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Avoiding terminological confusion between the notions of 'biometrics' and 'biometric data': an investigation into the meanings of the terms from a European data protection and a scientific perspective

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Introduction

Biometric technologies allow the capture, collection, and processing of biometric information about individuals. Their information is then transformed into digital bits that can be retrieved when necessary for comparison. The biometric processing of individuals' information and data raises personal data protection issues. The first one is whether individuals' biometric data constitute a category of personal data as defined at European level. But to be able to determine the legal regime applicable to biometric data, one must understand and assess the definition(s) given to the term 'biometric data' by the European data protection community. This is highly relevant since the European Commission has introduced a regulatory definition of the term in its proposals of revision of the European Data Protection Framework. This reform, commonly designated under the name of the Data Protection Reform Package,[1] is composed of a General Data Protection Regulation (GDPR) (replacing the current Data Protection Directive, Directive 95/46/EC)[2] and a specific Directive on data protection and law enforcement (replacing the current Council Framework Decision 2008/780/JHA).[3] The European Parliament (EP) voted in first reading the two proposals of the package in March 2014,[4] whereas the Council of the

Key Points

- This article has been motivated by an observation: the lack of rigor by European bodies when they use scientific terms to address data protection and privacy issues raised by biometric technologies and biometric data. In particular, they improperly use the term 'biometrics' to mean at the same time 'biometric data', 'identification method', or 'biometric technologies'.

- Based on this observation, there is a need to clarify what 'biometrics' means for the biometric community and whether and how the legal community should use the term in a data protection and privacy context.

- In parallel to that exercise of clarification, there is also a need to investigate the current legal definition of 'biometric data' as framed by European bodies at the level of the European Union and the Council of Europe.

- The comparison of the regulatory and scientific definitions of the term 'biometric data' reveals that the term is used in two different contexts. However, it is legitimate to question the role that the scientific definition could exercise on the regulatory definition. More precisely, the question is whether the technical process through which biometric information is extracted and transformed into a biometric template should be reflected in the regulatory definition of the term.

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1 The two proposals are designated under the expression 'Data Protection Reform Package', although it is not the official name given by the European Commission. However, several European bodies, such as the European Data Protection Supervisor, have used this expression to designate the two proposals. See, for example, 'Opinion of the European Data Protection Supervisor on the data protection reform package', Brussels, 7 March 2012.

2 European Commission, Proposal for a Regulation of the European Parliament and of the Council on the protection of individuals with

regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation), COM (2012) 11 final, 2012/0011 (COD), Brussels, 25 January 2012.

3 European Commission, Proposal for a Directive of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data by competent authorities for the purposes of prevention, investigation, detection, or prosecution of criminal offences or the execution of criminal penalties, and the free movement of such data, COM(2012) 10 final, 2012/0010 (COD), Brussels, 25 January 2012.

4 European Parliament, legislative resolution on the proposal for a regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation) (COM(2012) 0011-C7-0025/2012—2012/0011 (COD)), Brussels, 14 March 2014.
European Parliament, legislative resolution on the proposal for a directive

European Union (EU) only agreed in June 2015 on a text for the GDPR.[5] At the time of writing, the European Commission, EP, and Council of the EU have started a 'trilogue' on the proposal of the GDPR,[6] whereas the Council of the EU pursues its discussions among its members on the proposal of Directive in law enforcement and data protection. As a consequence, regulatory definition of biometric data at EU level referred to in the article is the one contained in the original proposal of GDPR together with its amended version adopted by the EP and agreed by the Council of the EU.

By clarifying the meaning of 'biometric data' from a European data protection perspective, there is a need to distinguish it from the term 'biometrics'. As will be explained in the first section 'Biometrics: a catchall notion?', different European bodies have indeed used the term 'biometrics' in their legal opinions and reports to mean all at the same time 'biometric data', 'identification method', and 'biometric technologies'.[7] This article claims that the term 'biometrics' is first a technical term that does not have any legal meaning from a data protection perspective. After having described the notion of 'biometrics', the article will focus, in the second section 'Biometric data: a technical and a legal notion', on the notion of 'biometric data', which is crucial from a data protection point of view. It will argue that the term refers to two different notions, a legal one and a scientific one, which cannot be merged into a single one since they serve different purposes. The article will explain the fundamental difference between the two and will investigate whether or not the legal definition should reflect the scientific definition.

This article focusses on terminological issues and not on the legal nature of 'biometric data'. However, defining 'biometric data' and as a consequence 'biometrics' is a necessary first step to later assess the legal nature of 'bio-

metric data' from a European data protection perspective. This following step is not the topic of the current article but of a subsequent one. In addition, this article will attempt to bridge a gap between legal experts in the European data protection field and scientists in the biometric field. Both types of experts use the same terms but give them different meanings.[8] By understanding how scientists are approaching the two notions, this article will assess whether (and how) the regulatory definitions of 'biometrics' and 'biometric data' should reflect the scientific ones. It will, however, not assess whether the scientific definitions might need to reflect the legal ones.

The text of reference on the scientific side is the International Standard ISO/IEC 2382–37 harmonizing the vocabulary used in the field of biometrics.[9] Although the current version of the Standard is the first one published and might be subject to revision, it has already been quoted as a document of reference by national data protection authorities.[10] The Standard contains more than 100 entries that are used in the field of biometrics. References to its definitions will mainly focus on the two most relevant notions in a data protection context: 'biometrics' and 'biometric data'. Other terms used in the field of biometrics will be mentioned in the course of this article, but they will not be thoroughly analysed. To reflect the diversity of definitions and disciplines, several scientific sources published before the adoption of the International Standard will also be mentioned. They include among others definitions in glossaries [the *Glossary of Biometric Terms* of 1999 and the *Biometrics Glossary* of the US National Science and Technology Council (NSTC) of 2006],[11] a report on Biometric Recognition[12] and the Encyclopedia of Biometrics.[13]

On the side of data protection and privacy in relation to biometric technologies, the review of the existing

of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data by competent authorities for the purposes of prevention, investigation, detection, or prosecution of criminal offences or the execution of criminal penalties, and the free movement of such data (COM(2012)0010—C7-0024/2012—2012/0010 (COD)), Brussels, 14 March 2014.

5   Council of the EU, Proposal for a Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation), Preparation for a general approach, 2012/0011 (COD), 11 June 2015.

6   European Commission's press release: <http://europa.eu/rapid/press-release_STATEMENT-15-5257_fr.htm> accessed 20 July 2015.

7   See, for example, Article 29 Data Protection Working Party, 'Opinion 3/2012 on development in biometric technologies', 00720/12/EN, WP 193, Brussels, 27 April 2012.

8   This article has been inspired by discussions with biometric experts and engineers working in the field of biometrics. Experts in different fields use the same terms with different meanings without necessarily acknowledging the differences. Concerning the term 'biometrics', it is first of all a technical term. As a consequence, one cannot ignore its meaning from a scientific perspective.

9   ISO/IEC 2382-37: 2012 (E)—Information Technology—Vocabulary—Part 37: Biometrics <http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=55194> accessed 20 July 2015.

10   Garante (Italian Data Protection Authority), Guidelines on Biometric Recognition and Graphometric Signature, Annex A to the Garante's Order of 12 November 2014, 3 <http://194.242.234.211/documents/10160/0/GUIDELINES+ON+BIOMETRIC+RECOGNITION> accessed 20 July 2015.

11   Association for Biometrics and International Computer Security Association, '1999 Glossary of Biometric Terms', 1–12 <http://biometrics3.tripod.com/pubs/glossary.pdf> accessed 20 July 2015. US National Science and Technology Council's Subcommittee on Biometrics, 'Biometrics Glossary' (2006), 1–33 <http://www.biometrics.gov/documents/glossary.pdf> accessed 20 July 2015.

