The *sui generis* database protection and automated and connected cars

Will machine-generated data from automated and connected cars fall within the *sui generis* right if the proposed EU Data Act is adopted?

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Abstract

The connected and automated car is performing more and more driving tasks autonomously. This produces a lot of data. The EU Database Directive gives non-original databases protection through the *sui generis* database right. Whether these databases with machine-generated data should be part of the scope of the right is unclear, depending on the interpretation of the right. The proposed EU Database Act includes Article 35 aimed at clarifying this legal uncertainty. This thesis examines the potential impact of the article on the *sui generis* right and how this will impact the possibility for databases from these cars to be granted this right. This is done by examining the technology of a connected and automated car through a literature study, focusing on the data obtained and generated by the IoT technology it uses, and examining the scope of the *sui generis* right as well as the potential interpretations and implications of Article 35 using an EU legal method. This is then applied to the context of a connected and automated car. The conclusion is that the car uses a combination of sensors, connectivity and the IoT to obtain and generate data to develop AI technology. The scope of the *sui generis* right in this context depends on the interpretation of "obtained" data and whether this includes "created" data. The potential adoption of the "spin-off" theory also impacts this. Article 35 narrows the scope if interpreted as clarifying the *sui generis* right and the right is assumed to exclude machine-generated data. If the right doesn't exclude this data, then the Database Act is either making a subject matter change or not narrowing the scope. The car must be interpreted as collecting data and Article 35 as not narrowing the scope for these databases to receive *sui generis* right.

Abbreviations

ADS	Automated driving system
AG	Advocate General
AI	Artificial Intelligence
BHB	British Horseracing Board Ltd
CJEU	Court of Justice of the European Union
CAC	Connected and automated cars
DA	Data Act
DbD	Database Directive
DDT	Dynamic driving task
EU	European Union
IoT	Internet of Things
IP	Intellectual Property
IPR	Intellectual Property Right
LiDAR	Light Detection And Ranging
SAE	The Society of Automotive Engineers
SGDR	*Sui generis* database right

1. Introduction

1.1 Background

When Ford Motor Company began selling the Model T in 1908, no one expected it to transform cities and transportation the way it did, but the car soon came to replace the use of horse and buggy in the US and soon the whole world.[1] Now, as the connected and automated car (CAC) is slowly becoming a reality, it's expected to transform cities and transportation on a similar scale.[2]

The emergence of CACs brings with it multiple potential benefits to society because it can perform some and eventually all of the driving tasks. Traffic accidents are expected to reduce as it's estimated that human error is involved in 95% of all road traffic accidents.[3] Human factors that lead to road traffic accidents include fatigue, influence of alcohol and speeding.[4] These factors are not present in CACs that are fully autonomous. Also, a CAC can drop off passengers and drive on, making parking lots and garages in city centres unnecessary and allowing that space to be replaced by e.g. housing or parks. It could also increase car-sharing which would lead to a reduction in traffic congestion and air pollution.[5] It also allows for more free time during transport for rest, work and other activities.[6]

There are also several economic benefits to the emergence of CACs. The market for CACs in the EU is expected to grow exponentially, with expected revenues for the EU automotive industry exceeding EUR 620 billion by 2025 and EUR 180 billion for the EU electronic sector. This could make the EU automotive industry

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[1] Ford Motor Company, 'The Model T – The model T is Ford's universal car that put the world on wheels.' <https://corporate.ford.com/articles/history/the-model-t.html> accessed 1 April 2022.

[2] Katherine Shaver, 'City planners eye self-driving vehicles to correct mistakes of the 20th century auto' (Washington, 20 July 2019) <https://www.washingtonpost.com/transportation/2019/07/20/city-planners-eye-self-driving-vehicles-correct-mistakes-th-century-auto/> accessed 5 April 2022.

[3] European Commission, 'Report from the Commission to the European Parliament and the Council – Saving lives: Boosting Car Safety in the EU' COM(2016) 787 final, 12 December 2016.

[4] Kateřina Bucsuházya, Eva Matuchováa, Robert Zůvalaa, Pavlína Moravcováa, Martina Kostíkováa, Roman Mikuleca 'Human factors contributing to the road traffic accident occurrence', (2020) 45 Transportation Research Procedia, p. 555 – 561.

[5] Katherine Shaver, 'City planners eye self-driving vehicles to correct mistakes of the 20th century auto' (Washington, 20 July 2019) <https://www.washingtonpost.com/transportation/2019/07/20/city-planners-eye-self-driving-vehicles-correct-mistakes-th-century-auto/> accessed 5 April 2022.

[6] SOU 2018:16. Slutbetänkande av Utredning om självkörande fordon på väg. *Vägen till självkörande fordon – introduktion.*, p. 178.

more competitive and create new jobs and boost economic growth.[7] The EU is already investing into this, granting EUR 200 million to a Croatian company planning to develop a taxi service with fully automated cars by 2024.[8]

A large part of the economic value in CACs relates to data. To enable autonomous driving, the car needs various information from both within the car as well as its surrounding. This large amount of data is obtained and generated using sensors, connectivity and IoT technology and then processed using AI technology for machine learning and decision-making by the car.[9] CACs essentially run on data.[10] There is an estimation that a fully autonomous and connected car will generate 4000 GB of data every day.[11] This data includes information such as names of passengers, GPS coordinates of the car's location, speed of the car, engine performance and the surrounding environment.[12] The majority of this data comes through the IoT and is usually processed and stored in databases, which are necessary for developing the relevant AI technology.[13] The vast amount of data produced and its high economic value makes the issue of who can control this data important.

In the EU, for large datasets processed and stored in databases, the Database Directive (DbD) grants exclusive right to the database maker where either the structure of the database is protected by copyright under the criteria of originality[14] or the *sui generis* database right (SGDR) based on a substantial investment made

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[7] European Commission, 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions – On the road to automated mobility: An EU strategy for mobility of the future' COM(2018) 283 final, 17 May 2018.

[8] Sergej Novosel Vuckovic, 'Već 19 gradova zanima se za robotaksije koje razvija naša tvrtka' *Poslovni Dnevnik* (Zagreb 16 March 2022) < https://www.poslovni.hr/sci-tech/vec-19-gradova-zanima-se-za-robotaksije-koje-razvija-nasa-tvrtka-4329079> accessed 2 May 2022.

[9] Henry Alexander Ignatious & Hesham-El-Sayed, Manzoor Khan, 'An overview of sensors in Autonomous Vehicles' (2022) 98 *Procedia Computer Science*, p. 737.

[10] Eesha Goel & Sunny Kumar, 'Changing the world of Autonomous Vehicles using Cloud and Big Data' (2nd International Conference on Inventinve Communication and Computational Technologies, ICICCT, Coimbatore, 2018) <https://ieeexplore.ieee.org/abstract/document/8473347?casa_token=hN5xUhuKJ8oAAAAA:9GmWmwbrVF97b1h1pPmSp-TaXOAaOlY4RLxr76uh8co6i7ObfBWUbDiY-bdGR_p3dTqID6VoiA> accessed 5 May 2022, p. 368.

[11] Jan Becker, Tianxin Nie and Zhanxiang Chai, *Autonomous Driving Changes the Future* (Springer Singapore 2021), p. 58.

[12] Sylvia Zhang, 'Who owns the data generated by your smart car?', (2018) 32(1) Harvard Journal of Law & Technology, p. 299-320.

[13] F. Fathi, N. Abghour & M. Ouzzif, 'From Big Data to Better Behavior in Self-driving Cars' (2nd International Conference on Cloud and Big Data Computing, ICCBDC, Barcelone, 2018) <https://dl.acm.org/doi/abs/10.1145/3264560.3264572?casa_token=u4Ra_mmhpx0AAAAA:KkksFdJFKIHgbR4hBO-KVrSHDHBcG0v1PW7Zbe0uYbGxmc47SCXxE-1iILI6tqvvDPHBLZCXr3IMWQ> accessed 3 May 2022, p. 42.

[14] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases, Article 3.

into creating the database. This investment can be made into obtaining, verifying or presenting the data.[15] For a non-original database, such as those with machine-generated data that are produced by CACs, it's only the SGDR that might be applicable.[16] Under this right, the database maker can prohibit extraction and re-utilisation of parts or the whole database, effectively controlling the database.[17] The purpose of the SGDR is to promote the creation of databases by protecting the database maker's investment.[18] But for IoT technologies that generate data automatically as part of their function and as a necessity for their operations, whether a substantial investment has been made into creating the database is unclear. The investment is usually aimed at enabling the function and operation of the IoT, not the database itself, i.e. the database could be seen as a by-product rather than the aim of the investment.[19] This makes it unclear if databases with this machine-generated data can be granted SGDR.[20]

The EU's newly proposed Data Act (DA) addresses this legal uncertainty in Article 35, which is aimed at clarifying the scope and application of the SGDR.[21] One of the main purposes of the DA overall is to remove barriers on access, use and share of data.[22] Given that the SGDR grants exclusive rights to database makers to control its database and databases with machine-generated data are increasing due to the expansion of IoT technology (as well as the value of data playing a central role for the future economy), whether the scope of SGDR is applicable to these databases or not determines whether a vast amount of datasets are controlled by just the database makers or are freely accessible. This is important to evaluate and determine for markets such as those producing CACs, given the expected societal and economic impact of this. This can impact further innovation on the automotive

[15] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases, Article 7.
[16] European Commission, 'Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' SWD(2022) 34 final, 23 February 2022. p. 131.
[17] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases, Article 7.
[18] Johan Axhamn, *Sui generis-skydd för databaser* (MercurIUS Förlags AB 2006), p. 23.
[19] Estelle Derclaye, 'Database sui generis right: should we adopt the spin-off theory?', (2004) 26(9) *European Intellectual Property Review*, 402 – 403.
[20] European Commission, 'Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' SWD(2022) 34 final, 23 February 2022. p. 15 – 16.
[21] Ibid. p. 135.
[22] Ibid. p. 133.

market as well as investments into database creation.[23] With this background, it's necessary to examine potential legal implications of Article 35 of the DA on the SGDR and its effect on databases produced by IoT technologies and used by CACs.

1.2 Purpose and research question

The purpose of this essay is to describe and analyze the potential impact of Article 35 in the EU Commission's proposed Data Act, on the sui generis database right, especially in the context of data obtained or generated by connected and automated cars and related intelligent transportation systems.

To fulfil this purpose, the following research questions will be answered:

1. How does a connected and automated car obtain or generate data using the Internet of Things (IoT)?
2. What is the potential implication of Article 35 of the proposed Data Act on the scope of application of the *sui generis* database right?
3. How may Article 35 of the proposed Data Act impact the scope of the *sui generis* database right as applied in the context of connected and automated cars?

1.3 Delimitations

This thesis will be limited to examining the EU Database Directive, and the implications of the proposed EU Data Act on this, and will not include the related national legislation of Member States implementing the Directive. While national legislation may somewhat differ between the Member States and impact how the SGDR is implemented, for the purpose of this essay it is sufficient to include the legislation on EU level. Given that the Data Act is an EU regulation and hence would be directly applicable in Member States if adopted, its potential implications will be the same in all Member States.[24]

[23] Ibid. p. 15 – 16.
[24] European Union 'Court of Justice of the European Union (CJEU)' (European-union.europa.eu) <https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/institutions-and-bodies-profiles/court-justice-european-union-cjeu_en#:~:text=The%20Court%20of%20Justice%20of,national%20governments%20and%20EU%20institutions.> accessed 8 May 2022.

