

Northumbria Research Link

Citation: Wilson, Tim (2016) Criminal justice and global public goods: The Prüm Forensic Biometric Cooperation. *The Journal of Criminal Law*, 80 (5). pp. 303-326. ISSN 0022-0183

Published by: SAGE

URL: <http://dx.doi.org/10.1177/0022018316668450> <<http://dx.doi.org/10.1177/0022018316668450>>

This version was downloaded from Northumbria Research Link: <http://nrl.northumbria.ac.uk/27800/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)



**Northumbria
University**
NEWCASTLE



University**Library**

CRIMINAL JUSTICE AND GLOBAL PUBLIC GOODS: THE PRÜM FORENSIC BIOMETRIC COOPERATION MODEL

Tim J Wilson

Professor of Criminal Justice Policy, School of Law, Northumbria University, Newcastle UK

[As unnumbered footnote

Corresponding author:

Tim J Wilson, School of Law, Northumbria University, Northumbria University, Newcastle City Campus, 2 Ellison Pl, Newcastle upon Tyne NE1 8ST, UK.

E-mail: tim.wilson@northumbria.ac.uk.]

Abstract

This article places sharing forensic biometric data for international criminal justice cooperation purposes within the domain of global public goods. Such cooperation is a rational response to globalization, but faces several obstacles. These range from socio-cultural and political concerns about national legal and criminal justice autonomy to the potential impact of market fundamentalism on scientific standardization and cooperation mechanism delivery. The significance of such inhibitors will vary as societal and personal perceptions of stability change. These issues are examined by analysing the progress achieved with the EU Prüm forensic biometric data exchange model. Shocks to European stability, such as the increased scale of terrorist crimes and the UK EU referendum result will inevitably test the resilience of Prüm. Combining insights from global public goods and criminal law scholarship, however, may help to identify how reactions to such shocks, including questions about future UK participation in Prüm, might be managed.

Keywords

International criminal justice cooperation; global public goods; forensic science standardization; market fundamentalism/neoliberalism; Brexit

Introduction

This article responds to the publication of *Forensic Science and Beyond: Authenticity, Provenance and Assurance* (hereinafter Walport) by addressing the three policy objectives falling within the Chief Scientific Adviser's remit, namely: (a) identifying how significant emerging technology might be exploited either directly or indirectly in the national interest, (b) providing evidence to support policy making and (c) improving national resilience and security.¹

¹ M. Walport, *Annual Report of the Government Chief Scientific Adviser 2015: Forensic Science and Beyond: Authenticity, Provenance and Assurance* vol. 1 (Government Office for Science: London 2015) 4. Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/506461/gs-15-37a-forensic-science-beyond-report.pdf (accessed 14 July 2016).

Following an earlier chapter commissioned for Walport, it invests them with an international dimension, but differs from its precursor in three respects.² Firstly, it focuses exclusively on one scientific or technological development: the automated exchange of forensic bioinformation (DNA and finger/palmprints) data. Secondly, following the UK Refendum, consideration will be given to how this might affect UK policy making that had only several months before settled on and had obtained political approval to join Prüm. Thirdly, it considers the future prospects for the Prüm model following major shocks within the EU from terrorist crimes, which could result in a greater emphasis on security (hereinafter ‘securitization’) in international criminal justice cooperation.³

Neither Prüm nor the international criminal justice cooperation this facilitates is a ‘final global public good’. Instead this data sharing is treated as an ‘intermediate input’ into the production of a global public good or goods.⁴ Comparisons from public health are, respectively, the development of pharmaceutical knowledge and the eradication of polio.⁵ Loader and Walker similarly refer to transnational policing as an intermediate input to the final good of security.⁶ Therefore this article seeks to answer the following questions (a) is Prüm an effective model as an intermediate input into a global public good(s) and (b), if so, (i) why, (ii) how stable is this approach and (iii), given the Walport focus of this special issue, what are the implications of the EU Referendum results for UK law and policy making towards this model of international criminal justice cooperation?

Irespective of how the final and intermediate input to the public good (or goods) are described, arguably criminal justice cooperation brings to international development the doctrinal robustness of law. This may complement the normatively rich attributes of public goods, such as government free from the taint of corruption or more generically goods contributing to the improvement of human life. This assumption is tested by the multi-disciplinary approach in this article that enables significant congruency to be highlighted between global public goods research findings and various legal doctrines.

Global public goods is a concept that originated in development economics. It was primarily intended to improve international decision making –in response to globalisation - for the benefit of poorer countries. There is a clear argument for locating Prüm in this domain. International criminal justice cooperation supports UN Sustainable Development Goal 16.3: ‘promote the rule of law at

² T. Wilson, ‘The Global Perspective’ in M. Peplow (ed.), *Annual Report of the Government Chief Scientific Adviser 2015: Forensic Science and Beyond: Authenticity, Provenance and Assurance: Evidence and Case Studies* 82-93 Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/506462/gs-15-37b-forensic-science-beyond-evidence.pdf (accessed 14 July 2016).

³ The term ‘securitization’ is used in this article to denote an increased emphasis within criminal justice agencies, such as police services, and their international cooperation activities on protection and prevention against security risks (including terrorism) and not in its more usual financial sense of how assets are used to guarantee loans.

⁴ P. Eigen and C. Eigen-Zucchi, ‘Corruption and Global Public Goods’ in I. Kaul, P. Conceição, K. Le Goulven and R.U. Mendoza (eds.), *Providing Global Public Goods: Managing Globalisation* (OUP, New York: 2003) at 583.

⁵ I. Kaul and R.U. Mendoza, ‘Advancing the Concept of Public Goods’ in Kaul *et al.*, above n.4 at 80-89 and P Eigen and C Eigen-Zucchi, above n.4 at 576-597.

⁶ I. Loader and N. Walker, ‘Locating the Public Interest in Transnational Policing’ in A. Goldsmith and J. Sheptycki (eds.), *Crafting Transnational Policing: Police Capacity-Building and Global Policing Reform* (Hart, Oxford: 2007), n.2 117-118.

national and international levels and ensure equal access to justice for all⁷. Deference to such ideals is found in many criminal justice cooperation texts, but may be combined with more normatively ambiguous objectives. For example, the EU- US Mutual Legal Assistance (MLA) agreement refers to the 'consolidation of the rule of law and respect for human rights and humanitarian law, as well as the preservation of peace' and then adds 'and the strengthening of international security'.⁸

Kaul and Mendoza have observed how 'as national borders become porous and cross-border economic activity increases, these goods become indivisible across borders or transnational'.⁹ Globalisation has created an impetus for the promotion of criminal justice cooperation. It has also, particularly with terrorist crimes, ceased to be geographically remote throughout the EU and has gained 'a civil dimension', thus blurring possible distinctions between criminal justice and security cooperation.¹⁰ National boundaries (even maritime borders) are increasingly irrelevant economically and socially, offering little check to unauthorised entry or protection against transnational offending.¹¹ Similarly in a liberal democracy, at a theoretical level, criminal justice conforms to the two defining characteristics of publicness: (a) non-excludability (the producer cannot exclude any person from benefitting from it) and (b) non-rivalry (consumption by one person does not diminish its availability for others).¹² It is possible to classify global public goods on the basis of 'the nature of their publicness and the conditions of their provision' (for example natural or human-made).¹³ What appears to be more pertinent, however, in a criminal justice context is how to structure cooperation to achieve 'globalness managed to mutual advantage'. This is seen within a global public goods context, as placing the onus of proof on those proposing an international solution to justify such a strategy.¹⁴ This offers an initial example of a degree of congruence between global public goods and legal doctrine. The former might justify an approach to international negotiations. Should the negotiations eventually result in rights-limiting legislation (inevitable with forensic bioinformation), the necessity stage of proportionality analysis places a similar requirement on the state during judicial review.