12   Whither Biometrics Committee & National Research Council, *Biometric Recognition: Challenges and Opportunities*, JN Pato and LI Millett (eds) (The National Academies Press, Washington 2010).

13   SZ Li (ed.), *Encyclopedia of Biometrics* (1st edn, Springer, New York, 2009), 1419 p.

literature is based on two main studies. The first is *Bio-Privacy, Privacy Regulations and the Challenge of Biometrics* by Nancy Yue Liu.[14] The second is the reference work on *Privacy and Data Protection Issues of Biometric Applications* by Els Kindt.[15] In the first book, the author briefly describes the notion of 'biometrics' in a short section on terminology, whereas in the second book, the author thoroughly assesses the legal nature of biometric data and proposes her own definition. If this article is built on their research, it also goes beyond. It proposes to investigate how the scientific definitions of 'biometrics' and 'biometric data' by the biometric community can help the European data protection community to understand the notion of 'biometrics' and to determine whether the scientific definition could be used to 'reshape' the legal definition of 'biometric data'.

Legal opinions, reports, and legislative reports at the European data protection level will also be reviewed. For the purpose of this article, the European level should be understood as encompassing the level of the EU and of the Council of Europe. At both levels, several initiatives and measures addressing biometric issues are interesting to assess.

More precisely, at EU's level, Opinions and a *Working Document on biometrics* issued by the Article 29 Working Party as well as different Opinions of the European Data Protection Supervisor (EDPS) on biometric issues will be surveyed. This part is completed by the analysis of the European Commission's proposals on the Data Protection Reform Package. Whenever necessary, a distinction will be made between the text proposed by the European Commission, the text adopted at first reading by the EP and the text agreed by the Council of the EU.

Besides initiatives at the EU level, several documents adopted at the level of the Council of Europe on biometric issues deserve special attention. First of all, the issue of the application of the principles contained in Convention 108 to biometric data was raised in 2005 in a progress report drafted by the Consultative Committee of the Convention.[16] The Parliamentary Assembly of the Council of Europe (PACE) also raised in 2011 the importance to take into account 'the human rights implications of biometrics' through notably a standardized definition of 'biometric data'. For this reason, three documents, Resolution 1797 (2011), Recommendation 1960 (2011), and the preparatory report of the Resolution and Recommendation, called the Haibach Report, have been analysed.[17] Last but not least, the draft explanatory report on the modernization of Convention 108 is also mentioned.[18]

'Biometrics': a catchall notion?

In a general dictionary, such as Merriam-Webster, the term 'biometrics' is defined in two different ways. It is a synonym of 'biometry', understood as 'the statistical analysis of biological observations and phenomena'.[19] It also means 'measurement and analysis of unique physical or behavioural characteristics (as fingerprints or voice patterns) especially as a means of verifying identity'.[20] For scientists from different disciplines (such as medicine, mathematics, statistics, or biometrics),[21] the term has more than two meanings. These multiple meanings have indeed created the need to harmonize the vocabulary used in the biometric field. In the field of data protection and privacy, the different European institutions and bodies that have assessed biometric issues have not always used the term 'biometrics' in a consistent way.

Ultimately, in conclusion of the section, the article will determine whether or not the term 'biometrics' should be used in a data protection and privacy context.

14   N Yue Liu, *Bio-Privacy, Privacy Regulations and the Challenge of Biometrics* (1st edn Routledge, Abingdon 2012), 276 p.

15   E Kindt, *Privacy and Data Protection Issues of Biometric Applications, a Comparative Legal Analysis* (Law, Governance, Technology Series, vol. 12, 1st edn Springer, Dordrecht 2013), 975 p.

16   Council of Europe, Consultative Committee of Convention 108, 'Progress Report on the Application of the Principles of Convention 108 to the Collection and Processing of Biometric Data' (2005) <http://www.coe.int/t/dghl/standardsetting/dataprotection/Reports/Biometrics_2005_en.pdf> accessed 20 July 2015.
      The report was updated in 2013 by an academic report, which has not been analysed in the article since it has not been issued nor endorsed by the Council of Europe or any of its bodies.

17   Parliamentary Assembly of the Council of Europe, Committee on Legal Affairs and Human Rights, 'The Need for a Global Consideration of the Human Rights Implications of Biometrics', Rapporteur H Haibach, Doc. 12 522, 16 February 2011 <http://assembly.coe.int/nw/xml/XRef/X2H-Xref-ViewPDF.asp?FileID=13103&lang=en> accessed 20 July 2015.
      Parliamentary Assembly of the Council of Europe, Recommendation 1960, 'The Need for a Global Consideration of the Human Rights Implications of Biometrics' (2011) <http://assembly.coe.int/nw/xml/XRef/X2H-Xref-

      ViewPDF.asp?FileID=17964&lang=en> accessed 20 July 2015.
      Parliamentary Assembly of the Council of Europe, Resolution 1797, 'The Need for a Global Consideration of the Human Rights Implications of Biometrics' (2011) <http://assembly.coe.int/nw/xml/XRef/X2H-Xref-ViewPDF.asp?FileID=17968&lang=en> accessed 20 July 2015.

18   Council of Europe, Bureau of the Consultative Committee of Convention 108 for the protection of Individuals with regard to automatic processing of personal data (ETS No. 108), 'Draft Explanatory Report of the Modernised Version of Convention 108' (based on the proposals adopted by the 29th Plenary meeting of the T-PD), Strasbourg, 25 March 2014, TP-PD- BUR (2013) 3ENrev5 http://www.coe.int/t/dghl/standardsetting/dataprotection/TPD_documents/T-PD-BUR(2013)3Rev5%20-%20Draft%20explanatory%20report.pdf> accessed 20 July 2015, the latest version available at the time of writing.

19   <http://www.merriam-webster.com/dictionary/biometry> accessed 20 July 2015.

20   <http://www.merriam-webster.com/dictionary/biometrics> accessed 20 July 2015.

21   S Stiegler, 'The Problematic Unity of Biometrics' (2000) 56 Biometrics 653, 658.

Table 1 Definition of 'biometrics' in the European data protection context

European bodies	Definitions of 'biometrics'
Article 29 Working Party	1. Mainly synonym of biometric data. (Working document on biometrics, Opinion 7/2004, Opinion 3/2012)
	2. Occasionally synonym of identification method or biometric technologies. (Opinion 3/2012)
EDPS	1. Synonym of biometric data. (EDPS's various Opinions)
	2. Methods for uniquely recognizing humans based on one or more intrinsic physical or behavioural traits. (EDPS's glossary of terms)
Consultative Committee of Convention 108	Systems that use measurable, physical, or physiological characteristics or personal behaviour traits to recognize the identity or verify the claimed identity of an individual. (Progress Report, 2005)
PACE	Same definition as the one contained in the 2005 Progress Report. (Haibach report, 2011)

Uses of the term 'biometrics' in the European data protection context

Neither of the two founding legal texts on data protection and privacy at the European level[22] mentions the term 'biometrics' or 'biometric data'. These two texts are the Council of Europe's Convention 108 (Convention 108)[23] and Directive 95/46/EC on data protection (Data Protection Directive).[24] However, different European bodies have addressed the issues of the impact of the use of biometric technologies on data protection and privacy principles. All the definitions mentioned in this section are recapped in Table 1.

'Biometrics' used as a synonym of 'biometric data'

At EU level, the first body to analyse the notion of 'biometrics' from a data protection perspective is the Article 29 Data Protection Working Party (Working Party or Article 29 WP).[25] Its work on biometric issues has had a major influence on other European bodies and, in particular, on the EDPS.