1.4 Materials and method

To fulfil the purpose of this thesis, the questions will be answered using a literature study and the EU legal method. The first question will be answered based on a literature study of the technology and function of a CAC. The focus will be on the activities relating to obtaining and generating data, from the perspective of the SGDR. The material that will be used are scientific articles and relevant literature within this area. Since CACs are continuously being developed, the study will mainly be based on currently used technology. It is also possible for a CAC to obtain and generate data with somewhat varying technology but the core of the technology, which is relevant to answer the first question, is the same and thus what will be included in the literature study.

The second question will be answered using the EU legal method, while the third question will be answered by combining the literature study and EU legal method. The EU legal method is based on EU primary and secondary law. Secondary law (regulations, directives, decisions, recommendations and opinions) is based on the principles and objectives derived from primary law (treaties). Secondary law is legally binding.[25] The thesis focuses on the EU Database Directive and the proposed EU Data Act regulation. EU directives are implemented in Member States through national legislation. The directives are legally binding and require them to achieve the given objectives but allow them to choose the form and method for this. EU regulations are also legally binding and have general application, i.e. they don't require national implementation but are directly applicable in the Member States.[26]

Secondary law is described in an abstract way and therefor relevant case law from the Court of Justice of the European Union (CJEU) will be examined to understand the purpose and interpretation of the provisions and determine the scope and application of the legislation.[27] The case law from the CJEU assures equal

[25] European Commission, 'Types of EU law' (ec.europa.eu) <https://ec.europa.eu/info/law/law-making-process/types-eu-law_en#legislative-vs-non-legislative> accessed 9 May 2022.
[26] Consolidated Version of the Treaty on the Function of the European Union (2012) OJ C 326/47 (TFEU), Article 288.
[27] European Union 'Court of Justice of the European Union (CJEU)' (European-union.europa.eu) <https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/institutions-and-bodies-profiles/court-justice-european-union-cjeu_en#:~:text=The%20Court%20of%20Justice%20of,national%20governments%20and%20EU%20institutions.> accessed 8 May 2022.

application of EU law in Member States.[28] It also makes sure that priority is given to the interpretation of the law that guarantees compliance with primary law and ensures its effectiveness.[29] The case law included in the analysis will be limited to the SGDR in the Directive (Article 7). This will be used to interpret the scope and application of the SGDR as well as to discuss the potential impact Article 35 of the DA could have on this.

In analyzing the scope of the SGDR in the DbD, references will be made both to the provisions, which are legally binding, and the recitals in the preamble, which aren't legally binding. The recitals do not have any autonomous legal effect and do not derogate from the actual provisions of the DbD but are rather used as interpretative tools in the EU legal order. They are particularly relevant for understanding the case law produced by the CJEU as it references relevant recitals to resolve ambiguities in the provisions.[30]

The Advocate General's (AG) opinion on the cases will also be used to assess the various interpretations of the scope and application of the SGDR, which are the foundation of the legal uncertainty regarding its potential application on databases of machine-generated data. This is necessary to then consider the various interpretations and implications of Article 35 of the DA, i.e. to answer the second and third question. Important to note is that while the CJEU must consider the AG's opinion, the role of the AG is to assist the court with an impartial and independent opinion, thus the opinion isn't legally binding as the court may agree or disagree and subsequently rule in line with or against the opinion.[31]

Given that the DA has not yet been adopted, it is a non-binding legal instrument. Unlike the DbD of which the legal implications are known, there is no case law asserting the scope and application of the regulation. To analyze the potential impact of Article 35 in the DA relating to CACs, the Impact Assessment accompanying the Data Act and relevant research will be used. Impact assessments

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[28] Consolidated Version of the Treaty on European Union (2008) OJ C115/13 (TEU) Article 19.

[29] Koen Lenaerts and José A Gutierrez-Fonz 'To Say What the Law of the EU Is' (2013) Distinguished Lectures of the Academy, Working Paper 2013/09, p. 16 – 17.

[30] Roberto Baratta 'Complexity of EU Law in the Domestic Implementing Process' *The Theory and Practice of Legislation*, 2(3), 293-308, p. 301.

[31] Consolidated Version of the Treaty on the Function of the European Union (2012) OJ C 326/47 (TFEU), Article 252, Consolidated Version of the Treaty on European Union (2008) OJ C115/13 (TEU) Article 19.

are part of the EU's atypical acts which are instruments that are sometimes used in the lead up to adopting a legislation in the EU, which can be lengthy, and then serves to give insight into the effect of the proposed legislation.[32] Impact assessment are produced for initiatives, such as regulations, put forth by the EU Commission, and they assess the likely economic, social and/or environmental impact of the initiatives. They are not part of the proposal and are not legally binding but are used to assess the probable effect of the proposed legislation.[33] This, as for other atypical acts in the EU, can be used to understand the reasoning and incentives behind certain measures and provisions, as well as the possible impact of them.[34]

1.5 Structure

Chapter two explains the functions of a connected and automated car, focusing particularly on the data obtained and generated by the car. The chapter outlines the relevant technology and concepts, such as levels of autonomous driving, sensors, connectivity, the Internet of Things, Artificial Intelligence and machine learning. This is used to explain the role of data for the functioning of the car.

Chapter three examines the *sui generis* right for databases under the EU Database Directive (Article 7), which protects databases based on the investments made into the database (which differentiates from copyright protection of databases) and relates it back to chapter two and CACs. This chapter briefly introduces the motivations for the EU adopting the DbD as well as its scope and aim. It highlights the most relevant case law for the implementation of the SGDR. The chapter ends by introducing a case about the SGDR that is particularly relevant for databases of CACs.

Chapter four introduces the proposed Data Act and the Impact Assessment related to it. This chapter focuses on Article 35 of the proposal which takes aim at the SGDR of the Database Directive. The potential implications of this article on SGDR

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[32] Chun Hung Lin, 'Legal Development of Atypical Acts in the European Union with Some Reference to Spectrum Management Legislation', *Athens Journal of Law*, 6(1), 9-36, p. 9.

[33] European Commission, 'Impact assessment' (ec.europa.eu) < https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/impact-assessments_en#subsidiarity-and-proportionality> accessed 1 April 2022.

[34] Chun Hung Lin, 'Legal Development of Atypical Acts in the European Union with Some Reference to Spectrum Management Legislation', *Athens Journal of Law*, 6(1), 9-36, p. 15.

is discussed and applied to databases of CACs, relating back to chapter two and three.

Chapter five summarises and gives conclusion to the previous chapters and gives answers to the research questions.

2. Connected and automated cars and their data

2.1 Introduction

This section outlines the technology of a connected and automated car. The first part focuses on the basic technology of autonomous driving and its different levels, as well as the various sensors and use of the Internet of Things (IoT) which are vital for generating and obtaining the data necessary for a CAC. How this is used for machine learning and developing the artificial intelligence (AI) of a CAC is also explained. The second part examines how and what type of data the car generates and obtains and what it is used for. The function of the CAC and the type of data it obtains and generates will be used for exploring if and how this data can be protected in a database under the SGDR and how this might change with the implementation of the proposed Data Act.

2.2 Technology of a connected and automated car

2.2.1 Autonomous driving

2.2.1.1 Introduction

Driving requires numerous functions. This includes planning, localization, control, management and perception.[35] This entails decision-making, which for a fully automated and connected car is performed by AI.[36] For the AI system to make these decisions, it's necessary to acquire relevant information relating to environment perception.[37] The AI, like a human driver, needs to know how its surrounding environment looks to know how and where to drive. It does this mainly by

[35] Asif Faisal, Md Kamruzzaman, Tan Yigitcanlar & Graham Currie, 'Understanding autonomous vehicles: A systematic literature review on capability, impact, planning and policy' (2019) 12(1) *Journal of Transport and Land Use*, p. 49.

[36] Mario Hirz & Bernard Walzel, 'Sensor and object recognition technologies for self-driving cars', (2018) 15(4) *Computer-Aided Design and Applications*, p. 3.

[37] Shladover, S. E. (2018). Connected and automated vehicle systems. *Journal of Intelligent Transportation Systems*, 22, p. 190.

collecting data through sensors and the IoT.[38] The obtained and generated data amounts to a very large dataset which is processed and used for the car to identify its location, its plan and route and to recognise and respond to road signs and various obstacles on the path. This includes identifying and responding to other vehicles, cyclists, and pedestrians.[39] The data processing is then done by AI machine learning algorithms that have previously been trained on big historical datasets.[40] To understand this technology it's relevant to first look at the various levels of autonomous driving.

2.2.1.2 Levels of autonomous driving

A fully automated and connected car can perform all driving tasks autonomously, without the support or intervention of a human driver. But a car is usually not either human-driven or self-driven but there are rather different levels of autonomous driving, going from a lower to a higher level. This is because the driving tasks are multiple and it's possible that some tasks are performed autonomously by the car and some by or with assistance of a human driver. As the CAC is developed, certain driving tasks have and will become autonomous before others, such as braking and steering. Hence, it's relevant to view autonomous driving on a scale rather than as a category.[41] While there is no official international system to classify the various levels of autonomous driving, the six levels described by the Society of Automotive Engineers (SAE) has become increasingly useful in international cooperation in this area.[42]

The organisation SAE[43] describes six levels of autonomous driving based on the division of the dynamic driving task (DDT) between the human and the autonomous system.[44] Level 0 is no driving automation. At this level, the entire DDT is

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[38] Henry Alexander Ignatious & Hesham-El-Sayed, Manzoor Khan, 'An overview of sensors in Autonomous Vehicles' (2022) 98 *Procedia Computer Science*, p. 737.

[39] Shladover, S. E. (2018). Connected and automated vehicle systems. *Journal of Intelligent Transportation Systems*, 22, p. 196 – 197.

[40] Jan Becker, Tianxin Nie and Zhanxiang Chai, *Autonomous Driving Changes the Future* (Springer Singapore 2021), p. 150.

[41] SAE International, J3016, June 2018, p. 2.

[42] SOU 2018:16. Slutbetänkande av Utredning om självkörande fordon på väg. *Vägen till självkörande fordon – introduction*, p. 181.

[43] The Society of Automotive Engineers (SAE) is a US-based global organisation of 128 000 engineers and other experts in the field of automotive, aerospace, and commercial-vehicle industries. The organisation produces voluntary consensus standards for different industries, primarily for the transportation industry.

[44] SAE International, J3016, June 2018, p. 2.

performed by the driver. At Level 1 there is an advanced driving assistance system which, for example, helps the driver to brake, accelerate and steer the car. Level 2 has partial driving automation. The car can brake, accelerate and steer autonomously but a driver is required to monitor the conditions and perform the remaining tasks involved in driving. At Level 3 the car has conditional driving automation. This means that the car has an automated driving system (ADS) which can perform all of the DDT under certain conditions. However, a driver still must be ready and able to take control when this is requested by the ADS and the conditions are not sufficient for autonomous driving. Level 4 is high driving automation where the ADS performs the entire driving task and monitors the environment in certain conditions without requiring the attention or readiness of a driver to take control of the car. But the car can only drive autonomously in some conditions or areas and not all the time and everywhere. At the final level, Level 5, there is full driving automation. At this stage, the car is often referred to as a self-driving car. The car then has an ADS that can fully drive the car in all conditions and a driver doesn't need to be ready or able to be involved in driving the car. The car can then drive in all situations and environments that a human driver can drive in.[45]

2.2.2 Sensors generating and obtaining data

2.2.2.1 The role of sensors

For a CAC to perform a DDT, it needs to collect a vast amount of data. Depending on the task, the car must be able to monitor its surrounding, detect obstacles ahead and plan its routes. Part of this data is obtained and generated using various sensors placed in and around the car.[46] Sensors are devices that sense changes in the environment and convert this change into a numerical measurement that can then be processed.[47] This is what allows the car to examine its surrounding and detect the position, geometry, type and motion of various objects around it, which is used for the car to make decisions relating to various DDT. Each type of sensor has

[45] Ibid. p. 4 – 19.