The article begins by describing the principal theoretical and empirical issues covered. These arise from four factors: (i) the social nature of the good and, in the case of forensic bioinformation, an interrelationship with privacy and data protection; (ii) difficulties for policy making and resource allocation stemming from poor data about the impact of criminal justice initiatives and the burden of

⁷ United Nations, General Assembly, *Report of the Open Working Group of the General Assembly on Sustainable Development Goals*, A/68/970, August 2014. Available at <https://sustainabledevelopment.un.org/focussdgs.html> (accessed 13 April 2016).

⁸ Agreement on Mutual Legal Assistance between the European Union and the United States, 25 June 2003, OJ L 181/34.

⁹ See Kaul and Mendoza, above n.5 at 97.

¹⁰ S. Medvedev and I. Tomashov, 'Security as a Global Public Good: Common Issues for the European Union and the G8' in M.V. Larionova (ed.), *The European Union in the G8: Promoting Consensus and Concerted Actions for Global Public Goods* (Ashgate, Farnham, 2012) 214.

¹¹ Home Affairs Committee, *Migration Crisis* (HC 2016–17, 24) paras 27–33.

¹² This article is concerned with access to justice at a theoretical level. The delivery of justice as a public good requires adequate Legal Aid funding, etc.

¹³ S. Medvedev and I. Tomashov, 'The Concept and Definition of Global Public Goods' in M. Lavrionova, above n.10 at 17–20.

¹⁴ I. Kaul, P. Conceição, K. Le Goulven and R.U. Mendoza, 'Why do Global Public Goods Matter today?' in I. Kaul *et al.*, above n. 4 at 12.

proof in relation to proportionality; (iii) the extent to which the Prüm model might reflect an asymmetrical distribution of power within the EU resulting in pressure on weaker members to internalise the costs of crime; and (iv) public law concerns about the scope of EU criminal law and socio-cultural notions of national sovereignty. This section ends with a brief description of the key features of Prüm to explain how this model for criminal justice cooperation sidesteps all or some of politico-legal issues.

The second section consists of an empirically based analysis of how the criminological externalities of cross-border travel within Europe assume an increasingly global character. This also illustrates how the Prüm system can generate decision-informing data about trends in these externalities or 'public bads' of globalization. Both may have probative relevance to proportionality in respect of rights-limiting law relating to the use of forensic bioinformation.

The third and fourth sections consider the lessons from the Prüm model and alternative options for cooperation. The first key delivery issue is the extent to which Prüm implementation both ultimately depended on and possibly incentivised international scientific standardization. The second consideration is the significant national legal and institutional effort required for implementation. Both issues raise questions about the assumptions underlying market fundamentalism.

The final section begins by considering the future stability of this model, particularly in the light of convergence between EC and US security policy that is accelerating because of terrorist crimes. It addresses whether an awareness of potential congruence between global public goods theory and various legal doctrines might heighten awareness of the strengths of the Prüm model in the face of the potential securitization of EU criminal justice cooperation. These issues are then brought together in the conclusion by considering their implications of this for potential UK post-Referendum options for sharing forensic biometric data for international criminal justice cooperation purposes.

The Delivery and Analysis of Global Public Goods with a Criminal Justice Dimension

Since the late 1990s there has been a greater appreciation of the 'negative spillovers from the the inadequate supply of transnational public goods, notably those stemming from communicable diseases, environmental degradation, spreading conflicts and financial instability'.¹⁵ This has introduced significant legal issues into international development debates, but global public goods with criminal justice aspects feature less prominently in policy making and research.¹⁶ Loader and Walker – when locating international policing in the domain of global public goods - identified two elements that distinguish security from purely economic public goods, such as environmental degradation. First, an added dimension: the root problem is socially generated. Second – unlike the more objective (or at least more quantifiable) provision of a classic economic good (e.g. housing) - perceptions of security/insecurity greatly depend on each person's subjective assessment of the

¹⁵ T. Sandler, 'Assessing the Optimal Provision of Public Goods: In Search of the Holy Grail' in Kaul et al., above n.4 at 131.

¹⁶ For example, the legal focus in the 2000 Millennium Development Goals (MDGs) was international trade, finance and governance related. Available at <http://www.unmillenniumproject.org/goals/gti.htm#goal8> (accessed 14 July 2016). Criminal justice and even security is overshadowed by such issues in the main publications by Kaul and her colleagues.

social order.¹⁷ The second observation should be qualified by noting how significant increases in recorded crime coincided with fairly widespread social uncertainties during the early stages of intensified globalisation.¹⁸ A similar significance might be attached to the rising general anxiety about terrorism.

Legal analysis dating back to the inception of Prüm, however, helps to place this second element (a personal perception of threats and their potential consequences) onto a more extended and justiciable continuum. International criminal justice cooperation involving the exchange of sensitive personal information, such DNA and fingerprint data, will result (in terms of Article 8 ECHR), in an interference with privacy and requires effective data protection in all the countries involved.¹⁹

There is a further complication. This arises from the comparatively poor quality of criminal justice data. UK criminal justice policy rarely demonstrates rigorous evidence-based decision-making. Politicians acknowledge in their more candid moments to being 'driven more by considerations of political advantage than by appeals to evidence'.²⁰ Nevertheless, if it is hypothesised that decision making in international development and global cooperation more generally is expert dominated (e.g. climate change initiatives), the insufficient range, depth and quality of data relating to criminal justice could be a significant handicap when resources for the delivery of global public goods are rationed. Prüm, however, can assist decision making in such circumstances. It can be used to produce analyses of certain kinds of transnational offences or offending.²¹ Such analyses may address also the burden of proof should the proportionality of the law relating to criminal justice cooperation be challenged.²²

It has been argued that the adoption of Prüm evidences an asymmetrical distribution of power or influence in policy making within the EU. This again is chiefly dealt with later, but what follows about the general EU legal context and the specific structure of Prüm is relevant to this issue.

As *Marper* makes clear, ECtHR, through the margin of appreciation, gives Convention signatory states very wide discretion over the collection, retention and use of forensic biometric data.²³ Within the EU legal order, the paramount authority of the member states over criminal justice and security is recognised in the treaties.²⁴ This, however, exists to some extent in a state of tension with developing CJEU case law from *Pupino* onwards.²⁵ It is worth noting from a Brexit perspective, that Prime Minister May (as Home Secretary) accepted that bi-lateral criminal justice cooperation with

¹⁷ See Loader and Walker, above n. 6 at 114-115.

¹⁸ N. Lacey, *The Prisoners' Dilemma: Political Economy and Punishment in Contemporary Democracies* (CUP, Cambridge: 2008) 20-29.

¹⁹ The leading case is *S & Marper v. The United Kingdom* App no 30562/04 (ECtHR, 4 December 2008). See also for references to separate data protection issues, E.J. Kindt, *Privacy and Data Protection Issues of Biometric Applications* (Springer: Dordrecht, 2013) 221.

²⁰ D. Faulkner and R. Burnett, *Where Next for Criminal Justice?* (The Policy Press, Bristol: 2012) 53.

²¹ For the definition of these terms see Wilson, above n.2 at 82.

²² For a recent critical analysis of the proportionality test see: J. Rivers, 'The Presumption of Proportionality' (2014) 77(3) *MLR* 409-433.

²³ See *Marper*, above n. 19 [125].

²⁴ Article 4(2) TEU: 'The Union shall respect the ... State functions [of Member States], including ..., maintaining law and order and safeguarding national security.'