The first document published by the Article 29 Data Protection Working Party is a *working document on biometrics* in 2003,[26] followed in 2012 by Opinion 3/2012 on the *recent developments in biometric technologies*.[27] In the working document, the Working Party assessed whether and how the Data Protection Directive could apply to the processing of biometric data. The term 'biometrics' is used throughout the report without being expressly defined. But one understands that the word is constantly used as a synonym of 'biometric data'.[28] A textual analysis of Opinion 3/2012 reveals that the term 'biometrics' is also used as a synonym of 'biometric data',[29] however, not in a consistent way. In several paragraphs of the Opinion, the Working Party used the term 'biometrics' to also mean 'identification method'[30] and 'biometric technologies'.[31] But at no point did the Working Party specify using different meanings of the

22   Data protection and privacy as 'separate concepts'; see, for example, P Hustinx, 'European Leadership in Privacy and Data Protection' in A Rallo Lombarte and R Garcia Mahamut (eds), *Hacia un Nuevo Derecho Europeo de Protección de Datos, Towards a New European Data Protection Regime* (Tirant lo Blanch, Valencia 2015), 15, 25.

23   Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, Strasbourg, 28 January 1981 (ETS No. 108) <http://conventions.coe.int/Treaty/EN/Reports/HTML/108.htm> accessed 20 July 2015.

24   Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data, OJ EC L.281/31, Brussels, 24 October 1995.

25   The Working Party is an independent advisory body to the European Commission on data protection matters; for the composition and description of the Article 29 Working Party, see <http://ec.europa.eu/justice/data-protection/article-29/index_en.htm> accessed 20 July 2015.

26   Article 29 Data Protection Working Party, Working Document on biometrics, 12168/02/EN, WP 80, Brussels, 1 August 2003.

27   Opinion 3/2012, WP 193 (2012) (n 7).

28   Working Document on biometrics, WP 80 (2003) (n 26), see, for example, the following sentences as illustration: 'This kind of data [referring to biometrics] is of special nature' (p. 2); 'There are discussions concerning the incorporation of biometrics on ID cards, passports, travel documents and visa', p. 2, Footnote 2.

29   See, for example, Opinion 3/2012, WP 193 (2012) (n 7), the use of 'biometrics' in the following sentences: 'collecting different biometrics' (p. 6), 'to use biometrics of an employee', (p. 11) (. . .) 'biometrics must not be taken from somebody without his knowledge', (p. 14).

30   Opinion 3/2012, WP 193 (2012) (n 7), see, for example, the use of 'biometrics' in the following sentence: 'Biometrics are, in some cases, replacing or enhancing conventional identification methods', p. 16.

31   Opinion 3/2012, WP 193 (2012) (n 7), see, for example, the use of 'biometrics' in the following sentences: 'new trends on biometrics', p. 16, title of Section 4.2 of the Opinion that describes new biometric technologies; 'multi-modal biometrics (. . .) can be defined as the combination of different biometric technologies to enhance the accuracy or performance of the system', p. 6.

term. Besides these few paragraphs, the Working Party seems to have consistently and constantly used the term 'biometrics' as a synonym of 'biometric data'.[32] The notion of 'biometric data' has not been defined by the Working Party in its Opinions addressing biometric issues but in Opinion 4/2007 on the general *concept of personal data*.[33] This definition will be reviewed in the section 'Biometric data: a technical and a legal notion'.

In its own Opinions relating to biometric issues,[34] the EDPS has used the term 'biometrics' as a synonym of 'biometric data' and has referred to the definition elaborated by the Article 29 Data Protection Working Party in Opinion 4/2007.[35] However, as explained in the following sub-section, the glossary of the EDPS, available on its website, contains a definition of 'biometrics', which is not in line with the Working Party's definition.

Finally, it should be mentioned that the term 'biometrics' is not mentioned in the Data Protection Reform Package. The term appears, however, in the impact assessment document of the proposals, in which it is used as a synonym of 'biometric data'.[36] But no further detail on its meaning or origin is provided.

'Biometrics' used as a synonym of 'biometric technologies'

Several bodies belonging to the Council of Europe's level have used the term 'biometrics' as synonyms of 'biometric technologies' or 'biometric systems' in the specific context of personal data and in the broader context of human rights. In addition, the EDPS and to some extent the Article 29 Data Protection Working Party have also used the term 'biometrics' in that sense.

At the Council of Europe's level, the Consultative Committee of Convention 108, in charge of monitoring the implementation of the principles contained in the Convention, has been the first to define the term 'biometrics'. In a progress report *on the application of the principles of Convention 108 to the collection and processing of biometric data*,[37] it has defined the term as '(S)ystems that use measurable, physical or physiological characteristics or personal behaviour traits to recognize the identity or verify the claimed identity of an individual'.[38]

The PACE has reused the definition of the Consultative Committee when it tackled the issue of *the human rights implications of biometrics* in Resolution 1797 and Recommendation 1960.[39] But the preparatory report of these two instruments inaccurately mentions the glossary of the EDPS as the source of the definition instead of the progress report of the Consultative Committee.[40]

In its glossary of terms available on its website, the EDPS has indeed defined the term 'biometrics' not as 'biometric data' but as a method of recognition based on biometric characteristics (see Table 1 for the exact wording). This definition calls for several remarks. First of all, the glossary of terms is not legally binding.[41] It constitutes a compilation of definitions originating

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32   For example, Article 29 Data Protection Working Party, Opinion No. 7/2004 on the inclusion of biometric elements in the residence permits and visa taking account of the establishment of the European information system on visas (VIS), 11224/04/EN, WP 96, Brussels, 11 August 2004. Article 29 Data Protection Working Party, Opinion 3/2005 on implementing the Council Regulation (EC) No. 2252/2004 of 13 December 2004 on standards for security features and biometrics in passports and travelled documents issued by Member States, 1710/05/EN-rev, WP 112, Brussels, 30 September 2005.

33   Article 29 Data Protection Working Party, Opinion 4/2007 on the concept of personal data, 01248/07/EN, WP 136, Brussels, 20 June 2007.

34   See, for example, EDPS, 'Opinion on the Proposal for a Regulation of the European Parliament and of the Council concerning the Visa Information System (VIS) and the exchange of data between Member States on short stay-visas (COM (2004) 835 final)', Brussels, 23 March 2005, OJEU, C 181/13.
EDPS, 'Opinion on the Proposal for a Council Decision on the establishment, operation and use of the second generation Schengen information system (SIS II) (COM52005) 230 final); the Proposal for a Regulation of the European Parliament and of the Council on the establishment, operation and use of the second generation Schengen information system (SIS II) (COM(2005) 236 final) and the Proposal for a Regulation of the European Parliament and of the Council regarding access to the second generation Schengen Information System (SIS II) by the services in the Member States responsible for issuing vehicle registration certificates (COM (2005) 237 final)', Brussels, 19 October 2005, OJEU, C91/38.
EDPS, 'Opinion of the European Data Protection Supervisor on the modified proposal for a Council Regulation amending Regulation (EC) 1030/2002 laying down a uniform format for residence permits for third-country nationals', Brussels, 16 October 2006, OJEU, C 320/21.
EDPS, Opinion on 'the proposal for a Regulation of the European

Parliament and of the Council amending Council Regulation (EC) No 2252/2004 on standards for security features and biometrics in passports and travel documents issued by Member States', Brussels, 26 March 2008, OJEU, C 200/1.

35   See paragraph 18 of EDPS, Opinion on a research project funded by the European Union under the Seventh Framework Programme (FP7) for Research and Technology Development—Turbine (TrUsted Revocable Biometric IdeNtitiEs), Brussels, 1 February 2011.

36   See the following sentence: 'including biometrics amongst the sensitive data' (p. 115) in European Commission, 'Impact Assessment accompanying the document Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation) and Directive of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data by competent authorities for the purposes of prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and the free movement of such data', Brussels, 25 January 2012, SEC (2012) 72 final.