[46] Mario Hirz & Bernard Walzel, 'Sensor and object recognition technologies for self-driving cars', (2018) 15(4) *Computer-Aided Design and Applications*, p. 2.

[47] Henry Alexander Ignatious & Hesham-El-Sayed, Manzoor Khan, 'An overview of sensors in Autonomous Vehicles' (2022) 98 *Procedia Computer Science*, p. 737.

specific characteristics depending on its use.[48] Based on this, the sensors can then be split into two categories; proprioceptive and exteroceptive sensors. [49]

2.2.2.2 Proprioceptive sensors

Proprioceptive sensors (internal state sensors) are used to obtain and generate data on the state of the car itself. Examples of internal data is the car's speed, wheel position and battery voltage. Proprioceptive sensors include inertial measurements units (IMU), encoders, inertial sensors (gyroscopes and magnetometers) and location sensors (GNSS).[50]

IMU and GNSS track the movement and position of the car. Encoders are sensors that measure rotation of e.g. the wheel. Inertial sensors detect the movement of the car. Locational sensors can for example give information on the navigation of the car.[51]

2.2.2.3 Exteroceptive sensors

Exteroceptive sensors (external state sensors) observe and obtain data from the environment around the car. This data includes distance measurement and light intensity.[52] Exteroceptive sensors used by a CAC are cameras, radio detection and range (Radar), light detection and range (LiDAR), ultrasonic sensors, long-range radio detection and front and rear end mid-range radar system.[53]

Cameras are used for object recognition but are sensitive to environmental factors such as the weather and light reflection. Infrared camera systems are used as night view technology. Radar sensors measure the geometry of obstacles. LiDAR is used to create detailed 3D-maps of the car's surrounding area. Ultrasonic sensors are used for parking assistant functions. Long-range radio-detection is used to detect

[48] Mario Hirz & Bernard Walzel, 'Sensor and object recognition technologies for self-driving cars', (2018) 15(4) *Computer-Aided Design and Applications*, p. 2.

[49] Henry Alexander Ignatious & Hesham-El-Sayed, Manzoor Khan, 'An overview of sensors in Autonomous Vehicles' (2022) 98 *Procedia Computer Science*, p. 737.

[50] Ibid. p. 737.

[51] Ibid. p. 737.

[52] Ibid. p. 737.

[53] Mario Hirz & Bernard Walzel, 'Sensor and object recognition technologies for self-driving cars', (2018) 15(4) *Computer-Aided Design and Applications*, p 3.

other vehicles on the road for automated cruise control functions. Front and rear end mid-range radar systems are used for emergency brake assistance.[54]

These sensor technologies and the data they obtain and generate are used in combination with connectivity and IoT technologies that provide other external information, also needed for the AI system to perform autonomous driving. [55]

2.2.3 The Internet of Things

2.2.3.1 Relationship between automation and connectivity

To understand the role of the IoT, it is necessary to understand the relationship between an automated car and connected car. The automated car and connected car have developed somewhat independent with differing technology and systems behind them. However, there is a strong connection between the two as they provide complimentary functions for autonomous driving. Looked at separately, a connected car has technology that connects cars to other vehicles, infrastructure and devices which allows for an exchange of information. An automated car is a car where all the driving functions are automated. [56]

The relationship comes from the additional data that connectivity provides. Connectivity is not always a technical necessity to enable autonomous driving but is commonly used for this.[57] While the sensors of the car can detect and monitor the immediate environment around the car, connectivity provides the necessary communication with the larger surrounding, such as with other vehicles.[58] This is done using the IoT or a direct data connection.[59] Information that is given through communication is information not detectable through sensors, e.g. traffic, weather conditions and the infrastructure.[60]

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[54] Ibid. p 3.

[55] Ibid. p. 3 – 4.

[56] Shladover, S. E. (2018). Connected and automated vehicle systems. *Journal of Intelligent Transportation Systems*, 22, p. 190 – 191.

[57] SOU 2018:16. Slutbetänkande av Utredning om självkörande fordon på väg. *Vägen till självkörande fordon – introduction*, p. 187.

[58] Shladover, S. E. (2018). Connected and automated vehicle systems. *Journal of Intelligent Transportation Systems*, 22, p. 196 – 197.

[59] Jan Becker, Tianxin Nie and Zhanxiang Chai, *Autonomous Driving Changes the Future* (Springer Singapore 2021), p. 43.

[60] Shladover, S. E. (2018). Connected and automated vehicle systems. *Journal of Intelligent Transportation Systems*, 22, p. 196 – 197.

The information shared by connected cars mainly goes vehicle to vehicle (V2V), vehicle to infrastructure (V2I), vehicle to pedestrian (V2P) or vehicle to everything (V2X).[61] V2V includes data on the position and speed of surrounding cars. V2I is wireless data shared between cars and the roadside units of infrastructure, with data on traffic, road conditions and the weather.[62] V2P is communication with other road user, such as a cyclist, who carries a device (e.g. mobile phone or wearable).[63] This wireless communication is for safety-related services. V2X is a category under which all mentioned categories fall, i.e. all device that can be connected to the car. Particularly important are the IoT devices.[64]

2.2.3.2 Connectivity and the IoT

The IoT is a system that connects several devices directly, using the internet, and is the main technology used for connected cars.[65] It supports the CAC in generating and obtaining data by connecting it with surrounding IoT applications and services which gives it necessary information relating to driving, e.g. road conditions, traffic and navigation. Apart from sharing the data, the IoT can also upload the data to a cloud system to be analyzed and operated and used to enable autonomous driving functions.[66]

There are different types of wireless communication technologies CACs use for connectivity depending on purpose. This includes 5.9 GHz DSRC (a WiFi-like technology), Wifi, cellular communications (4G, WiMax and in the future 5G), satellite communication systems and Bluetooth.[67]

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[61] Ibid. 191.

[62] Ovidiu Vermesan et al, 'IoT technologies for Connected and Automated Driving Applications' in Ovidiu Vermesan and Joël Bacquet (eds), *Internet of Things – The Call of the Edge* (Rivers Publishers 2020), p. 258.

[63] Shladover, S. E. (2018). Connected and automated vehicle systems. *Journal of Intelligent Transportation Systems*, 22. p. 191 – 192.

[64] Ovidiu Vermesan et al, 'IoT technologies for Connected and Automated Driving Applications' in Ovidiu Vermesan and Joël Bacquet (eds), *Internet of Things – The Call of the Edge* (Rivers Publishers 2020), p. 258

[65] Jan Becker, Tianxin Nie and Zhanxiang Chai, *Autonomous Driving Changes the Future* (Springer Singapore 2021), p. 58.

[66] Ovidiu Vermesan et al, 'IoT technologies for Connected and Automated Driving Applications' in Ovidiu Vermesan and Joël Bacquet (eds), *Internet of Things – The Call of the Edge* (Rivers Publishers 2020), p. 256.

[67] Shladover, S. E. (2018). Connected and automated vehicle systems. *Journal of Intelligent Transportation Systems*, 22. p. 192

Using cloud computing, the information obtained and generated by the IoT is then stored in the cloud.[68] This data in combination with the data from sensors is put into geometrical models to estimate targets and used in algorithms that recognise and evaluate the driving situation in real time. The complexity of this process requires the use of AI.[69]

2.2.4 Artificial intelligence

2.2.4.1 Machine learning

Algorithms made for autonomous driving replace the human driver in a CAC. They determine the car's position (localization), the objects and obstacles in the car's environment (perception), and plan routes, make driving decisions and execute vehicle motion to get to the destination (planning and controlling).[70]

AI is the use of computer technology to replicate human brain functions. For a CAC, this includes areas of perception and decision-making. To develop AI in CACs, machine learning is used.[71] This is a type of AI where software applications are used to increase the accuracy in predicting outcomes without having to be explicitly programmed to do this. Using historical data as input, machine learning algorithms can predict output values.[72] Due to the complexity of the driving task, deep learning algorithms are used, which is a more advanced form of machine learning. The more advanced the deep learning is, the more similar the AI will be to human intelligence.[73]

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[68] Jan Becker, Tianxin Nie and Zhanxiang Chai, *Autonomous Driving Changes the Future* (Springer Singapore 2021), p. 57.

[69] Ibid. p. 3 – 4.

[70] Ibid. p. 45 – 46.

[71] Ibid. p. 66.

[72] Ibid. p. 150.

[73] Ibid. p. 55.

2.3 Data generated and obtained by connected and automated cars

2.3.1 Types of data

2.3.1.1 Introduction

The combined technologies of sensors, connectivity and the IoT will collect a vast amount of data, both directly necessary to enable autonomous driving as well as other data. When considering the scope and application of the SGDR, the data contained in a database is relevant to consider. The type of data from a CAC can be categorised according to the information the data contains, such as identity information. The data can also be categorised based on how the data is gathered, considering not just the technology of how the car obtains and generates the data but whether it is pre-existing or created data.

2.3.1.2 Types of data based on the information contained

The data obtained and generated by a CAC includes categories of identity information, app data, external sensors data, diagnostic data, locational data and driving behaviour data.[74] Identity information includes name, gender and age and could be used for targeted marketing.[75] This data can be shared through direct communication from the vehicle, using connectivity and the IoT.[76] App data includes information on usage pattern of apps and the data from this could be used for in-car entertainment. This information is collected through the IoT. Both categories of data are generated by the user only. External sensors data is the data captured by the car's various sensors, such as the cameras, LiDAR and radar. This data is for example used for machine learning. Diagnostic data is data on e.g. the engine performance and can be used for car maintenance. These two categories are generated by the CAC. Locational data includes GPS coordinates and routes taken. This data is obtained using locational sensors and can be used to improve traffic. Driving behaviour data is for example information on speed and acceleration. This can be used for risk management and insurance rates. Both locational and driving

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[74] Sylvia Zhang, 'Who owns the data generated by your smart car?', (2018) 32(1) Harvard Journal of Law & Technology, p. 299-320.

[75] Ibid. p. 299-320.

[76] McKinsey & Co, *Car Data: Paving the Way to Value-creating mobility* (Advanced Industries 2016), p. 9.

behaviour data is generated by both the user of the car and the car itself.[77] Table 1 illustrates a simplified categorisation of these types of data, their characteristics and potential uses.

Type of Data	Examples	Generated by	Potential uses
Identity information	Name, gender, age, insurance	User	Targeted marketing
App Data	Usage pattern of apps (e.g. website visits)	User	In-car entertainment
Locational Data	GPS coordinates, routes, time spent at location	User and CAC	Improving public transportation and traffic
External Sensor Data	Images captured by the sensors of the CAC (e.g. camera, radar, LiDAR)	CAC	Improving machine learning, accident reconstruction
Diagnostic Data	Engine performance, tire pressure level	CAC	Car maintenance
Driving Behaviour Data	Speed, acceleration, weight of passenger	User and CAC	Risk management, determining insurance rates

Table 1. Types of data generated or obtained by a CAC.[78]

2.3.1.3 Types of data based on how the data is gathered

Data can also be categorized according to if it is collected or recorded, as well as if it is pre-existing or created data. Most commonly, the data can be divided into categories of collected, created, created and presented, and recorded.