²⁵ Case C-105/03 *Pupino* [2005] ECR I-5285.

the EU, even for a country still well embedded within the TEU and TFEU as Denmark, is subject to CJEU jurisdiction.²⁶) This is potentially problematic from a human rights perspective because of the uncertain and perhaps unpromising jurisdictional interface between ECtHR and the CJEU.²⁷ Also Herlin-Karnell's constitutionally focused analysis of EU criminal law suggests that its competence is far too imprecise and its development has been ad hoc rather than strategic, reflecting perhaps an inadequate knowledge of criminal law within its institutions, including the CJEU.²⁸

These legal and bio-ethical concerns intersect with Loader and Walker's analysis of the obstacles to international policing as an intermediate public good. This stems from recognising tensions in the social and cultural dimensions of publicness, particularly a significant 'socio-historical limitation':

... the sense of mutual trust, common engagement and general readiness to put things in common has been and remains strongly associated with the national state...

... despite the deepening of global interdependence, the growth of institutions of global governance, and an arguably greater public consciousness of both these developments, sentiments of trust, loyalty and abstract solidarity remain stuck at national or subnational levels ...²⁹

This gives rise to the notion within the public goods literature on security to cooperation asymmetry ('... governments remain extremely reluctant to cooperate on security matters ..., terrorists have cooperated in networks since the onset of modern day terrorism ...').³⁰

These convergent concerns help to shape views about the potential limits and modalities of EU criminal justice and/or security cooperation policies. These socio-cultural considerations are also congruent to debate about the scope of EU criminal law, which following extensive analysis Herlin-Karnell argues should be restricted to (a) 'financial crimes ... linked to the concept of market creation' and (b) the response to cross-border offending.³¹

Prüm, in addition to satisfying the most abstemious prescription for the competence of EU criminal law – as a model of criminal justice cooperation – neatly sidesteps these socio-cultural problems.³² This is so fundamental a point that it is necessary now to briefly describe the key features of the Prüm model.

²⁶ HC Deb, 10 July 2014 vol 584, col 487.

²⁷ S. Douglas-Scott, 'The Relationship Between the EU and The ECHR Five Years on from the Treaty Of Lisbon', *University of Oxford Legal Research Paper Series, Paper No XX/2015*.

²⁸ E. Herlin-Karnell, *The Constitutional Dimension of European Criminal Law* (Hart, Oxford: 2012).

²⁹ Above n.6 115-116.

³⁰ T. Sandler, 'Recognizing The Limits To Cooperation Behind National Borders: Financing The Control Of Transnational Terrorism' in I. Kaul and P. Conceição (eds), *The New public Finance: Responding To Global Challenges* (OUP, New York: 2006) 195.

³¹ See Herlin-Karnell above n. 28 at 237.

³² The main legal instrument is Council Decision 2008/615/JHA of 23 June 2008 on the stepping up of cross-border cooperation, particularly in combating terrorism and cross-border crime. For a more detailed description of the Prüm arrangements see: H. Soletto Muñoz and A. Fiodorova, 'DNA and Law Enforcement in the European Union: Tools and Human Rights Protection', (2014) *Utrecht Law Review* 10 149-162.

Already a legal obligation for all but one of the current EU member states, the Westminster Parliament (cognizant of support from the Scottish government and the Northern Irish administration) voted in December 2015 to reverse a previous UK opt-out.³³ Iceland and Norway are members of Prüm, but not yet operational, and Switzerland has applied to join.³⁴ The system operates as a two stage process, but for brevity only the DNA arrangements are described here.

During stage 1 anonymous data (DNA profiles are a series of numbers inputted into a digital form in standardized genetic format) are sent, usually daily, to each member state to which the transmitting country is connected for Prüm data exchange purposes. The anonymous data will only be retained in the receiving country if (a) there is an automatic 'hit' and (b) that 'hit' is scientifically valid (i.e. as a scientifically valid 'match') and (c) the case is of sufficient gravity, for personal details to be shared during Prüm Stage 2 about the known individual to whom the DNA profile relates.³⁵ However, a match between DNA profiles that are anonymous in both countries (i.e. because both were based on the DNA (a 'trace') of an unknown person) may, subject to national laws and inter-state agreements, be used to analyse trends etc. in cross-border offending.

The key doctrinal issue arising in respect of the international exchange of forensic biometric data is proportionality. Specifically, following *Marper*, whether the use to which such data is put is proportionate and strikes a fair balance between the competing public and private interests.³⁶ The Prüm legislation, however, ensures that any questions in relation to this will be determined by relevant national laws – where in *Marper* ECtHR acknowledged the existence of a very wide margin of appreciation - and not the EU framework itself. Thus, Prüm provides major scope for the national legal autonomy recognised by the the margin of appreciation to be exercised.³⁷ This means that information referring to a known individual will be disclosed internationally (a) in circumstances regulated by the national law of the state holding that demographic information (e.g. rules governing which data may be held and exchanged, especially with regard to the gravity of offence

³³ HC Deb 8 December 2015, vol. 603 cols 914-963 and HL Deb 9 December 2015, vol. 767 cols 1636 – 1648.

³⁴ International Agreements Council, Decision of 26 July 2010 on the conclusion of the Agreement between the European Union and Iceland and Norway on the application of certain provisions of Council Decision 2008/615/JHA on the stepping up of cross-border cooperation, particularly in combating terrorism and cross-border crime and Council Decision 2008/616/JHA on the implementation of Decision 2008/615/JHA on the stepping up of cross-border cooperation, particularly in combating terrorism and cross-border crime, and the Annex thereto (2010/482/EU); and Swiss Federal Council, *Coopération Prüm: le Conseil fédéral délivre un mandat de négociation*, press noticed dated 13.03.2015. available at: <https://www.news.admin.ch/message/index.html?lang=fr&msg-id=56539> (accessed 14.06.15).

³⁵ The Prüm process and filtering of scientifically unreliable 'hits' and criminologically unimportant matches is described in M.D. Taverne and A.P.A Broeders. *The light's at the end of the funnel!: Evaluating the effectiveness of the transnational exchange of DNA profiles between the Netherlands and other Prüm countries* (Paris Legal Publishers, Zutphen:2015). The proposals for the introduction of Prüm exchanges into English Law made by Home Secretary (now Prime Minister) May can be found in Home Office, 2015 *Prüm Business and Implementation Case Cm* (2015) 9149 5-7 and 232-236 available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/480129/prum_business_and_implementation_case.pdf (accessed 19 July 2016).

³⁶ Above n. 19.

³⁷ This is indicated by an analysis in F. Santos, H. Machado and S. Silva, 'Forensic DNA databases in European countries: is size linked to performance?' (2013) *Life Sciences, Society and Policy* 9:12. It is difficult, however, especially within the text allowance for a journal article to fully describe the range of variation in national laws and a restrictive / expansionist binary division of such laws though useful is also problematic. In some countries the laws governing retention will have changed since their analysis was completed.

and/or the existence of a conviction) and (b) also as a result of operational judgements in both states about whether the crime is sufficiently serious to warrant the exchange of information. Such arrangements may differ under national law to take account of individual circumstances, such as the data subject's age.³⁸

The Prüm legislation contains minimum standards for data protection, but compliance is a matter for national data protection bodies and law. This is sufficiently flexible to accommodate significantly different national approaches, including the enhanced forensic biometric governance regime in England (by both the Information Commissioner and, following the Protection of Freedoms Act 2012, the appointment of a specific (forensic) Biometrics Commissioner).³⁹ There is a potential weakness in such arrangements as the national authorities of a transmitting state cannot know what happens to personal information from matches that have been retained in a receiving country. The classic answer would be mutual trust among EU member states, but as will be seen later even the international collection of statistics about Prüm operations is flawed and effective regulation may ultimately depend on proactive cooperation between national data supervision authorities who meet with the European Data Protection Supervisor (EDPS) and the Commission under the auspices of the Article 29 Working Party. With Brexit in mind, it is important to note that the data protection authorities of Norway, Liechtenstein and Iceland are members of that working party.⁴⁰

The EU was not particularly original in devising an approach that recognised such national autonomy. It is similar, for instance, to the rules under the Rome Statue of the International Criminal Court (ICC) (1998) for cooperation (including information sharing) with signatory states that is often seen as 'a middle ground between a vertical and horizontal model' for state/ tribunal cooperation.⁴¹ Given that UK accession to the Rome Statue is autonomous of its EU membership, this country's confidence with this mode of cooperation, presumably also suggests Prüm should be an acceptable option in the event of Brexit for criminal justice cooperation more generally.