37   Progress Report (2005) (n 16).

38   Progress Report (2005) (n 16), paragraph 16.

39   Recommendation 1960 (2011) (n 17) and Resolution 1797 (2011) (n 17).

40   Haibach (2011) (n 17).

41   The Opinions of the EDPS are also not binding, but they constitute authoritative advice. See EDPS, 'The EDPS as an Advisor to EU Institutions on Policy and Legislations: Building on Ten Years of Experience, Policy Paper', Brussels, 6 June 2014 <https://secure.edps.europa.eu/EDPSWEB/webdav/site/mySite/shared/Documents/EDPS/Publications/Papers/PolicyP/14-06-04_PP_EDPSadvisor_EN.pdf> accessed 20 July 2015.

Table 2 Definitions of 'biometrics' by the scientific community

Scientific sources	Definitions of 'biometrics'
1999 Glossary of Biometric Terms	(Singular form): A measurable, physical characteristic or personal behavioural trait used to recognize the identity or verify the claim identity of an enrolee
Biometric Glossary	1. *Characteristic:* measurable biological or behavioural aspects of the person that can be used for automated recognition
	2. *Process:* automated methods of recognizing an individual based on measurable biological and behavioural characteristics
Report on Biometric Recognition	1. Synonym of biometry
	2. Automated recognition of individuals based on biological and behavioural characteristics
ISO/IEC 2382-37 Standard	1. As an adjective: of or having to do with biometrics
	2. As a noun (plural): automated recognition of individuals based on their biological and behavioural characteristics

from different EU institutions. The function of the glossary is to provide readers with a better understanding of data protection issues. Second, as specified on the website, most of the definitions link to their sources. In the case of the definition of 'biometrics', no source is indicated. Third, even if it does not have any legal value, it has been quoted (even if wrongly). This indicates that it has at least a value of reference.

Definitions of 'biometrics' by the scientific community

In science understood as a broad discipline, the term 'biometrics' has multiple meanings. According to the Encyclopedia of Biometrics, there are several explanations. Biometrics is a relatively new field. As a logical consequence, the literature in that area 'contain(s) a variety of definitions for any single biometric term, as well as a variety of terms for seemingly the same concept'.[42] Glossaries produced by several associations and national councils have added some confusion by proposing diverging definitions for the same term. To provide clarity to the biometric industry, the International Standards Organisation (ISO) together with the Electrotechnical Commission (IEC) has established a specific working group to harmonize the biometric vocabulary.[43] This has resulted in the publication, in December 2012, of the first version

of the ISO/IEC 2382-37 Standard on the harmonization of biometric vocabulary. Scientific definitions mentioned in this section can be found in Table 2.

Several scientific disciplines, several meanings

From an etymological point of view,[44] the term 'biometrics' refers to the words 'bio' and 'metrics', both deriving from ancient Greek. 'Bio' finds its origin in the Greek word βίος ('bios'), which means *life*. 'Metric' derives from the Greek word 'metrikos' or 'metron', which means *measurement*. From the etymology of the term, one could infer that 'biometrics' is the science that measures life attributes.[45] However, this definition is too simplistic and does not reflect the multifaceted nature of the term.

Glossaries of biometric terms, such as the 1999 Glossary of Biometric Terms of the Association for Biometrics (AfB) and of the International Computer Security Association (ICSA) or the Biometric Glossary of the US NSTC, show the diversity of situations in which the term might apply. In the 1999 Glossary of Biometric Terms, 'biometrics' is defined in its singular form as a measurable biometric characteristic, whereas in the Glossary of the NSTC, biometrics means both biometric characteristic[46] and biometric process.[47]

In another report written by a committee under the US National Research Council (the Whither Biometrics

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42 R McIver, 'Biometric Vocabulary Standardization' in SZ Li (ed.), *Encyclopedia of Biometrics* (1st edn, Springer, New York, 2009), 158.

43 A working group, Working Group 1, was established within the Subcommittee 37 (Subcommittee on Biometrics) of the Joint Committee 1 of the ISO/IEC, in charge of standardization in the field of biometrics. For further details, see <www.iso.org> accessed 20 July 2015.

44 See, for example, V Zorkadis and P Donos, 'On Biometrics-Based Authentication and Identification from a Privacy-Protection Perspective:

Deriving Privacy-Enhancing Requirements' (2004) 12 IMCS 125, 137. S Prabhakar, S Pankanti, and A Jain, 'Biometric Recognition: Security and Privacy Concerns' (2003) IEEE Security & Privacy, Issue March–April, 33, 42.

45 Ibid.

46 Biometrics Glossary (2006) (n 11), 4.

47 Ibid.

Committee),[48] the notion of 'biometrics' is deemed to cover two different fields. The first one has emerged at the beginning of the 20th century as the application of statistics to the field of biology. In that context, biometrics is a synonym of 'biometry'.[49] The discipline has then evolved into biostatistics to cover the application of statistical and mathematical methods to many other fields. These include among others medicine, agriculture, biology, biophysics, and genetics.[50] More recently, with the growing use of automated systems to identify individuals, a second meaning has appeared. Biometrics is defined in that context as 'the automated recognition of individuals based on biological and behavioural traits'.[51] According to the Whither Biometrics Committee, this second field dates back to the 1980s.[52] In the context of this article, the second meaning only is of interest.

In 2002, the Joint Committee (JTC1) of the ISO/IEC established a new Subcommittee, SC 37, on Biometrics. The goal of the Subcommittee is to develop standards for biometrics. Among the six working groups created to support the tasks of the Subcommittee, Working Group 1 (WG 1) is responsible for harmonizing the vocabulary used in the field of biometrics.[53] The International Standard ISO/IEC 2382-37 is the result of its work.

Towards an harmonized definition of the term 'biometrics' in ISO/IEC 2382-37

The International Standard provides a definition of 'biometrics' and clarifies in that context correct and incorrect usages of the term.

The term 'biometric(s)' is mentioned under three different entries: 'biometric' as an adjective,[54] 'biometrics' as a plural noun (defined under 'biometric recognition'),[55] and 'biometric' as a singular noun (defined under 'biometric characteristic').[56] According to the International Standard, 'biometric' should either be used in its adjective or plural form. But it should not be used as a singular noun.[57]

As an adjective, the term means 'of or having to do with biometrics'.[58] Biometrics, as a plural noun, is described as the 'automated recognition of individuals based on their biological and behavioural characteristics'.[59] According to the Standard, recognition covers the two functions of a biometric system, ie the verification of identity and the identification of an individual.[60] The adjective 'automated' refers to a machine based system (...) either for the full process or assisted by a human being'.[61] Finally, the Standard acknowledges the existence of biostatistics since it clarifies that 'the general meaning of biometrics encompasses counting, measuring and statistical analysis of any kind of data in the biological sciences including the relevant medical sciences'.[62]

It should be noted that even if ISO/IEC Standards do not have a binding effect—unless imposed by law at national level—they are likely to be followed by governments and industries.[63] In the case of the International Standard ISO/IEC 2382-37, the Italian Data Protection Authority ('the Garante') has already acknowledged the authority of the Standard in its Guidelines on Biometric Recognition and Graphometric Signature. In that document, the Garante 'considers it necessary to use the definitions to be found in ISO/EC 2382-37 (...) in order to rely on the harmonized wording in a highly technical context'.[64]

As a consequence and in accordance with the International Standard ISO/IEC 2387-32, 'biometrics' as a noun should only be used to mean 'automated recognition'. Any other uses, and in particular as a synonym of 'biometric characteristic', should be excluded. The two glossaries mentioned above therefore contain definitions that do not comply with the International Standard.[65]

To conclude this section, on the scientific side, the existence of several definitions for the term 'biometrics' reflects not only the existence of different disciplines but also different understandings about the function of

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48   Composed of members from the industry and academia from different disciplines, the Whither Biometrics Committee was appointed to write a report on biometric recognition.