Collected data is pre-existing data that is collected from pre-existing sources, e.g. locational data obtained through the IoT by the CAC. The data exists prior to the

[77] Sylvia Zhang, 'Who owns the data generated by your smart car?', (2018) 32(1) Harvard Journal of Law & Technology, p. 299-320.

[78] Ibid. p. 299-320.

creation of the database and exists for anyone to collect. This data has not been created or invented but exists in the public domain.[79]

Created (or invented) data is data which didn't exist prior to the making of the database and was created by the database maker (by a human), e.g. a CACs planned routes. This data could be created as a main activity (the creation of the data is the sole purpose of its creation) or a by-product of another activity (its creation is the result of performing another activity).[80]

Created and presented data is created data with a specific type of presentation of the data applied as well. The creation of the data can be a main activity or by-product of another activity and the presentation can be a separate activity to creating the data or it could be done simultaneously in a way that is inseparable. This presentation can be done naturally and in a simplistic way, e.g. digitally created data organized in chronological order such as engine performance over a period of time, or it can be done manually, as well as being presented in a more complex structure.[81]

Recorded data is pre-existing data found in nature subsequently collected using instruments of measure and recorded in intelligible form. It's not created or invented by man but naturally occurs and is recorded. This is data available for anyone to record. E.g. weather data obtained through the IoT for the CAC. This could be seen as created data as the data did not exist in intelligible form before. The difference is that it pre-exists in nature and thus can be recorded by anyone. This could be difficult to distinguish between if it should be understood as collected or created. Is pre-existed data collected when recorded or is the recording created data? In relation to a CAC, this relates to the data that comes from the various sensors of the car's environment. The recorded data can also be either a main activity or just a by-product of another activity. Whether something is a main activity or by-product can also be difficult to distinguish. Sensors recording the

[79] Estelle Derclaye, 'Database sui generis right: should we adopt the spin-off theory?', (2004) 26(9) *European Intellectual Property Review*, 402-413, p. 409.
[80] Ibid. p. 409 – 410.
[81] Ibid. p. 410 – 411.

car's environment is the main activity of the sensors but it's done to enable autonomous driving.[82]

2.4 Summary and conclusions

The basic technology and function of a connected and automated car provides the answer to the first question on how the car obtains and generates data using the IoT. Depending on what level of autonomous driving the car has, it can perform more or less of the driving tasks autonomously and requires more or less data. The higher the level, the more of the driving task can be performed by the car and the more data is required. This is in part obtained and generated through sensors used to monitor the internal state of the car (proprioceptive sensors) or the environment around the car (exteroceptive sensors). This includes cameras, locational sensors and radar. Connectivity is also used to obtain, generate and share the data. The communication between the car and other devices allows this data to be transmitted. This is mainly done using the IoT and is then stored in the cloud using cloud computing. This data can then be put into algorithms for machine learning to develop the relevant AI technology for autonomous driving. The data obtained and generated includes necessary information for the AI to make driving decisions, such as traffic, weather, passengers and car performance. Due to the complexity of the driving task, the more advanced form of machine learning, deep learning, is used. The data can also be categorised into identity information, app data, external sensors data, diagnostic data, locational data and driving behaviour data. It can also be divided into collected or recorded data and pre-existing or created data. The IoT thus has the crucial role of obtaining and generating, as well as sharing, relevant data between the car and other IoT devices, which is necessary due to the complexity of the driving task and the fact that the car requires information in many areas. Through this, the car can for example communicate with other vehicles and pedestrians, know the weather and traffic conditions and determine the route and destination of the car.

[82] Ibid. p. 411 – 412.

3. The *sui generis* right and connected and automated cars

3.1 Introduction

This section explains the EU Database Directive, focusing on the *sui generis* right found in Article 7 and relating this to connected and automated cars. The first part briefly outlines the directive to give an overall view on database protection in the EU and how this may or may not be applicable to databases from connected and automated cars. The second part looks closer at the SGDR in the Directive and the relevant case law related to this right. This is used to understand the scope and application of the right and its potential applicability to databases by CACs. It also includes case law directly relating to the type of data obtained and generated by CACs.

3.2 The EU Database Directive

3.2.1 Overview

3.2.1.1 Background

The EU Database Directive (DbD) was enacted in 1996 to harmonise national legislation on database protection within the EU.[83] Member States were required to implement the Directive by January 1, 1998. The motivation for the DbD was to promote the creation of databases in the EU through harmonisation.[84] This was to deal with the existing legislation in Member States which had insufficient protection of databases.[85] The purpose was to promote data storage and the related processing systems, which were considered to have an important role in developing an information market in the EU and in dealing with the exponential growth of

[83] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases.
[84] Mark Schneider, 'The European Union Database Directive', (1998) 13(1) Berkeley Technology Law Journal, p. 552.
[85] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Recital 1.

information being generated and processed in trade due to the fast expansion of the internet.[86]

The DbD gives legal protection of databases in two ways, either through copyright[87] or SGDR.[88] The SGDR is given to creators of certain databases which do not qualify for copyright protection, but rather have made a substantial investment into it. Like other intellectual property rights (IPR), the DbD includes a scope of protection, protection requirements, rights and term of protection.

3.2.1.2 Definition of a database

The scope of the DbD covers databases in any form and it defines databases 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", as expressed in Article 1.[89] This is a broad definition.[90] Both electronic and non-electronic databases fall within this definition.[91] It doesn't, however, cover computer programs that have been used in the making or operation of the databases.[92]

3.2.1.3 Copyright protection of databases

The copyright protection of databases is a form of author's rights where the originality (i.e. the author's own intellectual creation) of the structure, created through the selection or arrangement of the contents, of the database is protected. The protection doesn't extend to the data itself and is without prejudice to any other copyright existing for the data.[93] The term of protection is governed by copyright law[94] and is the life of the author plus seventy years.[95]

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[86] Ibid. Recital 9 – 10, 12.
[87] Ibid. Art. 3.
[88] Ibid Art. 7.
[89] Ibid. Art. 1.
[90] Johan Axhamn, *Sui generis-skydd för databaser* (MercurIUS Förlags AB 2006), p. 43.
[91] Mark Schneider, 'The European Union Database Directive', (1998) 13(1) Berkeley Technology Law Journal, p. 556.
[92] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Art. 1(3).
[93] Ibid. Art. 3.
[94] Berne Convention for the Protection of Literary and Artistic Works, September 9 1886, as revised at Stockholm on July 14 1967, Art 7(1).
[95] Mark Schneider, 'The European Union Database Directive', (1998) 13(1) Berkeley Technology Law Journal, p. 557.

Given that copyright protection of databases is granted based on the requirement of originality of the structure of the database, it is not likely that this will cover databases with machine-generated data. There is usually no human interaction involved into the creation of the database structure but as is the case for CACs, these databases are made mainly through obtaining and generating data via the IoT.[96] The originality requirement is thus unlikely to be fulfilled, i.e. the creation of the database is not a reflection of an author's own intellectual creation.

3.3 The *sui generis* right

3.3.1 Overview

3.3.1.1 Introduction

A central part of the DbD was the creation of the *sui generis* intellectual property right. This protection is given to databases that in themselves are not an original intellectual creation that could be protected by copyright.[97] The motivation for the SGDR is the common law doctrine of the "sweat of the brow".[98] This means that a creator of a work should reap the benefits of the work they have put in, without the requirement of creativity or intellectual creation.[99]

3.3.1.2 Term of protection

The database right doesn't require any formalities, meaning there is no requirement to register the right but it comes into existence when the database is created. The protection is given to databases where the requirements for protection are fulfilled.[100] A database may thus have protection even when the database or the content doesn't have copyright protection.[101] This protection is given in addition to

[96] Peter K. Yu, 'Data producer's right and the protection of machine-generated data' (2019) 93(4) *Tulane Law Review* 859 – 929, p. 863.

[97] Simon Stokes, *Digital Copyright* (5th edn, Bloomsbury publishing 2019), p. 81.

[98] Mark Schneider, 'The European Union Database Directive', (1998) 13(1) Berkeley Technology Law Journal, p. 564.

[99] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Recital 39.

[100] Simon Stokes, *Digital Copyright* (5th edn, Bloomsbury publishing 2019), p. 83 – 84.

[101] Ibid. p. 81.

any copyright protection or other rights that may be given to either the database or its content and is granted without disrupting any other right.[102]

Database protection under the SGDR lasts for 15 years, beginning from the end of the year of the database being completed or made available to the public (whichever is longer). Updating the database with a qualitative or quantitative substantial change to its contents, such as additions, deletions or alterations, can extend the term of protection to another 15 years from the date of the update.[103] This means that a continuously updated database can be granted protection for an indefinite period of time.[104]

Considering the technology of a CAC, in particular the use of IoT, there is a high probability that the databases made are continuously updated with new data, as dynamic databases. The car's ability to drive is dependent upon obtaining and generating relevant data for driving in real time. Subsequently, this in theory would lead to an indefinite term of protection if the SGDR is to be granted to such databases.

3.3.1.3 Beneficiaries of protection

The database protection is given to the person who is the maker of the database, apart from when this is part of work that is created in the course of employment where the employer instead is the maker or when the parties agree on something else.[105] This means that the maker of the database is understood in general as the person who takes the initiative to create the database and who carries the risk of that investment.[106] This is also the person who carries the burden of proof.[107] It's not the employee or third party assigned to create the database who is viewed as the maker but the one who assigns it. In the case of the employer being the maker, it's required that the database is created during the employment and is not for private

[102] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Art. 7(4).

[103] Ibid. Art. 10.

[104] Simon Stokes, *Digital Copyright* (5th edn, Bloomsbury publishing 2019), p. 84.

[105] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Recital 29.

[106] Ibid. Recital 41.

[107] Ibid. Recital 54.

or personal reasons.[108] The SGDR can be in whole or part be transferred, assigned or granted.[109]

For the databases made in relation to CACs, this would be the producer of the car (unless a different agreement is made). It will be he or she who takes the initiative in creating the database as part of creating the car and who will carry the risk of investing into the creation of the database. This follows logically with the motivation of the SGDR, which is to reward the investment into making a database.[110]

Unlike the copyright protection, the SGDR, is limited to EU nationals or those with residence in the EU territory that are makers of databases.[111]. The maker must have an ongoing connection with an EU or EEA state, meaning the database right only applies within the EU and EEA area.[112] This connection can be that the principle place of business is in the EEA area or that the maker is an EEA national or resident.[113] Makers outside the EU not meeting these requirements cannot be granted SGDR, unless they have residence, or are incorporated or formed in a jurisdiction that give comparable protection to databases as the DbD.[114] This means that the SGDR can only be granted to makers of databases for CACs within the EU and EEA area.

3.3.2 Object of protection

3.3.2.1 Substantial investment

Apart from the requirements of a database falling within the definition of a database according to Article 1, for SGDR it must also fulfil the requirements of a substantial investment.[115] Article 7 asserts that SGDR is given to databases where there has

[108] Simon Stokes, *Digital Copyright* (5th edn, Bloomsbury publishing 2019), p. 84.

[109] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Art. 7(3)

[110] Ibid. Recital 39.

[111] Mark Schneider, 'The European Union Database Directive', (1998) 13(1) Berkeley Technology Law Journal, p. 560.

[112] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Art. 11.