The costs of Prüm implementation and the scientific standardization required to improve the efficiency and reliability of such cooperation are not insignificant, but these will be significantly eclipsed by the national costs and benefits of forensic biometrics for purely domestic purposes. The added cost of sharing national DNA data is likely to be low. In the Netherlands the staff cost for handling and interpreting scientifically the Prüm data exchanges in the Netherlands is approximately €27 per match.⁴²

Prüm: The Socio-economic and Criminological Context

The fate of Flight MH17 illustrates our modern globalised reality and how national resilience depends on international cooperation. The aircraft was destroyed on 17 July 2014 over Ukraine

³⁸ See especially Articles 5, 9 and 26 of 2008/615/JHA; above n.32.

³⁹ For the Biometric Commissioner's powers see The Protection of Freedoms Act 2012, ss. 20-21. For the proposed roles of the Biometric and Information Commissioners in terms of both Prüm and enhanced UK forensic biometrics governance see: Home Office, above n. 32 at 64 and 69.

⁴⁰ See the entry on the EDPS website. Available at <https://secure.edps.europa.eu/EDPSWEB/edps/site/mySite/Art29> (accessed 17 August 2016).

⁴¹ R. Cryer, H. Friman, D. Robinson and E. Wilmshurst, *An Introduction to International Criminal Law and Procedure* 2nd ed. (CUP, Cambridge: 2010) 510.

⁴² See Taverne and Broeders, above n.35 at 63-64.

when travelling from Amsterdam to Kuala Lumpur. The majority of the victims (193 out of 298 passengers and crew) were Dutch. Sixteen of the dead were British citizens, six of whom had dual nationality. Ante-mortem samples for these British victims were collected from three countries - the Netherlands, New Zealand and South Africa - in addition to the UK.⁴³ DNA and fingerprint experts from many nations contributed to the identification work. During its last phase, scientists from LGC Forensics (UK) were called in, alongside colleagues from Bode Cellmark Forensics (USA) and the International Commission on Missing Persons (ICMP) based in Sarajevo (Bosnia and Herzegovina), to help the Netherlands Forensics Institute accelerate the final DNA analyses of the victims' remains.⁴⁴ Similar collaboration (including UK forensic pathologists and scientists) on another criminal act on an even greater scale serves to reinforce the point that no country - not even one as wealthy as the USA - will necessarily have sufficient national expertise to deal with the consequences of incidents on the scale of 9/11 without international assistance.

As a result of being at the forefront of free trade and globalisation, the UK legal systems adapted early to the criminological consequences of the cross-border movement of citizens. The example of England and Scotland shows that this was not at the expense of their distinctive legal cultures. In Scotland, for example, the codification of criminal procedure began much earlier than in England and state law officers retain a procuratorial monopoly over the initiation of criminal proceedings.⁴⁵ More recently, the UK Parliament has effectively ceded most legislative competency in criminal justice matters, including the governance of policing within Scotland, to the Scottish Parliament.⁴⁶ There always has been and still remains, however, an almost seamless policing based on overlapping cross-border jurisdiction as well as cooperation. An English police officer's power of arrest is exercisable in Scotland and vice versa. These reciprocal arrangements are justiciable under the law relating to arrest (including those to protect the arrestee's rights) of the territory on which the arrest takes place and not the UK legislation that confers these reciprocal powers.⁴⁷

The demographic logic of cross-border criminal justice cooperation (both within and outside the UK) resulting from geography, colonial history and an increasingly globalised economy can be illustrated as follows:

- An estimated 795,000 Scots-born citizens probably accounted in 2001 for less than 1.5% or more of the population of England and Wales, whereas some 400,000 English born citizens account for almost 9% of the population of Scotland.⁴⁸

⁴³ J. Williams, 'Disaster Victim Identification' in Peplow, above n. 2 at 90-91.

⁴⁴ W. Heijnen, *DVI aspects of forensic investigation*, plenary session iv, 7th European Academy of Forensic Science Conference, Prague, 11 September 2015.

⁴⁵ L. Harris, 'Scotland' in K. Ligeti (ed.), *Towards a Prosecutor for the European Union, Volume 1* (Hart, Oxford: 2013) 627.

⁴⁶ Scotland Act 1998 ss. 28 and 29. The same primacy of the 'host' member state's national law is applied to police actions undertaken in the territory of another member state by 2008/615/JHA, for which see n. 32 at Art. 17 (2).

⁴⁷ Criminal Justice and Public Order Act 1994 s. 140.

⁴⁸ The latest available data for the Scottish diaspora comes from the 2001 Census, when, for those who provided information, the figure was approximately 1.5% of the population of England and Wales. See: J. Carr and L. Cavanagh, *Scotland's Diaspora and Overseas-Born Population* (The Scottish Government, Edinburgh: 2009) 8 and 14.

- The UK global diaspora was estimated in 2010 to be equivalent to 10% (some 3.5% within the EU) of the UK resident population, compared with 5.5% in 2001.⁴⁹
- Some 4% of the UK resident population was born elsewhere in the EU and approximately the same percentage of its resident population in third countries (i.e. outside the EU). Third country nationals disappear more rapidly from statistical scrutiny (as a result of naturalisation), consequently foreign born residents from third countries account for 8% of the UK resident population, but the proportion of UK citizens with global family links is much greater.⁵⁰ Genetically, non-European ancestry is estimated to extend to some 14% of the population.⁵¹ This data, however, understates social assimilation. For example by 2011 2.3 million people were in inter-ethnic relationships, including 9% of individuals of a Pakistani background.⁵²
- In absolute terms, UK residents are second only to German residents in being regular travellers to other EU countries (respectively, 31 million and 53 million trips in 2011), between twice or three times as many journeys as the next most travelled from countries, (France and the Netherlands)⁵³.
- In 2014-15, 118 million people (including UK residents) travelled to the UK, many on several occasions in that year, and approximately the same number left. (As a combined total this was approximately four times the resident population.)⁵⁴ Among the third country citizens who travelled to the UK during the year ending June 2014, for whom more detailed data is available, some 8.8 million were simply visitors (e.g. as tourists or attending business meetings) compared with 5.5 million entering the country to study, work for a significant time or for permanent residency or asylum.⁵⁵

This significant diversity of resident population, families with multiple national heritages and increasing fluidity of location is typical of any wealthy country within the European Union.⁵⁶

⁴⁹ T. Finch, H. Andrew and M. Latorre, *Global Brit: Making the most of the British diaspora*, 7 (IPPR, London: 2010). The 2001 estimate is taken from Carr and Cavanagh, above n.48 at 10.

⁵⁰ Eurostat data (2012). Available at http://Ec.europa.eu/eurostat/statistics-explained/images/d/d8/Foreign_and_foreign_born_population_by_group_of_citizenship_and_country_of_birth_2012.png (accessed 11 February 2016).