49   F Galton, 'Biometry' (1901) 1 Biometrika 7, 10.

50   CL Chiang and M Zelen, 'What Is Biostatistics?' (1985) 14 Biometrics 771, 775.
      Biometric Recognition (2010) (n 12), 16 and 17.

51   For example, A Jain, 'Biometric Authentication' (2008) 3 Scholarpedia 3716.

52   Whither Biometrics Committee (2010) (n 12), 16–18.

53   For further details on the history of ISO/IEC JTC1, see <https://jtc1history.wordpress.com/sc-37-r2013/> accessed 20 July 2015.

54   ISO/IEC 2382-37, term 31.01.01.

55   ISO/IEC 2382-37, term 31.01.03.

56   ISO/IEC 2382-37, term 31.01.02.

57   ISO/IEC 2382-37, term 37.01.01, the use of 'biometric' as a synonym of 'biometric characteristic' is deprecated. As a wrong use of the term, the

Standard gives the following example: 'the biometric recorded in my passport is a facial image.'

58   ISO/IEC 2382-37, term 37.01.01.

59   ISO/IEC 2382-37, term 37.01.03.

60   ISO/IEC 2382-37, term 37.01.03, Note 3.

61   ISO/IEC 2382-37, term 37.01.03, Note 4.

62   ISO/IEC 2382-37, term 37.01.03, Note 1.

63   <www.iso.org> accessed 20 July 2015.

64   Garante (n 10), 3.

65   Here, it should be noted that the Biometrics Glossary of the US National Science and Technology Council should have been adjusted to the International ISO/IEC Standard as it provided in its introduction that 'the subcommittee (in charge of the Glossary) w(ould) review th(e) Glossary for consistency as standards (ie the ones by ISO/IEC) are passed'; Biometrics Glossary (n 11), 1.

biometric technologies. However, with the adoption of the International Standard ISO/IEC 2382-37, the term should only be used to mean the 'automated recognition of individuals based on their biological and behavioural characteristics'.

On the legal side, the multiple definitions of the term create confusion and fuzziness. It is true that the Article 29 Data Protection Working Party has (almost) always used the term 'biometrics' as a synonym of 'biometric data'. Yet, there are a few exceptions in its Opinions that create confusion.[66] As for the EDPS, the European body seems to follow the analysis made by the Article 29 Working Party in its own Opinions. But this is partially true as its glossary of terms contains a different definition for the term 'biometrics'. Finally, bodies related to the Council of Europe define 'biometrics' in a way closer to the scientific definition of the term. As a result to avoid any confusion, when the term 'biometrics' is used in a data protection and privacy context, the term should exclusively refer to the definition contained in the International Standard, ie it should mean 'automated recognition'. In other cases, the term should not be used. Some authors have even argued that the term 'biometrics' should not be used at all because of the confusion that its historical and traditional meanings can create. Instead, the term should be exclusively replaced by the expression 'biometric recognition'.[67]

After having clarified the meaning of 'biometrics' and the conditions under which the term should be used in a data protection and privacy context, the article investigates the meanings of 'biometric data' for the biometric and European data protection communities.

Biometric data: a technical and a legal notion

The second section of the article explores how the term 'biometric data' has been defined and conceived from a scientific perspective and a data protection and privacy perspective. It will also assess whether the legal definition of the term should reflect the technical processing of an individual's data and if so, which technical criteria are missing in the legal definition(s) of the term.

Defining the notion of 'biometric data' is essential to determine the regime of data protection and privacy that can apply to this type of (personal) data.

Notion defined by the biometric community

In the different scientific sources,[68] the term 'biometric data' relates to or is defined as a 'biometric sample' or 'aggregation of biometric samples'. The Biometric Glossary elaborated by the US NSTC provides a broader definition as it considers 'biometric data' as 'a catch-all phrase for computer data created during a biometric process. It encompasses raw sensor observations, biometric samples, models, templates and/or similarity scores (...)'.[69] All relevant definitions are recapped in Table 3.

The different scientific definitions (glossaries, encyclopaedia) are linked to the technical transformation of the biometric characteristics into templates. The definition contained in the ISO/IEC 2382-37 refers in particular to the different phases of a biometric system.[70] Biometric data are therein described as 'biometric sample or aggregation of biometric samples at any stage of processing, e.g. biometric reference, biometric probe, biometric feature or biometric property'.

The ISO/IEC Standard therefore considers the following as biometric data: (a) the capture of the data ('biometric sample'),[71] (b) the extraction of the data contained in the sample ('biometric feature'),[72] (c) the attribution of stored biometric samples to a specific individual for comparison use ('biometric reference'),[73] and (d) the comparison ('biometric probe').[74]

The description of 'biometric data' in the International Standard leads to several remarks. First of all, the Standard does not provide much detail on the definition itself except that it expressly specifies that the notion 'needs not to be attributable to a specific individual'.[75] This is precisely this non-criterion that distinguishes the notion of 'biometric data' in a data protection context from the notion in the scientific context. That link between an individual and his or her biometric characteristics is at the heart of the data protection framework. It allows the iden-

66   See Opinion 3/2012, WP 193 (2012) (n 7) and examples provided in n 30 and 31 of this article.

67   A Jain, A Ross, and K Nandakumar, *Introduction to Biometrics* (1st edn, Springer, New York, Dordrecht, Heidelberg, London, 2011), 2.

68   'Biometric Data' in SZ Li (ed.), *Encyclopedia of Biometrics* (1st edn, Springer, New York, 2009), 81.
     ISO/IEC 2383-37, term 37.03.06.
     Glossary of Biometric Terms (1999) (n 11).

69   Biometrics Glossary (2006) (n 11), 5.

70   These phases are usually the enrolment, storage, acquisition, and matching of the data.

71   'ISO/IEC 2382-37, term 37.03.21; defined as "analog or digital representation of biometric characteristics prior to biometric feature "extraction"'.

72   ISO/IEC 2382-37, term 37.03.11; defined as 'numbers or labels extracted from biometric samples and used for comparison'.

73   ISO/IEC 2382-37, term 37.03.16; defined as 'one or more stored biometric samples, biometric templates or biometric models attributed to a biometric data subject and used as the object of biometric comparison'.

74   ISO/IEC 2382-37, term 37.03.14; defined as 'biometric sample of biometric feature set input to an algorithm for use as the subject of biometric comparison to a biometric reference'.

75   ISO/IEC 2382-37, term 37.03.06.

Table 3 Notion of 'biometric data' as defined by the biometric community

Scientific sources	Definitions of 'biometric data'
1999 Glossary of Biometric Terms	Information extracted from the biometric sample and used either to build a reference template (template data) or to compare against a previously created reference template (comparison data).
The Biometric Glossary	A catchall phrase for computer data created during a biometric process. It encompasses raw sensor observations, biometric samples, models, templates, and/or similarity scores. Biometric data are used to describe the information collected during an enrolment, verification, or identification process, but they does not apply to end-user information such as user name, demographic information, and authorizations.
Encyclopedia of Biometrics	Any data record containing a biometric sample of any modality (or multiple modalities), whether that data have been processed or not. Biometric data may be formatted (encoded) in accordance with a standard or may be vendor specific (proprietary) and may or may not be encapsulated with the metadata.
ISO/IEC 2382-37 Standard	Biometric sample or aggregation of biometric sample at any stage of processing, eg biometric reference, biometric probe, biometric feature, or biometric property.

tification of individuals. The identification, or better said the identifiability,[76] of an individual is fundamental to the notion of 'biometric data' in a personal data context.[77]

Second, as defined in the Standard, the terms 'biometric features' and 'biometric characteristics' are absolutely not synonymous. 'Biometric feature' corresponds to 'numbers or labels extracted from biometric samples and used for comparison'[78] and is thus limited to the information extracted from the biometric sample. 'Biometric characteristic' exists independently of the technical process of information extraction. The term is defined as 'biological and behavioural characteristics of an individual from which distinguishing, repeatable biometric features can be extracted for the purpose of biometric recognition'.[79] Examples of biometric characteristics are finger topography, finger ridge patterns, and retinal patterns.[80]

