 17, at 268.

222. *See* Greg Sterling, *German “Ancillary Copyright” Law to Go into Effect, Imposes Limits on Search Results*, SEARCH ENGINE LAND (May 16, 2013), <https://searchengineland.com/german-ancillary-copyright-to-go-into-effect-imposes-limits-on-search-results-159843> (new law required Google and others that index or aggregate news to pay for links or excerpts for those news items).

223. Matthew Karnitschnig & Chris Spillane, *Plan to Make Google Pay for News Hits Rocks*, POLITICO (Feb. 15, 2017, 7:36 PM), <https://www.politico.eu/article/plan-to-make-google-pay-for-news-hits-rocks-copyright-reform-european-commission/>. *See generally* Hornung & Goeble, *supra* note 17, at 265.

property rights regime would face insurmountable implementation obstacles. For example, if sensors on a car owned by a company (for example a taxi company) generate various “valuable” data relating to the driver (in this example, the taxi driver), the passengers (the customers sharing the taxi), and various people that come into the proximity of the car (people crossing the street in front of the taxi), who would have ownership rights in that data? Governments, businesses, and individuals would need to claim broad exceptions to broad data property rights in the interest of free speech, information freedom, safety, and security, and courts would inevitably get entangled in litigation that would require constant weighing of property versus speech rights and constant censorship of speech and information flow. Data subjects who successfully sell their data would have to keep accounts for income received and pay taxes. Collective rights societies may come into existence and create new bureaucracies and paperwork. Every data trader would constantly have to issue privacy notices to data subjects or obtain renewed consent, provide individual access, grant portability honor objections and comply with requests to be forgotten under the EU GDPR. To avoid these and other practical problems, data should be left to the public domain, a concept rooted in Roman law as *res nullius*, which means “property of no one,” or *res communis*, “a public good.”²²⁴

CONCLUSION

No one owns²²⁵ or should own²²⁶ data as such.²²⁷

Data as such—the content of information—exists conceptually separate from works of authorship and data bases (which can be subject to intellectual property rights), physical embodiments of information (data on a computer chip, which can be subject to personal property rights; warning symbol painted on a road, which can be subject to real property rights) and physical objects or intangible items to which information relates (a dangerous malfunctioning vehicle to which the warnings on road markings or a computer chip relate).²²⁸ Lawmakers have granted property rights to different persons regarding works of authorship, data bases, chattels, land and other items for the purpose of incentivizing investments and improvements, a purpose that does not exist with respect to data as such.²²⁹

Individual persons, businesses, governments, and the public at large have different interests in data and access restrictions.²³⁰ These interests are protected

224. Christopher R. Rossi, ‘A Unique International Problem’: The Svalbard Treaty, Equal Enjoyment, and *Terra Nullius*: Lessons of Territorial Temptation from History, 15 WASH. U. GLOBAL STUD. L. REV. 93, 117 n.150 (2016).

225. *See supra* Part III.

226. *See supra* Part VI.

227. *See supra* Part II for distinction regarding information content, expression, physical manifestation of data and information objects.

228. *See supra* Part II.

229. *See supra* Parts III, VI.

230. *See supra* Part IV.

by an intricate net of existing laws that deliberately refrain from granting property rights in data. Existing property laws intentionally *exclude* data from subject matter definitions.²³¹ Existing data-related laws and property laws balance interests in data and access restrictions based on public policy considerations that would be impaired by a creation of property rights in data.

New property rights in data are not suited to promote better privacy or more innovation or technological advances, but would more likely suffocate free speech, information freedom, science, and technological progress. The rationales for propertizing data are not compelling and are outweighed by rationales for keeping the data “open.” No new property rights need to be created for data.

231. *See supra* Part V.