⁵¹ This has been taken into account to calculate the risk of genetically derived errors when calculating random match probabilities for forensic DNA matches. See: The Forensic Science Regulator (2014), *Guidance: Allele frequency databases and reporting guidance for the DNA (Short Tandem Repeat) profiling FSR-G-213 Issue 1*.

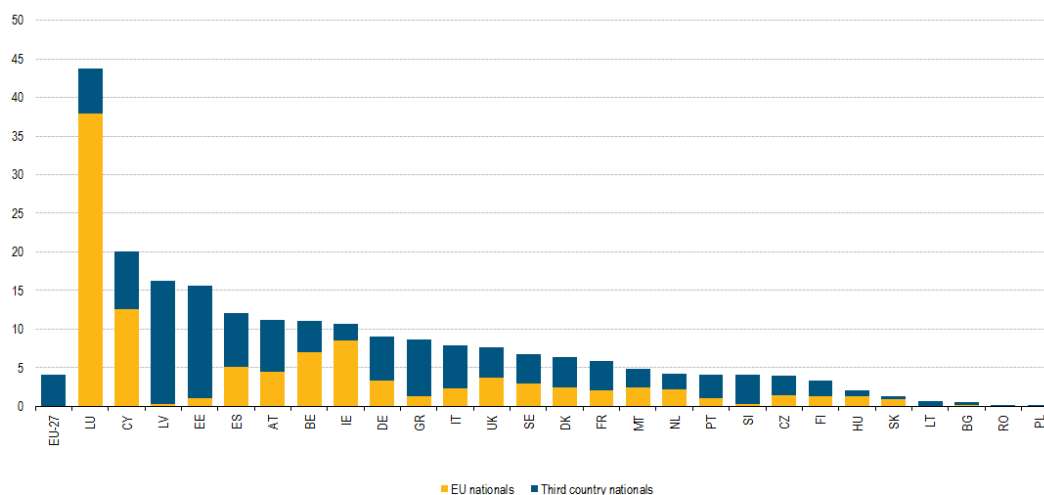
⁵² E. Mian, 'Race to the Bottom' *Prospect* August 2016, 72.

⁵³ Eurostat data (2013). Available at http://Ec.europa.eu/eurostat/statistics-explained/index.php/File:Number_of_foreign_trips_of_at_least_one_night%2%80%99s_duration_for_personal_purposes_made_by_residents_of_EU_Member_States,_with_destination_in_the_EU_or_a_third_country,_2008-2011.png (accessed 11 February 2016).

⁵⁴ National Audit Office, *E-borders and successor programmes*, HC 608 Session 2015-16, 5.

⁵⁵ Home Office, *Immigration statistics: January to March 2015* Available at <https://www.gov.uk/government/publications/immigration-statistics-january-to-march-2015/immigration-statistics-january-to-march-2015> (accessed 22 July 2016).

⁵⁶ Eurostat data (2016). Available at http://Ec.europa.eu/eurostat/statistics-explained/index.php/EU_citizenship_statistics_on_cross-border_activities (accessed 13 April 2016).



For Malta latest available data (for 1 January 2012) are used only for totals, the rest are estimated; population data for HR comes from 2011 Census as on 31 March 2011
 Source: Eurostat Reference Year 2011 ([migr_pop1ctz](http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&plugin=1))

Figure 1. Foreign nationals (% of total population) resident in EU countries (2011).

Unless there is a global crisis equivalent to the 1929 Great Crash (not wholly unimaginable), it is likely that the globalised economy and the consequential locational fluidity will continue to profoundly shape the demographics and cross-border travel in the UK and neighbouring countries. North American census data supports this view. In the USA the foreign born population had exceeded the current UK figure of 8% by 1990 and by 2010 was estimated to have reached 13% of the total population.⁵⁷ The foreign-born population of Canada represented almost 21% of the total population in 2011. That is the highest such level among the G8 countries.⁵⁸

There is far less information and research, however, about the externalities (or ‘public bads’) in terms of cross-border offences or offending. Evidence about this might be judged essential for arguments about legitimate aim and capable means in a proportionality analysis, and highly significant for balancing the case for cooperation against the costs to rights of the cooperation, notably for the privacy of forensic biometric information.

What is clear is that freedom of movement and migration have not affected the long-term decline in traditional (non-cyber or fraud) offences or offending. Overall crime data in the 2015 Crime Survey for England and Wales was at its lowest since it began in 1981.⁵⁹ In the twelve months ending December 2015 the number of first time entrants dealt with by English and Welsh criminal justice

⁵⁷ C. J. Gibson and E. Lennon, *Population Division Working Paper No. 29: Historical Census Statistics on the Foreign-Born population of The United States: 1850 To 1990*, (U.S. Bureau of the Census, Washington, D.C.: 1999). Available at <https://www.census.gov/population/www/documentation/twps0029/twps0029.html> (accessed 13 April 2016) and E. M. Grieco, Y. D. Acosta, G. P. de la Cruz, C. Gambino, T. Gryn, L. J. Larsen, E. N. Trevelyan, and N. P. Walters, Report Number: ACS-19: *The Foreign-Born Population in the United States: 2010* (U.S. Bureau of the Census, Washington, D.C.: 2012). Available at <https://www.census.gov/library/publications/2012/acs/acs-19.html> (accessed 13 April 2016).

⁵⁸ Statistics Canada, *Immigration and Ethnocultural Diversity in Canada* (Statistics Canada, Ottawa: 2013). Available at <https://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-010-x/99-010-x2011001-eng.cfm> (accessed 13 April 2016).

⁵⁹ Office of National Statistics, *Crime in England and Wales: Year ending December 2015* 5.

agencies fell by 68% in the case of juveniles and 19% for adults since 2006/07⁶⁰ There are no national statistics for crimes committed by foreign citizens in England and Wales, but research by Johnson and his colleagues suggests that offending by the citizens of other EU countries accounts overall for some 1% of prosecuted offences. Their research indicates that where data exists for similar offending in other EU member states (approximately 4% of total crime in the Czech Republic, 3% in Italy, Germany and Denmark, 2.5% in the Netherlands, 1.5% in Slovakia, and less than 1% in Austria and Poland), it appears to be broadly consistent with or below the proportion of other EU nationals resident in those countries (see Figure 1 above).⁶¹

Offences committed in the UK by the citizens of other EU states, are chiefly relatively low level acquisitive crime, particularly theft from shops. Such offending is also concentrated geographically in the south east, eastern counties and Cumbria rather than dispersed nationally.⁶² This spatial concentration is consistent with other data and estimates. In London, where foreign-born people (not just from the EU) comprised 37 per cent of the population of central London and 33 per cent of the outer boroughs in 2013, it is reported that foreign citizens account for 25-30 per cent of arrests (approximately 50,000-66,000 arrests per annum) and an estimated 25 per cent of high-harm offenders (including organised crime group members and predatory sex offenders).⁶³

English prison data is difficult to interpret because of problems with convicted prisoner deportations, and laws and policies that encourage custody to be served in the country of nationality. In general, however, it appears to be consistent with 'high-harm offender' estimates. Some 9,895 foreign citizens (11.65 per cent of the total population, of which total nationals from other EU countries accounted for 4.98 per cent of that total) were held in English prisons on 31 December 2015.⁶⁴ Although better data is needed, it is known from individual cases that generally low levels of offending and often for minor crimes by most offenders from other EU countries mask much more serious challenges for the police and prosecutors: (a) in finding the much smaller number of serious criminals among such residents and (b) in obtaining information to help assess the criminal threat that an identified individual poses. As this article at several points considers criminal justice cooperation in relation to security initiatives, it is worth noting a similar problem posed by the small number of terrorists within an estimated 1.8 million irregular EU external border crossings (compared with some 200 million authorised crossings) in 2015.⁶⁵

This is a problem identified by criminologists and policy makers since the 1990s, for example, in 1993:

⁶⁰ Ministry of Justice, *Criminal Justice Statistics 2015: England and Wales* 34.