Notion defined by the Legal Community in the Data Protection and Privacy Context

Not surprisingly Convention 108 and the Data Protection Directive do not mention the term 'biometric data'. At the time of their respective adoption (1980 and 1995), the topic of 'biometric data' and the application of data protection rules to biometric technologies were not widely discussed. One of the first documents to address biometric

issues is the *working document on biometrics* released in 2003 by the Article 29 Data Protection Working Party.[81] But it is not until 2007 that the Working Party defines the term 'biometric data' in its generic Opinion on the concept of personal data, Opinion 4/2007.[82] That definition has been referred by the EDPS, in particular in its Opinion on the Turbine project.[83] In 2012, the European Commission proposed to add a definition of 'biometric data' in the future regulatory framework of data protection.[84] Both the EP and the Council of the EU have amended the proposed definition during their respective vote and political agreement on the proposal of the GDPR.[85] In parallel, at the level of the Council of Europe, the Consultative Committee of Convention 108 has taken a different stance. In the latest draft explanatory report of the modernization of Convention 108, the Consultative Committee has defined the term by reference to the technical process of extraction of biometric information.[86]

The exact wording of the different definitions proposed by the European bodies and institutions can be found in Table 4. Instead of presenting each of them in a chronological or linear order, common criteria have been extracted and their relevance assessed. The following three criteria are discussed below: (1) the qualification of 'biometric data' as personal data, (2) their link to biometric characteristics, and (3) their characteristic of

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76   The identifiability is the ability to identify an individual from his or her data.
77   Opinion 4/2007, WP 136 (n 33).
78   ISO/IEC 2382-37, term 37.03.11.
79   ISO/IEC 2382-37, term 37.01.02.
80   ISO/IEC 2382-37, examples under term 37.01.02.
81   Working document on biometrics WP 80 (2003) (n 26).

82   Opinion 4/2007, WP 136 (n 33).
83   Opinion on the Turbine Project (2011) (n 35).
84   Data Protection Reform Package (n 1).
85   European Parliament, legislative resolutions on the data protection reform package (2014) (n 4). Council of the EU, political agreement (n 5).
86   Council of Europe, Consultative Committee, Draft Explanatory Report (2013) (n 18).

'uniqueness'. In addition, at the end of the section, the article explores whether one or several criteria, extracted from the technical definition of the term, should be added to the legal definition of the term.

Qualification as personal data

Among the different legal definitions reviewed, only the one amended by the EP and the Council of the EU explicitly links biometric data to the notion of 'personal data'. In the original proposals of the Data Protection Reform Package, the European Commission has broadly defined 'biometric data' as 'any data relating to (biometric) characteristics' (underline added).[87] During the numerous discussions on the many EP's amendments to the European Commission's proposals, the adjective 'personal' was added to the definition for a 'linguistic clarification'.[88] This is the unique justification that can be found in the written reports of the parliamentary amendments. In the impact assessment accompanying both proposals of the Data Protection Reform Package, the European Commission has implicitly recognized 'biometric data' as a category of 'personal data'. It states that one of the possible legislative options to revise the data protection framework could be to add, among others, 'biometric data' to the category of sensitive data.[89] Yet, sensitive data are a specific category of personal data.[90]

Without labelling 'biometric data' of 'personal data', other institutions have, however, acknowledged the nature of 'biometric data'. This is the case of the Article 29 Data Protection Working Party, which has stated that 'biometric data are in most cases personal data'.[91] The EDPS has also reproduced the argument of the Working Party in its own Opinions.[92]

At the level of the Council of Europe, the different bodies involved in biometric issues have made thorough analysis and claimed for a need to clarify the definition and the type of legislations covering these data.[93] Finally, it should be mentioned that the Consultative Committee of Convention 108 has refused to take position on the issue in its Progress Report of 2005, quoting arguments pro and con the qualification of 'biometric data' as 'personal data'.[94] Yet, the Consultative Committee has concluded that 'as soon as biometric data are collected with a view to automatic processing there is the possibility that these data can be related to an identified or identifiable individual'[95] and thus be personal data.

What does it mean to classify biometric data as personal data? To understand it, a cross reference to the definition of personal data is necessary. In the resolutions adopted by the EP and the political agreement of the Council on the General Data Protection Directive, personal data are defined as 'any information relating to an identified or identifiable person (. . .) (underline added); an identifiable person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, unique identifier or to one or more factors specific to physical, physiological, genetic, mental, economic, cultural or social or gender identity of that person'.[96] This definition of personal data is very similar to the definition contained in current Article 2(a) of the Data Protection Directive.[97] Classifying biometric data among personal data therefore means that biometric data have the ability to identify individuals.

The definition proposed by the European Commission and amended by the EP and the Council does not reflect the position of the Article 29 Data Protection Working Party on the specificities of 'biometric data'. In its Opinion on *the concept of personal data*, the Working Party has characterized 'biometric data' as both 'content of information' about an individual and 'a link between one piece of information and the individual'.[98] The Working Party has also introduced a flimsy distinction between 'biometric data' and the source from which they are extracted. According to the Working Party, the sources themselves—such as human tissues—should not be considered as 'biometric data' and should not be subject to data protection rules.[99] As observed by some authors, this distinction is, however, very questionable

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87   See, respectively, original Article 4(11) of the proposed General Data Protection Regulation and original Article 3(11) of the proposed Directive on law enforcement (n 2 and 3).

88   See JP Albrecht (rapporteur), Draft report on 'the proposal for a regulation of the European Parliament and of the Council on the protection of individual with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation)', PE 506.145v01-00, amendment 778 proposed by Alexander Alvaro, p. 101. <http://www.europarl.europa.eu/sides/getDoc. do?pubRef=-//EP//NONSGML+COMPARL+PE-506. 145+01+DOC+PDF+V0//EN&language=EN> accessed 20 July 2015.

89   SEC (2012) 72 final (n 36), 52 and 56.

90   Article 8, paragraph 1 of Directive 95/46 EC.

91   See Opinion 3/2012, WP 193 (2012) (n 7), p. 3, making reference to its Working Document on biometrics.

92   See, for example, Opinion on the Turbine project (2011) (n 35).

93   See, for example, Haibach Report (2011) (n 17), paragraph 64.

94   Progress Report (2005) (n 16), paragraph 50.

95   Progress Report (2005) (n 16), paragraph 51.

96   See, respectively, amended Article 4(2) of the proposed General Data Protection Regulation (n 4) and amended Article 4(2) of the proposed General Data Protection Regulation as agreed by the Council in June 2015 (n 6).

97   Current Article 2(a) of Directive 95/46/EC reads as follows: '"personal data" shall mean any information relating to an identified or identifiable natural person ("data subject"); an identifiable person is one who can be identified, directly or indirectly, in particular by reference to an identification number or to one or more factors specific to his physical, physiological, mental, economic, cultural or social identity.'

98   Opinion 4/2007, WP 136 (n 33), 8.

99   Opinion 4/2007, WP 136 (n 33), 9.

since it does not take into account progress of biometric technologies that might allow in the future the direct extraction of identifying elements from the human tissues themselves.[100] But as said, neither the European Commission nor the EP has followed this position.