[113] Simon Stokes, *Digital Copyright* (5th edn, Bloomsbury publishing 2019), p. 84.

[114] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Recital 56.

[115] Johan Axhamn, *Sui generis-skydd för databaser* (MercurIUS Förlags AB 2006), p. 48.

been a quantitative and/or qualitative substantial investment in obtaining, verifying or presenting the contents of that database. The right protects the database maker against extraction and/or re-utilisation of all or a substantial part of the contents of the database. Substantial is to be assessed in terms of either quantity, quality or both. [116]

The use of the word investment here reveals the economic basis of this right, which is in line with the expressed purpose of the SGDR.[117] According to the recitals, resources used for investment can be human, financial or technical.[118] Human investment is in time, effort or energy while technical investment refers to the acquisition of equipment to build the database.[119] This means there is an extensive interpretation of the term investment.[120]

To understand what the scope and application of the SGDR actually is and how it may apply to the database of a CAC, it's necessary to examine the interpretation of "obtaining", "verifying" and "presenting".

3.3.2.2 Obtaining, verifying and presenting

There have been several cases where the CJEU has clarified the interpretation of a substantial investment and what types of databases fall within the SGDR. Most notably are four cases where one concerns a database on horse racing and three concern the same lists of fixtures of English and Scottish football.

In *British Horseracing Board Ltd v. William Hill,* the British Horseracing Board Ltd (BHB) had a database on horse racing fixtures, runners and other racing information that they had invested GBP 4 million per annum into obtaining, verifying, maintaining and developing. BHB claimed the defendant, William Hill, had infringed on their database right by extracting and re-utilizing part of this

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116 Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Art. 7(1).

117 Tanya Aplin, 'The EU database right: recent development', (2005) 1 *Intellectual Property Quarterly*, p. 53.

118 Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Recital 7, 12, 40

119 Estelle Derclaye, 'Database sui generis right: What is a substantial investment? A tentative definition' (2005) 36(1) *International Review Of Intellectual Property and Competition Law,* 2-30, p. 2

120 Johan Axhamn, *Sui generis-skydd för databaser* (MercurIUS Förlags AB 2006), p. 50.

database without authorization, by displaying a small and specific portion of the information on the defendant's betting website.[121]

In the cases concerning football fixtures in the United Kingdom. These cases concerned a database where the data was generated and immediately included into the database. Fixtures Marketing Limited had been assigned to handle the exploitation of these lists outside of the United Kingdom. Three cases were brought against betting companies in Finland, Greece and Sweden, which had used parts of the fixture lists for their betting operations. In a time frame of a week the defendants would use around a quarter of the matches being played.[122]

In the *Fixtures Marketing Ltd v. Svenska Spel Ab* case, the court concluded that "obtaining" data relates to collecting data. In a CAC, this can for example be data on weather or traffic collected via the sensors or the IoT. "Verifying" is to be understood as investing in checking that the search elements are correct, both when creating the data and when it operates. In scenarios where the data has been created for the database, the court clarified that an investment into verification during the creation doesn't fall within the scope of SGDR, as this is done before it has been collected into the database.[123] The database of a CAC may verify its data as part of planning or correcting its driving route.

"Presentation" was interpreted as relating to investments made into placing the contents of the database into a systematic or methodological order as well as making them individually available.[124] For a CAC, this can relate to presenting the database in a way that is appropriate for the AI system to use the data for its algorithms, e.g. when the sensors translate their captured data and convert this into numerical data that can be put into machine-learning algorithms.

In *Fixtures Marketing Ltd v. Oy Veikkaus Ab*, the CJEU expressed that "quantitative" should be assessed in relation to quantitative resources while

[121] Tanya Aplin, 'The EU database right: recent development', (2005) 1 *Intellectual Property Quarterly,* 53 – 55.

[122] Estelle Derclaye, 'Database sui generis right: What is a substantial investment? A tentative definition' (2005) 36(1) *International Review Of Intellectual Property and Competition Law,* 2-30, p. 2 – 4.

[123] Case C-338/02 *Fixtures Marketing Ltd v. Svenska Spel Ab* (2004) ECR I-10497, para 27.

[124] Ibid. para 27.

"qualitative" should be assessed in relation to resources that are not quantifiable, such as intellectual or energy investment. This was based on recitals 7, 39 and 40.[125]

For databases with machine-generated data such as those of CACs, the interpretation of "obtaining" is particularly relevant. In the mentioned cases, the court and Advocate General both extensively considered the difference between "searching and collecting" data versus "creating" data and whether they fall within the activity of "obtaining" data. Depending on what underlying reasoning is used and the given database, the interpretations varied. This is what the legal uncertainty regarding the scope of the SGDR in relation to machine-generated data is about. Given that creating data often also is part of another main activity, there is a question of if investments into creating a database as part of another activity can be interpreted as an investment into the creation of the database, leading to the development of the "spin-off" theory. To determine the actual scope and application of the SGDR, this needs to be examined.

3.3.2.3 "Search and collect" versus "creating"

In *British Horseracing Board Ltd v. William Hill*, the CJEU interpreted "obtaining" as referring to resources used to search for existing data and collect them to construct a database, excluding protection for investments made into creating the data itself.[126] A similar sentiment was expressed in the *Fixtures Marketing Ltd v. Svenska Spel Ab*.[127] Here the CJEU pointed out that the purpose of the SGDR is to protect the investment into searching and collecting data into the database, as provided for in Recital 39. This conclusion was supported by the AG.[128] But she based this on a language comparison between the DbD in other languages, where it was not possible to interpret obtaining and creating as meaning the same.[129] This was also the conclusion in *Fixtures Marketing Ltd v. Oy Veikkaus Ab*, where the court pointed out that the investment into obtaining the data on football fixtures for the database was the same as the investment required to create the data and the

[125] Case C-46/02 *Fixtures Marketing Ltd v. Oy Veikkaus Ab* (2004) ECR I-10365, para 38.

[126] Case C-203/02 *British Horseracing Board Ltd v. William Hill* (2004) ECLI:EU:C:2004:695. para 80.

[127] Case C-338/02 *Fixtures Marketing Ltd v. Svenska Spel Ab* (2004) ECR I-10497, para 37.

[128] Ibid, para 24 – 25.

[129] Case C-338/02 *Fixtures Marketing Ltd v. Svenska Spel Ab* (2004) ECR I-10497. Opinion of AG Stix-Hackl, para 52.

indivisible link between the two excluded the fixtures list from possibility of SGDR with this foundation.[130]

Following this interpretation, the databases of CAC would be unlikely to claim SGDR as some of its obtained data is created by its technology. It is also possible that the data is created simultaneously with the database. However, what constitutes created data in this context is also difficult to determine. Are recorded images of the car's surrounding captured by the car's cameras created data (i.e. recordings) or collected data (i.e. information on existing obstacles, roads etc.)? Is the measurement of the engine performance and speed of the car created data (i.e. numerical measurements) or obtained pre-existing data? With this uncertainty of interpretation, a database maker may claim SGDR based on formulating the investment into the creation of the data as obtaining data.

The CJEU used the purpose of the DbD for its conclusion that the investment into creating the database and the data cannot be the same. The AG pointed out though in *Fixtures Marketing Ltd v. Svenska Spel Ab* that it is unclear whether the purpose of the DbD should be included when the CJEU determines the scope of the SGDR and if it is, then it's unclear how.[131] The purpose of the DbD is found in the recitals, which are not legally binding. She further elaborated on this in *Fixtures Marketing Ltd v. OPAP* where she noted that the purpose of the database is not expressed as a criteria for assessment of the scope of SGDR but rather that the criteria to consider are found in Article 1 and 7. With this reasoning, whether the intentions of the database maker coincides with the purpose of the DbD is irrelevant.[132] This means that a different interpretation of "obtaining" could be used by the CJEU which includes created data and thus expands the scope of the SGDR. For databases containing machine-generated data, this would increase the possibility to be granted SGDR.

At the same time, it can be argued that the purpose of a legislative act should be part of interpreting its application. It seems counterintuitive that the DbD should protect something it was not intended to protect, which seems to be in line with the

[130] Case C-46/02 *Fixtures Marketing Ltd v. Oy Veikkaus Ab* (2004) ECR I-10365, para 58 – 59.
[131] Case C-338/02 *Fixtures Marketing Ltd v. Svenska Spel Ab* (2004) ECR I-10497. Opinion of AG Stix-Hackl, para 24.
[132] Case C-444/02 *Fixtures Marketing Ltd v. OPAP* (2004) ECR I-10549. Opinion of AG Stix-Hackl, para 75.

reasoning of the CJEU. In *Fixtures Marketing Ltd v. OPAP* the court dismissed the investment into the creation of data based on the purpose of the SGDR being to promote storage and processing systems for existing information, not the creation of data that then can be stored and processed for a database, as expressed in the recitals.[133]

If the court followed the opinion of the AG in *Fixtures Marketing Ltd v. Svenska Spel Ab*, the necessity to prove a separate investment into the creation of the database would not be necessary. She claimed that if the substantial investment made into obtaining data for the database coincides with generation of data, then this should grant SGDR (despite concluding that generating data is not to be understood as obtaining data).[134] This is relevant for created and presented data. This was also the AG's opinion in *Fixtures Marketing Ltd v. OPAP*, where she expressed that if data is created at the same time as the processing of it and the two were inseparable, then this could still be interpreted as obtaining data.[135] But for a database by a CAC, separating the investment into the creation of data and database is difficult. This relates to the technology of the CAC where creating the database is part of enabling autonomous driving, not creating the database itself. Creating the database is not the main activity. Given that the SGDR is meant to promote the creation of databases, it is not clear whether a database made as a by-product should be granted SGDR.

3.3.2.4 Spin-off theory and machine-generated data

The difficulty in separating creation of data and investment into the creation of databases as well as the differing of opinions on what falls within obtaining data has brought about the spin-off theory, a legal doctrine most prominent in Holland.[136] A spin-off database is a database which is created as a by-product of a main or other activity of a producer. Given the requirement of a substantial investment for SGDR to be granted, a confusion has arisen over time among Member States' courts on if these databases qualify for this protection as well. The

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[133] Case C-444/02 *Fixtures Marketing Ltd v. OPAP* (2004) ECR I-10549, para 40.

[134] Case C-338/02 *Fixtures Marketing Ltd v. Svenska Spel Ab* (2004) ECR I-10497. Opinion of AG Stix-Hackl, para 56.

[135] Case C-444/02 *Fixtures Marketing Ltd v. OPAP* (2004) ECR I-10549. Opinion of AG Stix-Hackl, para 75.