⁶¹ D. Johnson, A. Ludwig, B. Younger and M. McCloskey (2015) *The Prüm Implementation, Evaluation and Strengthening (P.I.E.S.) of Forensic DNA Data Exchange: Northumbria University Final Report* (Northumbria University, Newcastle upon Tyne, UK, 2014) (Unpublished) 6. Source of Figure 1 is Eurostat, above n. 56.

⁶² D. Johnson, 'E.U. migrant criminal activity: Exploring spatial diversity and volume of criminal activity attributed to inter EU migrants in England' (2014) 5 *Applied Geography* 48.

⁶³ For sources see: Wilson above n.2 at 198 notes 15-17.

⁶⁴ Ministry of Justice, *Prison Population: 31 December 2015*, 2016. Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/495322/prison-population-31-december-2015.xlsx (accessed 8 April 2016).

⁶⁵ For convicted prisoner deportation problems see: Home Affairs Committee, *The work of the Immigration Directorates (Q4 2015)*, HC (2016-17 22) paras 89 – 93.

⁶⁶ Commission, *Stronger and Smarter Information Systems for Borders and Security COM (2016) 205 final* 2.

... it may not be an exaggeration to say that criminal organizations abolished national boundaries long ago. Crossing borders is no major problem to them and the losses are marginal. They rather see the border as a handicap for police and prosecution. Crossing the border is one of the trivial precautions which are routinely taken in all kinds (including the most simple forms) of organized crime. Considering these aspects, one may conclude that national borders do not improve, but reduce public safety in Europe.⁶⁷

More recent research has described in some detail the activities of the members of travelling criminal gangs in the Netherlands. Their members systematically engage in relatively petty but high volume offending and seek to evade detection by using multiple identities and crossing borders.⁶⁸ Patterns of cross-border offending and offences will vary considerably from country to country, but in the absence of a drastic reduction in visitor and foreign worker numbers, withdrawal from the EU is highly unlikely to change this aspect of UK crime. In such circumstances, the efficient international exchange of accurate information and reliable evidence with, at least, neighbouring EU member states, is just as indispensable for UK criminal justice as traditional cooperation between this country's internal jurisdictions.

The value of forensic science for linking crimes in different jurisdictions has been illustrated by the experience of countries, such as the Netherlands, that have routinely shared forensic biometric data via Prüm for several years (Figure 2).

Dutch Database: the nature of profile matched (through a scientifically validated comparison)	Other member state databases: the nature of profile matched	Number of matches reported to Dutch prosecutors and police
Anonymous profile (trace) recovered from a crime scene	The profile of a known person	3,100
Anonymous profile (trace) recovered from a crime scene	Anonymous profile (trace) recovered from a crime scene	2,326
The profile of a known person	Anonymous profile (trace) recovered from a crime scene	836
The profile of a known person	The profile of a known person	971

Figure 2. Forensic DNA data sharing: identifications made in the Netherlands (at February 2015)⁶⁹

A match between anonymous profiles recovered from crime scenes in one or more countries may have considerable value if analysts can link such information with other crimes. This may eventually lead to the identification of a possible suspect. It can certainly be used to identify trends and spatial

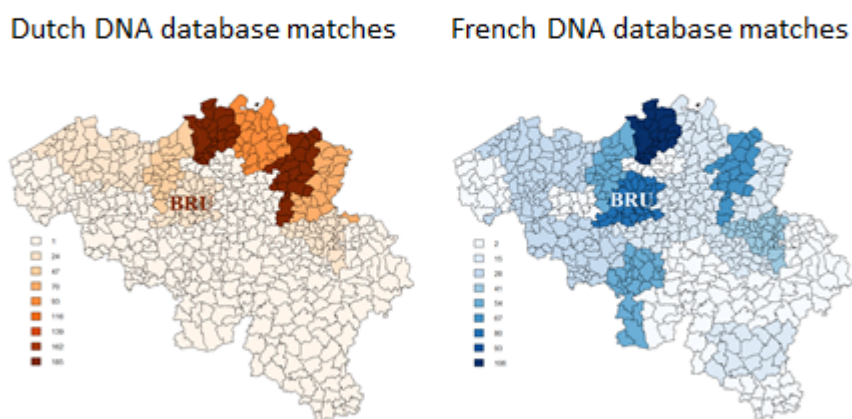
⁶⁷ M. Killias, 'Will open borders result in more crime? A criminological statement' (1993) 1 *European Journal on Criminal Policy and Research* 11.

⁶⁸ D. Siegal, *Mobile Banditry: East European and Central European Itinerant Criminal Groups in the Netherlands*, Eleven International Publishing: The Hague, 2014).

⁶⁹ Source: Netherlands Forensic Institute, 'Dutch DNA database has resulted in 25,000 international matches' 2015. Available at https://www.forensicinstitute.nl/about_nfi/news/2015/dutch-dna-database-has-resulted-in-25000-international-matches.aspx (accessed 31.May 2016).

features in transnational offences and offending. Used in this way, as the examples below from Belgium illustrate (see Figure 3), forensic science data analyses inform crime prevention strategies and investigative priorities at sub-regional levels.⁷⁰

Figure 3: the number and distribution of matches between DNA recovered from Belgian crime scenes and DNA profiles on Dutch and French databases



Research into Belgian Prüm matches indicated, consistent with the type of offences for which forensic bioinformation can often be recovered, that 39% of such matches related to burglary, other offences included violent theft (22%), sex offences (14%) and murder or kidnapping (4%).⁷¹

Forensic DNA is not the only forensic science discipline that - through international forensic biometric data sharing (including potentially via Prüm) - helps to give meaning to evidence recovered by investigators or unlocks access to important information from other jurisdictions about suspects. For example, fingerprint information from the mutilated remains of a suicide bomber recovered in Saint Denis was used to identify the corpse as that of a person who had been imprisoned in Belgium.⁷² Latent fingerprints deposited by a person who handled or made an improvised explosive device (IED) in Afghanistan were matched with an individual arrested as a suspected illegal

⁷⁰ Information for Figure 3 provided by the Nationaal Instituut voor Criminalistiek en Criminologie (NICC) / Institut National de Criminalistique et Criminologie (INCC) from work undertaken under the PIES project - The Prüm Implementation, Evaluation, and Strengthening of Forensic DNA Data Exchange (HOME/2011/ ISEC/AG/ PRUM/4000002150). For a discussion of how such data can be used at sub regional levels see: Wilson, above n.2 at 85.

⁷¹ P. Jeuniaux, 'Building maps of transnational crimes on the basis of Prüm', presentation at the PIES Conference held in Brussels on 29 September 2015.

⁷² Adam Withnall, 'Paris attacks 'mastermind' Abdelhamid Abaaoud killed in Saint Denis raid, prosecutor confirms' *The Independent*, 19 11.15. available at <http://www.independent.co.uk/news/world/europe/paris-attacks-mastermind-abdelhamid-abaaoud-is-dead-following-saint-denis-raid-prosecutor-confirms-a6740406.html> (accessed 5.April 2016).

immigrant sometime later at a border half the world away.⁷³ In this respect the fingerprint identification processes used as one technique for identifying the victims of the MH17 attack comes full circle.