Regarding the format under which biometric data are available (ie raw data, captured image, or biometric template), none of the definitions under review make a reference to it. In its Opinion 4/2007 *on the concept of personal data*, the Article 29 Data Protection Working Party has considered that any format on which personal data are stored or contained is relevant.[101] Concerning more specifically biometric data, the Working Party seems to have introduced in its *working document on biometrics* a distinction between biometric information in a raw form and biometric information captured on a template. While raw biometric information would qualify as personal data, information contained in a biometric template would be considered as personal data unless 'no reasonable means c(ould) be used to identify the data subject'.[102] The Working Party has added the condition in a footnote without providing further explanation on its meaning or on the criterion of 'reasonable means'.[103]

In the end, whether or not biometric templates are personal data is not very relevant to the definition of biometric data. It is more relevant for the assessment of the legal regime of protection applicable to them. But this issue is not covered in the current article. In addition, the definition of biometric data should not contain any reference to the existing formats. First of all, referring to specific formats in the definition will limit the application of the data protection rules to these formats. Second, no one can forecast the state of science in a couple of years. Formats that are currently unknown will be used in the future.

From biometric characteristics to 'data relating to' biometric characteristics

Through the different reports, opinions, and legislative proposals, the term 'biometric data' has been described as either 'biometric characteristic' or 'data relating to biometric characteristic'.

Definitions of the Article 29 Data Protection Working Party,[104] the EDPS[105]—by reference to the Working Party's works, and the PACE[106] are all focussed on biometric characteristics. Examples of these data are constituted by 'fingerprints, retinal patterns, facial structure, voices, but also hand geometry, vein patterns or even some deeply ingrained skills or other behavioural characteristic (such as handwritten signature, keystrokes, particular way to walk or to speak)'.[107] These 'typical' examples provided by the Working Party contrast with the list of examples provided in the Haibach report. The report contains examples of representations (such as images, pictures, or recording) of biometric characteristics and not examples of biometric characteristics themselves.[108] One could argue that biometric data, as understood and illustrated in the Haibach report, are 'data' about biometric characteristics and not biometric characteristics themselves.

The European Commission, the EP and the Council in their respective vote and agreement on the GDPR, and the Council of Europe have all understood 'biometric data' as '[personal] data relating to' biometric characteristics. The use of the preposition 'relating to' raises some issues as to the scope of the definitions: Do biometric characteristics also fall within the scope of the definition? Or should only data <u>about</u> biometric characteristics (such as images, recording, or algorithms of biometric characteristics) fall within that scope? The answer to the questions is not easy as none of the preparatory documents of the European Commission, the EP, or the Consultative Committee in charge of revising Convention 108 provide clarity on these issues.[109] The only hint that the European Commission provides is contained in the definition of 'biometric data'. In the proposals of the Data Protection Reform Package, the European Commission illustrates the definition of 'biometric data' with the examples of 'facial images and dactyloscopic data'.[110] Dactyloscopic data have been elsewhere defined as 'fingerprint images, images of fingerprint latents, palm prints, palm print latents and templates of such images'.[111] The examples only relate to representations of biometric characteristics. As a consequence, only

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100 For further reading, see criticism in Kindt (2013) (n 15), 107, Footnote 71.

101 Opinion 4/2007, WP 136 (n 33), 7.

102 Working Document on Biometrics, WP 80 (2003) (n 26), see Footnote 11 of the document.

103 For further reading, see analysis made in Kindt (2013) (n 15), pp. 111–114.

104 Opinion 4/2007, WP 136 (n 33), 8.

105 See, for example, Opinion on Turbine (2011) (n 35).

106 Haibach Report (2011) (n 17).

107 Opinion 4/2007, WP 136 (n 33), 8.

108 Haibach Report (2011) (n 17), p. 6, paragraph 5: 'fingerprint images, pictures of the iris or the retina, but also voice recording, individual gait or typing rhythm during logon'.

109 See, for example, SEC (2012) 72 final (n 36).
    Council of Europe, Consultative Committee, Draft explanatory report (2013) (n 18).

110 Respectively, Article 4(11) of the proposed General Data Protection Regulation and Article 3(11) of the proposed Directive on law enforcement (n 2 and 3).

111 Council Decision 2008/616/JHA 'on the implementation of Decision 2008/615/JHA on the stepping up of cross-border cooperation,

those representations and not the biometric characteristics themselves would logically fall within the scope of biometric data and thus personal data. In the end, it is not the fingerprint itself—defined as 'the unique pattern that exist on the underside of every human finger—but the image of that fingerprint (also called 'fingerprinting' or 'finger scanning')[112] that matters from a personal data perspective.

Uniqueness

The legal definitions under review refer to the 'uniqueness' of biometric characteristics. Before explaining its meaning from a scientific point of view, one should note that the different European bodies and institutions have merely stated that biometric characteristics are unique or that they can be used for 'unique identification'. But none of them have explained or demonstrated it. They have all referred to it as an established fact.

In the biometric literature, it is commonly accepted and asserted that biometric characteristics are unique.[113] And because they are unique, they can be used for human recognition, ie to authenticate individuals or identify them. However, many forensic scholars have criticized this assumption.[114] According to them, it has never been demonstrated, for example, that fingerprints are unique. This assumption might even be 'unprovable'.[115] Nancy Yue Lui, a legal scholar, takes a different stance in the debate. According to her, if the assumption following which biometric characteristics are 'unique' has never been proven, 'there is not yet any solid proof that this assumption is incorrect either'.[116] She, therefore, considers that the 'uniqueness' of biometric data is relative. Forensic scholars on their side believe that the issue for identification is not so much whether biometric characteristics are unique but whether they originate from the same source.

In the Data Protection Reform Package as well in the latest version of the draft explanatory report of revision of Convention 108, the emphasis is not put on the uniqueness of biometric characteristics but on their function. Biometric characteristics are therein defined as 'allow[ing]

the unique identification of [an individual]'.[117] Previously mentioned in the works of the Article 29 Data Protection Working Party,[118] this function has not been further explained. It has been considered by some that biometric data, due to their uniqueness, could be used as 'unique identifiers' and could link all information about an individual.[119] The author of the article considers the expression 'unique identification' unfortunate. It might convey the wrong impression about the functions of biometric data by reducing their role to the identification of individuals (ie the establishment of their identity). Besides identification, biometric data are also largely used to authenticate individuals (ie verify their identity).[120]

As a consequence, and because the 'uniqueness' of biometric characteristics is not established, the legal definition of 'biometric data' should not refer to this criterion. In addition, if the assumption were true, why would the legal definition only refer to that criterion? There are at least seven other criteria used to assess whether biometric characteristics are fit for human recognition.[121] 'Uniqueness' is only one of them.

From the analysis of the three common criteria, it can be concluded the importance of identifying biometric data as personal data and limiting the scope of their definition to the 'data relating' to biometric characteristics. For the reasons explained above, the third criterion relating to the questionable 'uniqueness' of biometric characteristics should not be part of the definition. After having assessed the criteria contained in the different legal definitions, the question becomes whether criteria extracted from the scientific definition should be used in the legal definition.

Link to the biometric processing of the data, missing criterion?

As shown in Table 4, most of the proposed regulatory definitions for the term 'biometric data' do not mention the technical process of extraction of biometric information and its transformation into a digital template. Only the definitions proposed by the Consultative

particularly in combating terrorism and cross-border crime', 23 June 2008, OJEU L 210/12, see Article 2 (i).

112   See Yue Liu (2012) (n 14), 39.

113   See among others, Li (2009), n 13 above.

114   For example, M Page, J Taylor, and M Blenkin, 'Uniqueness in the Forensic Identification Sciences: Fact of Fiction?' (2011) 206 Forensic Sci Int 12, 18.
D Kaye, 'Questioning a Courtroom Proof of the Uniqueness of Fingerprints' (2003) 71 Int Stat Rev 521, 533.
M Saks, 'Forensic Identification: From a Faith-Based "Science" to a Scientific Science' (2010) 201 Forensic Sci Int 14, 17.

115   S Cole, 'Is Fingerprint Identification Valid? Rhetorics of Reliability in Fingerprint Proponents?' (2006) 28 Law & Pol 109, 135.