[136] Johan Axhamn, *Sui generis-skydd för databaser* (MercurIUS Förlags AB 2006), p. 51

confusion relates to if the main or other activity that produces the database should count as an investment into the database or if the requirements of obtaining, verifying or presenting means that the aim of the investment must be to make the database, which the spin-off theory claims.[137]

This directly impacts the scope of protection. If these types of databases were granted SGDR, this would widen the scope.[138] The argument against is mainly based on that there is no substantial investment made into these databases since they are by-products, i.e. the substantial investment is in another (main) activity which produces the database. This is in line with using the purpose of the DbD to interpret the scope of the SGDR, which is that it should promote the creation of databases. Spin-off databases fall outside the aim of the DbD.[139] The spin-off theory is based on the presumption that by being a by-product, the database will be created regardless of SGDR protection.[140] As well, if all data produced can be granted SGDR, this would lead to a very wide scope, considering how many human activities produce information. The theory is also based on the argument that there needs to be a clear connection between the investment and the resulting database for the SGDR, as the CJEU has argued when denying SGDR protection. For spin-off databases, this connection sometimes doesn't exist or isn't easy to prove. It is also in line with competition law. The cost of performing an activity should be recouped within the same activity, otherwise consumers are paying twice for the same data. It is also based on the interpretation of "obtaining" not including the creation of data and effectively treating these databases as spin-off databases falling outside the SGDR.[141]

For this theory to hold, it is necessary to distinguish between the main and side activity, which is not always clearly distinguishable. IoT tools obtain and generate data as part of its functions and to enable its operations. The databases it creates can then be considered by-products of the functions and operations. From the perspective of the spin-off theory, databases containing machine-generated data

[137] Estelle Derclaye, 'Database sui generis right: should we adopt the spin-off theory?', (2004) 26(9) *European Intellectual Property Review*, p. 402 – 403.
[138] Ibid. p. 402 – 403.
[139] Ibid. p. 406
[140] Johan Axhamn, *Sui generis-skydd för databaser* (MercurIUS Förlags AB 2006), p. 51
[141] Estelle Derclaye, 'Database sui generis right: should we adopt the spin-off theory?', (2004) 26(9) *European Intellectual Property Review*, 402-413, p. 406 – 407.

would not be able to claim SGDR. With this reasoning, these databases don't fulfil the substantial investment requirement, as well as the original purpose of IPR protection for databases.[142]

But the theory doesn't consider that just because data is derived from a main activity doesn't prevent the possibility of there still being a substantial investment made into the database itself which is distinguished.[143] And even if the DbD doesn't include created data under obtained data, how should the two be distinguished? As previously discussed, recorded data can be viewed as either created or collected. Considering the initial motivation of the DbD as well, which was relating to telephone directories that were not protected by copyright in most Member States, this would also support spin-off databases receiving SGDR. These were created with data derived from the activity of attributing telephone numbers, i.e. spin-off databases.[144] If the motivation and purpose behind the DbD is relevant, then this purpose is relevant to consider as well.

The opinions on the spin-off theory vary but overall there is a consensus that from the perspective of this theory, databases with machine-generated data are unlikely to fall within the scope of SGDR. Depending on how to interpret the gathering of the data, it would likely be considered to contain at least some created data and to be by-products of other activities which would create the databases regardless of SGDR being applicable or not.[145] But the spin-off theory is not an established legal doctrine and there are cases within the EU where courts have ruled in favour of SGDR for databases of machine-generated data.

3.3.2.5 Sensor-generated data and *sui generis* protection

While not explicitly included in the DbD, depending on the interpretation of the SGDR, particularly in relation to whether "obtaining" data also includes created data as well as the potential adoption or rejection of the spin-off theory, the scope

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[142] European Commission, 'Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' SWD(2022) 34 final, 23 February 2022. p. 15 – 16.

[143] Estelle Derclaye, 'Database sui generis right: should we adopt the spin-off theory?', (2004) 26(9) *European Intellectual Property Review*, 402-413, p. 410.

[144] Ibid. p. 407.

[145] European Commission, 'Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' SWD(2022) 34 final, 23 February 2022. p. 132.

of the SGDR could encompass machine-generated data as that produced by the CAC's sensors and IoT.[146] Such a database was tried in *Autobahnmaut* BGH I ZR 47/08. Specifically, it concerned sensor-generated data from a road-toll system.[147]

In the case, the German Federal Supreme Court (Bundesgerichtshof) ruled on a highway company's database of sensor-generated data on motorway use and whether this was covered by the SGDR. The data included vehicle registration numbers, date of the toll journey and length of the travelled routes.[148] The company claimed it made a substantial investment into firstly obtaining the pre-existing data on the cars on the motorway and then verifying and presenting the data by processing it through software. The data came from natural phenomenon and the question was if this was to be perceived as pre-existing data that was obtained or created data from measuring the phenomenon. The court in Germany ruled in favor of the highway company concluding that it it's obtained data, not created, because it can be collected individually by anyone else, i.e. the data, while obtained through a machine, is not created or invented by the database maker. This means that created data is still not covered by the SGDR but what is interpreted as created data still varies and is unclear.[149]

For the CAC, this means that particularly databases of recorded data collected through sensors can be granted SGDR under this interpretation of the scope. This includes images of the car's surrounding and detection of obstacles, vehicles and the road ahead. By viewing the sensor-generated data as obtained data of pre-existing data, the scope and application of the SGDR significantly expands.[150] This interpretation can include data that is produced through almost any use of IoT as it can be argued to be data collected of pre-existing data. Essentially, the IoT in this interpretation becomes a tool for data collection, not data generation and is thus within the SGDR scope as it relates to investment into obtaining data.

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[146] European Commission, 'Staff working document: Evaluation of Directive 96/9/EC on the legal protection of databases' SWD(2018) 146 final, 25 April 2018. p. 13.

[147] European Commission, 'Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' SWD(2022) 34 final, 23 February 2022. p. 134.

[148] Case BGH I ZR *Autobahnmaut* 47/08 (2010), para 19.

[149] Stephanie Elgering, *Unlocking the Right to Data Portability* (Nomos Germany 2019), p. 38.

[150] European Commission, 'Staff working document: Evaluation of Directive 96/9/EC on the legal protection of databases' SWD(2018) 146 final, 25 April 2018. p. 13.

3.4 Summary and conclusions

The SGDR is found in Article 7 of the DbD and is an IP protection of non-original databases where a quantitative and/or qualitative substantial investment has been made into obtaining, verifying or presenting the data. It gives the database maker the right to prohibit others from extracting or re-utilising all or a substantial part of the contents of the database. The database maker is the person who initiates the creation of the database and carries the risk of the investment. For CACs, this is usually the producer of the car. The CJEU has interpreted the term "obtaining" data as collecting data, which for CACs could be the data gathered through its sensors and the IoT. The court interpreted "verifying" as investing in checking that the search elements are correct (excluding verification done during the creation of the data itself). This might be done for a CAC as part of planning a driving route. "Presentation" was interpreted by the CJEU as placing the data in a systematic or methodological order and making them individually available. A database for a CAC might do this in a way necessary for the AI system to easily extract the data and use in its algorithms.

Whether the SGDR covers databases of created data, and by that also machine-generated data, relates to the interpretation of "obtaining". The CJEU has favored an interpretation which restricts the scope to data that is "searched and collected" while other interpretations, such as that of the AG in many cases relating to the SGDR, opens the door for the possibility of created data also to be covered by the SGDR. For example, if the investment into the creation of data coincides with it being obtained, verified or presented into the database then this could be argued to fulfil the requirement for SGDR. The CJEU has concluded though that there must be a separate investment into creating the database which the database maker must be able to prove. As well, databases with created data are often by-products of other main activities, meaning that the investment made into creating the database could be interpreted as not being an investment into the database itself (the "spin-off" theory). This goes back to the purpose of the DbD being to promote the creation of databases. There have, however, been cases where databases with machine-generated data have been given SGDR as in the *Autobahnmaut*-case. Here recorded data was interpreted as collected data of pre-existing data, rather than created by the sensors. Created data is still not clearly encompassed by the SGDR but might be interpreted as collected data. Such an interpretation means that databases made of obtained and generated data of CACs can be granted SGDR. This means the scope and application of the SGDR can potentially include databases with machine-generated data.

4. The *sui generis* database clause in the proposed EU Data Act

4.1 Introduction

This section explores Article 35 in the proposed EU Data Act and its potential impact on the scope and application of the *sui generis* right in the EU Database Directive. This will also be related to connected and automated car's databases and their possibility of claiming SGDR. The first part gives a short overview of the proposal, it's scope and intended purpose, mainly focusing on Article 35 of the proposal which takes aim at the SGDR in the EU Database Directive. The second part discusses the potential implication this would have on the right as it relates to machine-generated databases, such as those produced by connected and automated cars.

4.2 The EU Data Act

4.2.1 Overview

The EU has created a European data strategy, aimed at creating a single market for data. This is so that data can freely flow within the EU across various sectors. One of the main concerns of the EU data strategy is how to deal with data being concentrated among relatively few actors. This is supposed to in part be solved through the proposed Data Act (DA). This regulation aims to open up data and ensure that access and use of the data is fair.[151]

Following these objectives of the DA, the proposal includes Article 35 addressing the SGDR in the DbD, to clarify the legal uncertainty regarding the scope of the SGDR, as it relates to databases of machine-generated data.[152] As discussed in

[151] European Commission, 'A European Strategy for data', (digital-strategy.ec.europa.eu) <https://digital-strategy.ec.europa.eu/en/policies/strategy-data accessed> 1 April 2022.

[152] European Commission, 'Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' SWD(2022) 34 final, 23 February 2022. p. 6.

Chapter 3, it's unclear whether SGDR also covers these databases.[153] Article 35 is particularly aimed at the data that is obtained and generated by IoT technology.[154] The technology used by CACs, such as the sensors and IoT, fall within this area.[155]

4.2.2 Article 35 of the Data Act proposal

The Data Act only has one article that relates to the SGDR under the Database Directive. Article 35 of the DA asserts that the SGDR, found in Article 7 of the DbD, doesn't apply to any database that contains data that is obtained from or generated by the use of a product or related service:

> In order not to hinder the exercise of the right of users to access and use such data in accordance with Article 4 of this Regulation or of the right to share such data with third parties in accordance with Article 5 of this Regulation, the *sui generis* right provided for in Article 7 of Directive 96/9/EC does not apply to databases containing data obtained from or generated by the use of a product or a related service.[156]

The purpose is to assure effective implementation of Article 4 and 5 of the DA, which is to enable the right of users to access, use and share with third parties this type of data. This is based on the perceived conflict between the SGDR of such databases and these objectives. Important to consider for evaluating the impact of Article 35 on the SGDR, is if this is intended and can indirectly amend or just clarify the DbD.[157]

In Recital 84 of the DA, the relationship between the DbD and DA is expressed:

> In order to eliminate the risk that holders of data in databases obtained or generated by means of physical components, such as sensors, of a connected product and a related service claim the *sui generis* right under Article 7 of Directive 96/9/EC where such databases do not qualify for the *sui generis* right, and in so doing hinder the effective exercise of the right of users to access and use data and the right to share data with third parties under this Regulation, this Regulation should clarify that the *sui generis* right does not apply to such databases as the requirements for protection would not be fulfilled.[158]

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[153] European Commission, 'Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' SWD(2022) 34 final, 23 February 2022. p. 15 – 16.

[154] Ibid. p. 15.

[155] Ovidiu Vermesan et al, 'IoT technologies for Connected and Automated Driving Applications' in Ovidiu Vermesan and Joël Bacquet (eds), *Internet of Things – The Call of the Edge* (Rivers Publishers 2020), p. 256.

[156] European Commission, 'Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' COM(2022) 68 final, 23 February 2022. Article 35.

[157] Ibid. Art. 4, 5.

[158] Ibid. Recital 84.

The recital expresses the DA as providing a clarification of the SGDR. Important to note is that the reason for why the SGDR would not be applicable to databases containing data obtained or generated by devices, such as sensors, of a connected product or related service, such as the CAC, is motivated by concluding that the requirements for SGDR would not be fulfilled.[159] Hence, the article presupposes that the SGDR is not applicable to these databases and the DA clarifies this legal uncertainty. As previously explained though, recitals are not legally binding. Also relevant to consider from Article 35 for databases of CACs is how the interpretation of "obtained" and "generated" data is to be interpreted as well as "product".