Published research has concentrated on how forensic data exchanges helps to identify suspects and criminological trends in the country where the offence has been committed,⁷⁴ but an equally important consequence of such cooperation is that it also enables criminal justice records to be shared between jurisdictions. Bail, 'bad character' admissibility and sentencing decisions require knowledge of criminal careers and real-world identity. This is not only a question of criminological efficiency, or even public safety. Where prior convictions may influence guilt and punishment, the law cannot be administered equitably, if prosecutors and courts can access the pertinent records relating to their fellow citizens, but not those of other residents or visitors. Access to criminals' back-stories can sometimes only be unlocked through sharing standardized biometric data between jurisdictions.

There is a parallel EU non-biometric system for joining-up the judicial records of different member states on a case by case basis: ECRIS (European Criminal Records Information System).⁷⁵ This extends to the preventative sphere and may facilitate, subject to what is permitted under national law, the exchange of conviction information relevant to employment with children.⁷⁶ If a separate biometric database cannot be used in parallel, the use of ECRIS may have to rely solely on an ability to determine through questioning the nationality of a suspect and identify the relevant countries in which he or she may have travelled. It may also have to cope with aliases or multiple identities. Little is known about the extent of such problems, but it has been estimated that in 95% of cases where third country nationals are sentenced in EU courts, no checks have even been made for relevant criminal records in EU member states.⁷⁷ ECRIS and Prüm are complementary to each other, thus, demonstrating the importance of how EU criminal justice cooperation is evolving as a system, rather than as a series of discrete international police or security cooperation initiatives or entirely separate databases.

Prüm: implementation Lessons: Scientific Standardisation

International cooperation, including the co-ordinated use of research funds, is essential to facilitate progress with forensic science based international criminal justice cooperation. This was recognized

⁷³ A. Kimery, 'DHS Testing Border Biometric Program in Hunt to Identify Terrorists', posted 22.10.15. Available at <http://in homeland security.com/dhs-testing-border-biometric-program-in-hunt-to-identify-terrorists/> (accessed 5 April 2016).

⁷⁴ For recent identification studies see: Taverne and Broeders above n. 35 and W. Bernasco, M. Lammers and K van der Beek, 'Cross-border crime patterns unveiled by exchange of DNA profiles in the European Union', (2015) *Security Journal* advance online publication, doi:10.1057/sj.2015.27.

⁷⁵ See: http://ec.europa.eu/justice/criminal/european-e-justice/Ecris/index_en.htm (accessed 22 July 2016).

⁷⁶ Commission, 'Report from the Commission to the European Parliament and the Council on the implementation of Council Framework Decision 2009/315/JHA of 26 February 2009 on the organisation and content of the exchange of information extracted from criminal records between Member States', COM(2016) 6 final 8-9.

⁷⁷ Commission, 'Impact Assessment Accompanying the proposal for a Directive of the European Parliament and of the Council amending Council Framework Decision 2009/315/JHA, as regards the exchange of information on third country nationals and as regards the European Criminal Records Information System (ECRIS), and replacing Council Decision 2009/316/JHA', SWD(2016) 4, 8.

in the biometrics standardization aspirations of the US- Canadian 'Smart Border Declaration' (2001).⁷⁸ By then it was likely that there was an awareness of problem created by earlier uncoordinated national agendas during the pioneering stage of forensic DNA, with the emergence of different national multiplexes.

A multiplex (marketed as a biochemistry 'kit') targets the forensic genetic analysis on a very small number of loci from the human genome. The analysis of only a few loci can determine whether cellular material recovered from a crime scene is identical to material donated by a known individual ('source attribution'). DNA analysis is sometimes highly complex. Potential complications arise when small amounts and/or degraded DNA are recovered, because of the smaller genetic variation between siblings, as a result of innocent transfer, or contamination.⁷⁹ Normally, however, when sufficient and good quality cellular material is carefully recovered from a crime scene the risk of an erroneous DNA match ('an adventitious match') is low. Even for a technologically obsolete multiplex, such as SGM+ (based on the analysis of ten loci) in a large forensic database, such as that operating in the UK, this risk is conservatively estimated to be in the order of 1 in 1,000 million.⁸⁰ With a smaller number of loci the random probability of error is much higher, for example, with the six loci SGM multiplex the risk of error was about 1 in 50 million.⁸¹

When national forensic science laboratories began to exchange DNA profiles there was not always a sufficient number of overlapping loci to ensure that the resulting hits/matches were scientifically valid. For example, in the Netherlands, when there were only six or seven loci in common with another country, hits/matches on the database, were respectively, 66% and 5% erroneous.⁸² The strong commitment within the European political and scientific communities to make DNA sharing reliable and efficient resulted in two solutions.

First, automated hits during Prüm data exchanges are monitored to identify unreliable results. If there are doubts about a hit, additional DNA testing can be undertaken to ensure that only scientifically robust matches are reported to the police or judicial authorities.⁸³ The latter practice is expensive and time-consuming, but such action will need to continue for many years to come. There are millions of DNA profiles - some even for national purposes (the kit improvements did more than address loci convergence problems and were intended to also improve the analysis of degraded DNA) - that have become technologically obsolescent unnecessarily early because of delayed collaborative development.

Secondly, new European standard DNA loci have been introduced to ensure sufficient commonality between European multiplex. Because of a high level of global scientific cooperation, in which the

⁷⁸ R. Zaiotti, 'Practising homeland security across the Atlantic: practical learning and policy convergence in Europe and North America' (2012) 21 *European Security*, 338.

⁷⁹ See: P. Gill, *Misleading DNA Evidence: Reasons for Miscarriages of Justice* (Academic Press, London: 2014).

⁸⁰ B. Bramley, 'DNA databases' in J. G Fraser. and R. Williams (eds.) *Handbook of Forensic Science* (Cullompton, Willan Publishing: 2009) 329.

⁸¹ P. Gill and T. Clayton, 'the current status of DNA profiling in the UK' in: Fraser and Williams, above n.80 30-31.

⁸² Linda Geddes, 'DNA super-network increases risk of mix-ups', *New Scientist*, 05 September 2011 (issue 2828). Available at <https://www.newscientist.com/article/mq21128285-500-dna-super-network-increases-risk-of-mix-ups/> (accessed 30 June 2013).

⁸³ Above Taverne and Broeders n. 35 at 21-23.

role of the FBI has been particularly important, there is now a high level of concordance with those used by the other DNA standard setting countries: the USA and China (see Figure 4). EU research funding supported this game-changing reform, but it also benefited from parallel investment by the US and other governments in forensic DNA for internal investigative purposes. Public commitments at that time to expand the forensic use of DNA provided reassurance about potential market demand for private sector commercial investment, particularly by US bio-science.⁸⁴ As a result intellectual property in modern multiplex kits belongs mainly to such American companies and the commercial profits from manufacturing this basic criminal justice commodity are likely to accrue mainly in the USA.