116   Yue Liu (2013) (n 14), p. 67.

117   See Article 4(11) of the proposed General Data Protection Regulation and Article 3(11) of the proposed Directive on law enforcement (n 2 and 3).

Council of Europe, Consultative Committee, Draft explanatory report (2013) (n 18), see paragraph 56, p. 13.

118   Working document on biometrics, WP 80 (2003) (n 26).
Opinion 4/2007, WP (n 33).

119   Working document on biometrics, WP 80 (2003) (n 26).
Data Protection and Privacy Commissioners, 'Resolution on the Use of Biometrics in Passports, Identity Cards and Travel Documents', 27th Conference, Montreux, 16 September 2005 <http://www.cnpd.pt/bin/actividade/Outros/biometrie_resolution_e.pdf> accessed 20 July 2015.

120   JL Wayman, 'Biometric Verification/Identification/Authentication/ Recognition: The Terminology' in SZ Li (ed.), *Encyclopedia of Biometrics* (1st edn, Springer, New York, 2009), 153, 157.

121   A Jain, A Ross, and K Nandakumar (2011) (n 67), see universality, uniqueness, permanence, measurability, performance, acceptability, and circumvention, pp. 29 and 30.

Table 4 Notion of 'biometric data' as defined by the legal community in the data protection and privacy context

European bodies/institutions	Definitions of 'biometric data'
Article 29 Working Party and EDPS	Biological properties, physiological characteristics, living traits, or repeatable actions where those features and/or actions are both unique to that individual and measurable, even if the patterns used in practice to technically measure them involve a certain degree of probability. (Opinion 4/2007)Definition quoted by the EDPS in Opinion on the Turbine project (2011)
PACE	Unique physical or behavioural characteristics that differ from one human being to another and that remain, in most cases, unaltered for life. (Haibach report, 2011)
Consultative Committee of Convention 108	Data resulting from a specific technical processing of data concerning the physical, biological, or physiological characteristics of an individual that allow the unique identification of the latter. (Draft explanatory report of the modernized version of Convention 108, 10 July 2013)
European Commission and EP	*Any personal* data relating to the physical, physiological, or behavioural characteristics of an individual that allow their unique identification, such as facial images or dactyloscopic data. (Text added by the EP indicated in bold italic.)(Article 4(11) of the proposed GDPR and Article 3(11) of the proposed Directive on data protection and law enforcement, 2012)(Resolutions of 12 March 2014 on two proposals of the European Commission)
European Commission and Council of the EU	*Any personal* data *resulting from specific technical processing* relating to the physical, physiological, or behavioural characteristics of an individual that *allow or confirm the* unique identification of *that* individual, such as facial images or dactyloscopic data. (Text added by the Council indicated in bold italic)(Article 4(11) of the proposed GDPR)(Political Agreement of 15 June 2015 on the GDPR)

Committee of Convention 108 and by the Council of EU in its political agreement refer to the 'specific technical processing' of biometric data. However, none of them refer to the automatic process that allows the identification of individuals or the verification of their identity.

Some authors consider that the proposed legal definitions fail to take into account, in particular, the use of 'automated means' to process biometric data and the purposes of biometric characteristics. Based on these two missing elements, Els Kindt has proposed the following new legal definition to the term 'biometric data': 'all personal data which (a) relate directly or indirectly to unique or distinctive biological or behavioural characteristics of human beings and (b) are used or fit to be used by automated means (c) for purposes of identification, identity verification or verification of a claim of a living natural person'.[122]

Her definition calls for several comments. First of all, should the definition of biometric data specify that biometric data are processed by automated means? This

seems at least not necessary in the context of the revision of Convention 108 as the Convention only applies to automatic processing of personal data.[123] This precision is, however, debatable in the context of the current Data Protection Directive as the text applies to both automatic processing and paper-based processing of data.[124] The advantage of referring to 'automated means' is to avoid ambiguity while allowing future technological developments. The term is indeed technologically neutral.[125] Second, should the purpose(s) of biometric characteristics be spelled out in the legal definition of biometric data? The way Els Kindt describes the purposes of biometric characteristics is more accurate than in the proposals of definitions contained in the Data Protection Reform Package and in the Draft explanatory report of revision of Convention 108. The proposed definitions are limited to the purpose of 'identification'. But should the definition be specific about the purposes and describe them? By doing so, there is a risk that future way of recognizing individuals might not be taken into account. Instead, the regulatory definition(s) should refer to the generic term of

122 Kindt (2013) (n 15), p. 149.
123 Article 3, scope, Convention 108.
124 Article 3, scope, Directive 95/46/EC.

125 J Terstegge, '"Article 3" Directive 95/46/EC' in A Büllesbach, S Gijrath, Y Poullet, and C Prins, *Concise of European IT Law* (Kluwer Law International, Alphen aan den Rijn, 2010), 42, 43.

'recognition', which is meant to cover both identification and verification of individuals.[126] Adding the purposes of biometric data would accurately reflect their current uses by the different communities (ie scientific, law enforcement, or forensic ones).

Finally, it is legitimate to question whether the formats of biometric data (raw data, sample, template) should be added to the definition. By doing so, there is a risk to limit biometric data to the currently existing formats. As any reference to the formats should instead remain technology neutral, the regulatory definitions should at the best refer to the expression "biometric data, whatever their form".

The definition of 'biometric data' proposed by the European Commission and amended by the EP and the Council of the EU does not refer to the technical process of extraction of information and its transformation into a biometric template. Neither does it refer to the automatic processing that allows the identification nor verification of identity. These technical aspects are completely absent from the proposed legal definition. However, for the reasons explained above, the legal definition of 'biometric data' should remain technologically neutral and not mention any format or the technical processing of data. Finally, it should be noted that in the absence of adoption of the Data Protection Reform Package,[127] the legal definition that prevails for the time being at the EU level is the one provided by the Article 29 Working Party. At the level of the Council of Europe, no definition prevails in the absence of authoritative sources.

Conclusions

This article has approached two notions regularly used in the European data protection field when addressing issues linked to biometric technologies: the terms 'biometrics' and 'biometric data'. Although often used as synonyms by several European bodies and institutions, the two terms have different meanings. To clarify their respective meanings, this article has explored their definitions from a data protection perspective and compared them with the definitions provided by the biometric community. From

this comparison and analysis, it results that most of the European bodies and institutions use the term 'biometrics' in a very confusing way: as a synonym of 'biometric data' but also as a synonym of biometric technologies. However, it appears that the term 'biometrics' has mainly a technical meaning. As a consequence, when used in a data protection context, the term should refer to its technical meaning as set by the biometric community. The text of reference is the current version of the International Standard ISO/IEC 2382-37. In that document, 'biometrics' refers to the automatic recognition of individuals.

The second term, 'biometric data' is more complex as it covers two different realities. From the perspective of the biometric community, it covers the technical process through which the biometric information is captured and transformed into a digital format. From the perspective of the data protection and privacy community, the term is approached as a type of personal data relating to biometric characteristics and linked to the identification or identifiability of an individual. The link to an individual is where the scientific and the legal definitions differ. Fundamental in a data protection and privacy context, that link becomes meaningless in the context of the International Standard. However, the legal definition proposed by the European institutions for the term 'biometric data' appears to be incomplete: it does not take into account the technical processing of biometric data. But should not the legal and the technical definitions remain distinct as they relate to two different contexts? If not, to which extent should the scientific definition be reflected in the legal definition? Although the article has not explored the question, it would be logical to also wonder whether the legal definition should be reflected in the scientific definition. This would open up another way of approaching the notion of 'biometric data' and possibly the relationship between the biometric field and the European data protection field.

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126 ISO/IEC 2382-37, term 37.01.03, entry 'biometric recognition', Note 3.

127 The negotiations are currently at the level of the Council.