4.3 Potential implications of Article 35 on the *sui generis* right

4.3.1 Impact Assessment Report on the Data Act

As previously explained, the proposal of the DA is a non-binding legal instrument of which the potential legal implications are not known. In considering the scope and application of the DA, instead of using case law as for DbD which for the DA is non-existent, it's useful to regard the Impact Assessment accompanying the Data Act (also not legally binding). This report gives an analysis of the expected effect of the proposed legislation. It also provides the reasoning behind the legislation and the expected effect.[160]

The Impact Assessment that accompanied the DA looks closer at the problems that come with expanding the SGDR to cover machine-generated data and the expected and desired effect of Article 35 of the DA.[161] Referencing the CJEU's rulings in the three cases involving Fixtures Marketing Ltd and the one with British Horseracing Board Ltd discussed in Chapter 3, the Impact Assessment points out that the court ruled against investments made into creation of data being grounds for SGDR and viewed such databases only as by-products of the actual investments, not the result of it. This is used to explain Article 35 and why its described as a clarification of

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[159] Ibid. Recital 84.

[160] Chun Hung Lin, 'Legal Development of Atypical Acts in the European Union with Some Reference to Spectrum Management Legislation', *Athens Journal of Law*, 6(1), 9-36, p. 9.

[161] European Commission, 'Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' SWD(2022) 34 final, 23 February 2022. p. 6.

the DbD, as the interpretation of the scope of the SGDR is assumed to already exclude these databases.[162]

Since the CJEU previously based their rulings on the purpose of the DbD, using it to motivate the interpretation of the scope of the SGDR, the Impact Assessment also uses the Data Act's proposal's aim when considering its impact on the SGDR for machine-generated data. The purpose of the proposal and specifically Article 35 is in large to remove barriers for access, use and share of data.[163]

This article is particularly aimed at data produced through the IoT in industrial settings, which is the type of machine-generated data that the SGDR could cover. If the SGDR is expanded to include such data, this would create barriers for access, use and share of that data. With the above interpretation, Article 35 effectively narrows the scope of the SGDR..[164] Thus most of the databases of the CACs will not be covered by SGDR. CACs are highly dependent upon the IoT and other technology with machine-generated data and the SGDR can potentially protect a large portion of the overall investments that are made into the CAC as a lot of it goes towards data and databases. This impacts the ability to protect this investment from competitors which essentially could make use of the data without investing into gathering it but could also promote innovation by unlocking this data.

This is one of the potential implications of Article 35 on the SGDR. The data holders of databases with machine-generated data cannot claim SGDR of database. For CACs, this is the car producer. The Impact Assessment points out that this effectively should change interpretations of cases such as the *Autobahmaut* case, where the clarification of Article 35 would mean that the database in this case should not be covered by the SGDR. The potential negative impact of the data holders losing this protection of their databases is estimated to not be significant in the short term. This is based on the assumption that the protection of machine-generated data is not a widely used tool to generate revenues currently. The economy-wide IoT rollout is presumed to be at an early stage and thus the impact is comparably low at this stage. However, it's expected to impact the data holders

[162] Ibid. p. 132.
[163] Ibid. p. 133.
[164] Ibid. p. 133.

in the future as the sensor-based data economy is expected to grow and this would effectively prevent them from restricting access to their data and gain revenue through this.[165] For a CAC producer, this could be true. The development of CACs are still at an early stage, much like the IoT technology it uses. If it were to become a new mode of transportation, replacing the manual car, with time it could be presumed that there will be an increase of competition in this market and the databases relating to autonomous driving could be valuable if given protection. Thus the impact of removing the possibility of SGDR now is low in comparison to the impact it has on the future. But it could also mean that the value of some of the data that the CAC obtains and generates could lose its economic value, e.g. the recorded data from CACs could in the future be recorded by numerous actors as the investments into similar sensors and the IoT increase. With an increase of competition, regardless of SGDR, the data itself could still be easily obtained, generated and accessed.

Article 35 is also expected to prevent the increase in transaction costs for actors of data, which might otherwise occur if SGDR of IoT data is continuously claimed. An immediate effect would also be a decrease of transaction costs of data sharing, accessing and using. Article 35 thus removes the SGDR from acting as a barrier to sharing, trading and using data generated by the IoT technologies. The access to data would hence be expected to increase as well as related costs to accessing data with SGDR decreasing.[166] While the DA would remove the possibility for CAC producers to claim SGDR for their databases, the reduced transaction cost and free access can open the door for new CAC producers as it would be a lower cost of production in this area. It could also increase innovation and research in this field.[167] This relates both to accessing the data freely as well as not having to invest as much into the technology for obtaining and generating the data, which is used both to develop the AI system as well as for the actual use of the CAC.

With this follows an increase in competition. Effectively denying SGDR of these databases would remove a barrier and is expected to facilitate entry to new markets and lead to the development of new products. It would provide easier access to

[165] Ibid. p. 136.
[166] Ibid. p. 136 – 137.
[167] Ibid. p. 137.

complete datasets for competitors and interested parties, increasing competition both in primary markets and aftermarkets.[168] It's necessary to note though that an assessment would have to be done on what else affects entry into the CAC market, e.g. high production costs and other IP protection. If removing SGDR would increase competition, it could also discourage entrance into this market as the increased competition could lower prices and revenue.

Though this is not what the Impact Assessment evaluates as a potential implication. Rather, it points out that there is no proof that there would be a decreased production of data and databases relating to the IoT nor the products and services relating to this. This is based on the evaluation made previously on the DbD where it was suggested that the SGDR of investments in databases has little or no positive effect on incentivizing database creation and that this is even more true for machine-generated data which usually is generated as a spin-off or by-product to other main activities, giving the example of vehicle data.[169] This effectively dismisses the relevance of the SGDR altogether, as the purpose of the DbD is to promote the creation of databases. In this case, the SGDR would not affect the production of the CAC's databases but only the possibility of them being protected by the SGDR.

The specific effect on the automotive sector is expected to be significant. Car and equipment manufacturers that are data holders will no longer have SGDR of their machine-generated databases. Meanwhile, aftermarket and spare services will benefit from this, as they will have access to data more easily, which was pointed out as a common difficulty as the result of SGDR.[170] Given that CACs are at an early stage of development, the aftermarket for this is currently not large compared to what it may become.

4.3.2 Different interpretations of Article 35

To further analyse the potential implications of Article 35 of the DA on the SGDR of the DbD, the interpretation of the scope and application of the SGDR and the reason behind it (as discussed in Chapter 3) is useful to consider.

[168] Ibid. p. 137.

[169] Ibid. p. 137 – 138.

[170] Ibid. p. 138.

The Impact Assessment for the DA provides numerous potential implications of Article 35 on the SGDR and the reasoning behind them. It stems from the interpretation that Article 35 expresses that databases with the type of data produced by the IoT, machine-generated data, are excluded from being covered by the SGDR. This is to be viewed as created data, which the CJEU has previously ruled against claiming SGDR.[171] As expressed in the DA, Article 35 is supposed to clarify the SGDR, i.e. presuming that as it's in the DbD, the scope doesn't cover these databases.

Following this interpretation, it can further be assessed that Article 35 will cover a wide range of databases, given that the definition of "product" found in Article 2(2) of the DA being rather expansive[172]:

> 'product' means a tangible, movable item, including where incorporated in an immovable item, that obtains, generates or collects, data concerning its use or environment, and that is able to communicate data via a publicly available electronic communications service and whose primary function is not the storing and processing of data; [173]

Any databases containing machine-generated data would be excluded, regardless of substantial investment of human, financial or technical resources into verifying and/or presenting data into the database.[174] By this we can conclude that the right to prohibit extraction and/or re-utilisation of all or substantial parts of the database that the database maker is granted under the SGDR[175] would not be effective and this would then be allowed. Whether there is a qualitative or quantitative investment will not give way to the protection. Essentially, these databases will be like open sources.

But this interpretation is not necessarily the only relevant and possible one of Article 35. There are arguments to be made against the interpretation that the SGDR

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[171] Ibid. p. 136.

[172] Toby Headdon 'The porposed EU Data Act and the sui generis database right' (*LexisNexis*, 17 May 2022) <https://www.lexisnexis.com/uk/lexispsl/tmt/document/412012/65G6-DG93-GXF6-83P9-00000-00> accessed 20 May 2022.

[173] European Commission, 'Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act)' COM(2022) 68 final, 23 February 2022. Recital Article 2(2).

[174] Toby Headdon ' The porposed EU Data Act and the sui generis database right' (*LexisNexis*, 17 May 2022) https://www.lexisnexis.com/uk/lexispsl/tmt/document/412012/65G6-DG93-GXF6-83P9-00000-00 accessed 20 May 2022.

[175] Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. Art. 7(1).

doesn't cover machine-generated data.[176] The DA aims to clarify that no database with this type of data should be covered by the right but there are cases where that right could be asserted to such databases.[177] As was discussed in Chapter 3, part of this issue comes down to the interpretation of the terms "obtaining", "verifying" and "presenting" which is necessary to determine the scope of the SGDR. Particularly the difficulty of determining if created data falls within the term obtaining. For machine-generated data, is the instalment of sensors, as the ones used for CACs, an investment into obtaining data? Or is the subsequent database created as a by-product and should this, in line with the spin-off theory, be interpreted as not being granted SGDR? What if this investment is both the investment into creating the data and the database? A CAC needs the data in the database to perform driving tasks, rather than just creating the database, meaning the investment into creating the data and database is presumably often one and the same. Can this investment still be assessed as an investment into obtaining data which, if substantial, can be granted SGDR despite not being separable from the investment into creating the data? As discussed in Chapter 3, the AG and the CJEU have differed on their conclusions as well as the reasoning of how to evaluate the scope and application of the right for created data. As seen in the *Autobahmaut*-case, machine-generated data can be interpreted as collected instead of created data.

It could then be argued that by also including the word "generating" in Article 35, this contributes to the narrowing of the scope and excludes created data, which would also encompass machine-generated data. This would be based on the interpretation that "generating" also encompasses "creating" data. The AG's opinion in *Fixtures Marketing Ltd v. Svenska Spel Ab* expressed the creation of data as generated data, which shows not the necessity but possibility to interpret the word as such.[178] Following this interpretation, this then excludes created data. But as the AG expressed in the mentioned case, a substantial investment into obtaining data that also encompasses the generation of data could be given SGDR as the

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[176] Estelle Derclaye and Martin Husovec, 'Why the Sui Generis Database Clause in the Data Act is counter-productive and how to improve it?' (*SSRN*, March 8 2022) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4052390> accessed 12 May 2022.

[177] Inge Graef and Martin Husovec 'Seven Things to Improve in the Data Act' (*SSRN*, March 7 2022) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4051793> accessed 13 May 2022.

[178] Case C-338/02 *Fixtures Marketing Ltd v. Svenska Spel Ab* (2004) ECR I-10497. Opinion of AG Stix-Hackl, para 56.

creation of data doesn't exclude the investment into obtaining it[179], meaning databases with machine-generated data would still receive SGDR if there is a substantial investment into obtaining the data as well or part of generating the data. If this is a possible previous interpretation of the DbD, it means that the SGDR doesn't as is exclude created data. If Article 35 is interpreted as excluding created data, then it is not a clarification but a subject matter change.[180] As well, it is important to still note that the confusion on what constitutes created data can differ in interpretations, meaning excluding created data from the scope of SGDR doesn't clarify what created data encompasses.

If Article 35 is to be interpreted as narrowing the scope of SGDR to completely exclude databases including any generated data, then this is a subject matter change rather than a clarification. The Data Act explicitly expresses the purpose of Article 35 to be a clarification of the SGDR. But a clarification follows that it doesn't change the law and thus what is protected, whereas a subject matter serves to change the design of the right to exclude certain databases from the right. But both applications cannot be pursued. This lack of clarity might lead to data that the DA aims to open up still falling within the SGDR. E.g. the database maker can frame their data collection as obtaining data instead of generating.[181] Again, the interpretation of these terms are detrimental but already this confusion indicates that the legal uncertainty Article 35 aims to resolve might sustain and thus the implication of Article 35 on the SGDR is not significant but the confusion remains and there is a possibility to interpret the SGDR to cover machine-generated data.

It is also relevant to consider the purpose of the DbD and the DA. It could be argued that the purpose of the DA should weigh into determining the scope and application of Article 35, given that the CJEU has previously used the purpose of the DbD to determine the scope and application of the SGDR. This is the reasoning of the Impact Assessment's presumption of the interpretation of Article 35 being to exclude the databases with machine-generated data. This would effectively narrow

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[179] Ibid. para 56.

[180] Estelle Derclaye and Martin Husovec, 'Why the Sui Generis Database Clause in the Data Act is counter-productive and how to improve it?' (*SSRN*, March 8 2022) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4052390> accessed 12 May 2022.

[181] Inge Graef and Martin Husovec 'Seven Things to Improve in the Data Act' (*SSRN*, March 7 2022) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4051793> accessed 13 May 2022.

the scope of the SGDR to exclude machine-generated databases, including those produced by the IoT in CACs. But it could also be argued that the purpose is to clarify DbD, and then it comes back to the question of what the correct interpretation of the DbD is so that the DA is applied in a way that doesn't become a subject matter change.

However, it's not expressed in the DA proposal that purpose should be used as a criteria in the application of Article 35. As discussed in Chapter 3, whether the purpose of the DbD should be considered in determining the scope and application of the SGDR is unclear.[182] A similar analysis can be made for the DA and Article 35. The DA, as the DbD, doesn't express the purpose of the regulation as a criteria to be used in assessing its application.

Another implication of Article 35 of the DA on the SGDR is that it could open the door for Member States to freely legislate in this area. Following the interpretation that Article 35 as indirectly amending the scope of the SGDR, this would exclude databases with machine-generated data from the DbD. This means that EU law doesn't cover these databases and thus it would be allowed for Member States to legislate on this. Given that the SGDR has legal uncertainty, it could be argued that, depending on the interpretation of the right, it already is possible for the Member States to legislate on this area. The DA in that case affects this by confirming that they can with Article 35.[183] The databases of CACs could then receive national protection in some Member States.

4.4 Summary and conclusions

Article 35 of the DA has the aim of clarifying the SGDR and removing the possibility of the right being granted to databases with machine-generated data, particularly that from the IoT, which is possible given the legal uncertainty regarding the scope of the SGDR. This issue comes down to the interpretation of "obtaining" data and whether created data falls within this scope. Depending on the

[182] Case C-338/02 *Fixtures Marketing Ltd v. Svenska Spel Ab* (2004) ECR I-10497. Opinion of AG Stix-Hackl, para 24, Case C-444/02 *Fixtures Marketing Ltd v. OPAP* (2004) ECR I-10549. Opinion of AG Stix-Hackl, para 75.

[183] Estelle Derclaye and Martin Husovec, 'Why the Sui Generis Database Clause in the Data Act is counter-productive and how to improve it?' (*SSRN*, March 8 2022) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4052390> accessed 12 May 2022.

underlying reasoning, numerous interpretations of the scope of the SGDR can be argued for, leading to several possible implications of the DA on the SGDR.

Assuming the DbD as is doesn't cover created data, Article 35 clarifies this and machine-generated data, such as that of CAC's, is not covered by SGDR. But if created data can also be formulated or interpreted as obtained data, then this clarification doesn't exclude machine-generated data and SGDR can be granted to databases with this data. The same goes for distinguishing a main activity and by-product, meaning the potential relevance of the spin-off theory here remaining unclear. If the purpose of the DA is used as a base for interpreting Article 35, as has been done in cases concerning the SGDR, then these databases should not be granted SGDR as the purpose of the DA is to remove barriers for this type of data to be accessed, used and shared. On the other hand, given the *Autobahmaut*-case, it can be argued that the DbD does not as is exclude databases with machine-generated data. Given that the DA explains the purpose of Article 35 as a clarification of the SGDR, excluding machine-generated data from SGDR if the DbD doesn't means that Article 35 is achieving a subject matter change rather than clarifying the DbD.

If Article 35 were to exclude these databases from SGDR, this could lead to these database makers no longer controlling this data, transaction costs relating to accessing the data would reduce and the datasets would be available like open sources. Actors in the automotive market would have access to more data, which could be particularly useful for developing AI systems which need large datasets for machine learning. This could lead to increase of competition and innovation in the area. Since the databases of CACs are made as a by-product of the main activity, which is to enable autonomous driving, removing SGDR won't affect the incentive for it being created and thus the production of databases should not decrease. It could also lead to national legislation on protection of these databases, as excluding them from SGDR allows for the Member States to legislate in this area.

5. Summary and conclusions

To answer the three research questions, a literature study on connected and automated cars and the EU legal method was used. The first question on how a CAC obtains or generates data using the IoT was answered in Chapter 2 by reviewing relevant scientific articles relating to the technology of a CAC. Depending on the sophistication of the CAC's technology, the car can perform different driving tasks and can achieve different levels of autonomous driving. This requires relevant knowledge on the car and the surrounding environment. Data on this is in part obtained and generated through sensors that monitor the state of the car (proprioceptive sensors) and the environment around the car (exteroceptive sensors). Depending on the type of sensors, various types of information can be gathered. Other data is obtained and generated through the connectivity between the car and other devices, mainly enabled through the IoT. This is data such as traffic, weather and GPS coordinates. Through this, the car can communicate with other cars, pedestrians and the infrastructure to examine the environment and determine its route. The IoT also serves to transfer data from the car sensors and that obtained and generated from the connectivity for cloud storage. The data the car obtains and generates is then used for machine learning to develop relevant AI technology, which is used to replace the human driver. The data that is obtained and generated by the car and largely through the IoT includes identity information, app data, external sensors data, diagnostic data, locational data and driving behaviour data. This can also be categorised as collected or recorded data and pre-existing or created data. Depending on how one interprets these terms, it can be concluded that the data obtained and generated through the IoT is either created or collected. For example, a sensor monitoring the direct environment around the car can either be creating data by measuring obstacles and creating a numerical measure or it can be interpreted as collecting data already existing. How the technology obtains and generates data from a legal perspective depends on if the IoT is interpreted as a tool for creating or collecting data. This relates back to the interpretation of how the data is gathered by the CAC.

To answer question two on the potential implication of Article 35 of the proposed Data Act on the scope of application of the SGDR, the EU legal method was used. This was also used to answer question three on how these implications might impact the SGDR being applied in the context of CACs. This was answered in combination with the literature study used to answer question one. This was done by first examining the scope and application of the SGDR in Chapter 3. For this, it was particularly important to examine the terms "obtaining", "verifying" and "presenting". These interpretations were studied through case law and further discussed using the AG's opinion and relevant research. "Verifying" relates to investments into checking that the search elements are correct, both when creating the data and when it operates. "Presenting" related to investments made into placing the contents of the database into a systematic or methodological order as well as making them individually available. "Obtaining" data relates to collecting data. In relation to databases by CACs, it is the term "obtaining" data which is particularly relevant. The CJEU had in numerous cases dismissed investments into creating data to qualify for SGDR as it is not to be understood as a substantial investment into creating databases. Here, it is relevant to examine the difference between "search and collect" versus "create". The CJEU had a strict interpretation of the SGDR scope here, dismissing even substantial investments into obtaining data for databases if this was inseparable from the investment into creating the data itself. This was mainly based on the purpose of the DbD being to promote creation of databases, not data itself. This would exclude CAC databases from SGDR. The AG had a differing opinion on this, pointing out that a substantial investment into creating data doesn't mean there isn't a substantial investment into obtaining, verifying or presenting the data and thus fulfils the requirement of SGDR. The AG also pointed out that using the purpose of the DbD for interpreting the scope of SGDR was not a criteria required by the provisions in the DbD but was outlined in the recitals, which are not legally binding. Interpreting what falls within created data is also difficult. Is a recording of something created data or collected? As well, using the purpose of the DbD to interpret the scope of the SGDR, investments into databases which are not the main activity but a by-product of another activity should not be granted SGDR. These investments are not made with the motivation to create databases, which is the purpose of the DbD. This is what the "spin-off" theory is based on. These spin-off databases, such as those created by CACs to enable autonomous driving, fall outside of the aim of the DbD. They would be created regardless of if they are granted SGDR. There is no clear connection between the investment and the database creation. The IoT technology in a CAC obtains and generates data as part of its functions and operations and thus the investment is in this and not the database. There is no distinguishable substantial investment into the creating of the database as required for the SGDR. The scope of the SGDR would not cover these databases then. But if such an investment can be proven, then SGDR should be applied. Also, the spin-off theory can best be applied if the purpose of the DbD is used as the underlying reasoning for determining the scope of the SGDR. But this isn't required. For databases by CACs, this would mean the scope also includes these databases. Also, if data obtained and generated by the IoT is interpreted as data coming from natural phenomenon, i.e. a collection of pre-existing data, then these databases can be granted SGDR. This was the interpretation used in the *Autobahnmaut*-case, where the SGDR scope was interpreted as encompassing databases with machine-generated data.

Considering the implication of Article 35 of the DA on the scope of application of the SGDR, it was relevant to consider the purpose of the DA and Article 35 specifically. The DA mainly looks to enable more access, use and share of data and Article 35 is supposed achieve this by clarifying the SGDR. This is done by expressing that data obtained and generated through the use of products and related services (such as the IoT) should be excluded from the SGDR. This is how the Impact Assessment accompanying the DA interprets Article 35. This is based on the reasoning that the article clarifies the DA and the CJEU has in the past ruled against databases with created data when interpreting the term "obtaining". For CACs this means that the database makers, the car producers, do not have protection of their databases through SGDR. According to the report, this should lead to more access, use and share of data, lower transaction costs relating to this, increased competition and innovation, and no decrease of database production. But as pointed out for the DbD, there is no legal requirement to interpret the Data Act using its purpose. It could then be interpreted by looking at the term "obtained" and "generated" data in the article. While generated data could be interpreted as an equivalent to created data, this still doesn't eliminate the possibility that creating data is instead interpreted as collecting data. Then databases with created data, such as those by CAC producers, can claim SGDR. As shown in the *Autobahmat*-case, sensors and the IoT can be interpret as collecting data, not creating it. If Article 35 clarifies the SGDR, then it cannot lead to a subject matter change as this would change the law and if these databases fall within the scope of the SGDR, then the DA cannot exclude it through a clarification. If it does impact the SGDR by removing machine-generated data from the scope, then this also leads to Member States being free to legislate in this area, opening up the door for national protection of the databases by CACs. The implications of Article 35 of the DA on SGDR depends on the interpretation of the SGDR as is and the interpretation of Article 35 and depending on what underlying reasoning is used in the interpretation. For a CAC, this means that it can be granted SGDR if investments into the use of the IoT is interpreted as investment into collecting data and Article 35 is interpreted as a clarification and not subject matter change of the SGDR.

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