Figure 4: the international convergence of DNA multiplexes⁸⁵

Year	Multiplex	Number of markers(including, where appropriate, Amelogenin)	Overlap with UK multiplex at that time		Overlap with USA multiplex at that time/ <i>final four rows only by 2017</i>	Overlap with China multiplex at that time
			England and Wales	Scotland		
1995	UK SGM	7	N/A		N/A	N/A
1998	USA Original CODIS	13	6		N/A	N/A
1999	UK SGM+	11	N/A		8	N/A
2010	China Sinofiler	15	9		11	N/A
2014	England and Wales DNA-17	17	N/A	11	8	10
2015	Scotland DNA-24	24	17	N/A	13	14
2017	USA CODIS core loci	20	15	20	N/A	14
At DEC. 2015	Original European Standard set (ESS/ISSOL)	7	7	7	6	6
At DEC. 2015	Current European Standard set (ESS)	12	12	12	11	7
At DEC. 2015	Prüm authorised loci (2008/616/JHA)	24	12	17	13/15	13

The UK gained some significant financial benefits from its pioneering role and investment in forensic DNA. UK government owned intellectual property (IP) rights was licensed to one of the major US biotech companies. In return for the unprotected IP, the Forensic Science Service (FSS) gained a substantial discount on its purchase of SGM+ plus kits over many years, which included, effectively, a royalty on all kits sold by that company. In return for the patent protected IP on a different kit (not an STR multiplex but used widely in both forensic science and molecular biology more generally), the FSS received an initial lump sum followed by royalties on all kits sold.⁸⁶

Standardisation is, in effect, an admission fee to criminal justice and security cooperation. It is worth noting here, in anticipation of points considered later about convergence in these areas between US and EU policy initiatives, how American commercial interests profited most from the standardisation of DNA multiplexes and, possibly, the overall emergence of forensic DNA. While little published evidence is available, it is important in the Walport context – of identifying how significant emerging technology might be exploited either directly or indirectly in the national interest - not to

⁸⁴ This reflects several discussions with former bioscience company executives.

⁸⁵ Table taken from Wilson, above n.2 at 87.

⁸⁶ Information provided by a former senior FSS employee. It is unclear what happened to these arrangements when the FSS was closed by the first (Coalition) Cameron Administration.

unquestioningly accept the assumptions of market fundamentalism (or 'neoliberalism').⁸⁷ Successive UK governments and the EC possibly made a major error by failing to emulate, in their contribution to the development of forensic DNA, US government scientific and technical development policies. As Mazzucato has demonstrated from a wide range of examples of technological innovation fostering economic growth, it is important 'to do as the United States actually did, not just as it says it did: more State not less'.⁸⁸

Returning to the key themes of this article, the role of bio-science companies in the development of DNA multiplexes also provides a reminder that the degree of publicness of intermediate inputs into global public goods may be different to that of the final good itself. This may raise further questions about exclusivity in benefit sharing and access that may require the development of public-private partnership initiatives for the advancement of global public goods to be congruent with clear and effective public procurement and concession award laws.

Prüm: Implementation Lessons: Alternative models and Enabling Effective Cooperation

The multiplex issues are recorded in the academic literature relating to the development of forensic science, not least because they may have a bearing on reliability of scientific expert evidence during a trial. The legal question that needs to be noted here, however, is that having clearly satisfied the capability stage of the proportionality test, would the Prüm system satisfy the necessity test. Is there an alternative course of action capable of achieving the same aim? There is indeed an alternative and older established approach to sharing biometric forensic and other criminal justice or security information provided by Interpol.

The Interpol approach differs from the Prüm model by operating as centralised database systems for fingerprints and forensic DNA. Interpol statistics are not available in the same level of detail and for extended time spans compared with Prüm, but the level of activity achieved, including for the entirely non-biometric (lost or stolen) travel documents system are given at Figure 5.

⁸⁷ See, for example, J Stiglitz *The Euro and its Threat to the Future of Europe* (Allen Lane, London: 2016).

⁸⁸ M. Mazzucato, *The Entrepreneurial State* (revised edition) (Anthem Press, London: 2015) at 1.

Interpol Database		Data	Searches	Hits/ Matches?
DNA	2014	140,000		86
Fingerprint	2010, but searches for 2009	103, 000 (all but 3,000 ten-prints)	Capacity to handle 1,000 requests each day	1,000
	2013	189,000	Ditto	1,200
Travel Documents	2008	16.7 million	25 million	5,000
	2014	45 million	+ One thousand million	'nearly 72,000'

Figure 5: Interpol centralised database: available results 2008/10 and 2013/2014⁸⁹

Comparisons between the two systems are difficult because of two known problems with Prüm statistics. Firstly, a recorded 'hit' (i.e. automatically generated hit) does not necessarily indicate a scientifically valid match because there might be (but we cannot tell) insufficient common loci between the two profiles that are declared to be a hit. Secondly, as Prüm is a dispersed system with simultaneous results being obtained in two places, its 'hit'/'match' statistics may contain double counting. The 52,500 'hits' achieved by 2012 through Prüm forensic DNA data sharing, however, can be conservatively recalculated.⁹⁰ By discounting the published cumulative total by the probably over stringent Dutch ('hit' to 'match') conversion and reporting data ratio of 33.3%, and then halving the result as a precaution against the risk of duplication, the result is approximately 17,000 matches in under four years.⁹¹ This is a startlingly different level of activity to what is known about the Interpol system. To put the Prüm statistics in perspective, particularly in terms of the low levels of transnational offending noted previously, it is helpful to look at national and not Interpol data. The reduced Prüm total would still be equivalent to 3% of total DNA hits/matches published in 2013 for

⁸⁹ The 2008/2009 data is taken from C. McCartney, R. Williams and T. Wilson (2010) *The Future of Forensic Bioinformatics*. Available at <http://www.nuffieldfoundation.org/sites/default/files/files/forensic-bioinformatics-report.pdf> (accessed 8.July 2015) and more recent data from the Interpol website <http://www.interpol.int/> (accessed 8.July 2015).

⁹⁰ Soleto Muñoz and Fiodorova, above n. 32 at 153.

⁹¹ C.P. van der Beek, *Implementing Prüm's step 1 in the Netherlands Issues and results*, presentation at the PIES Conference held in Brussels on 29 September 2015. The Dutch conversation rate from an automated 'hit' to a verified 'match' is conservative because the Database Custodian either eliminates scientifically valid results or does not attempt to validate hits when information is unlikely to be of interest to prosecutors.

Accepted version, as corrected at proof stage and with final funding statement.

all the 26 original Prüm member states, or more matches than the total number of national forensic DNA matches ever achieved in all but eight of those countries.⁹²

The comparative greater success of the Prüm technical model is reinforced by the data for fingerprint matches and vehicle related information responses. In 2014 the annual totals were, respectively, more than 6,000 and 2 million, by when (unadjusted for scientific validity or duplication) DNA 'hits' had exceeded 73,000.⁹³

Further perspective can be gained by looking at 'major project' delivery failure rates, especially where multiple IT interfaces coincide with varying degrees of legal complexity. Such comparisons are bound to some degree to be approximate, but the UK e-borders programme, designed to improve border control faced similar implementation challenges to Prüm:

- It required more than 600 air, ferry and rail carriers to supply data about people they are bringing in and out of the UK, and around 30 UK government agencies were also to supply data on persons of interest. All three Prüm data sources together require three times that number of international interfaces and, particularly for fingerprints, significant inter-agency and regional connectivity within member states, and by 2014 (Year 6) had achieved over 750 international connections.
- It was also suggested that a lack of clarity within UK government and among its contractors about what was legal under European law further exacerbated the difficult relationships with carriers. As, noted earlier, the Prüm system provides an international exchange framework, but with considerable autonomy in the national laws relating to forensic bioinformation.

The e-borders project was initiated in 2003, much earlier than Prüm, and was intended to be completed in 2011. The UK Government signed a contract in November 2007 with Raytheon, a US-based technology and defence company, to implement the programme, but this was terminated in 2010. Following a protracted legal dispute, which was settled out of court in 2015, it was estimated that successive governments had spent 'at least' £830 million between 2003 and 2015 on the e-borders programme and its successors. The programme was judged by the National Audit office to have successfully delivered some valuable new capabilities, but to have failed to deliver the programme's objectives in full.⁹⁴

To reach a balanced view of the Prüm delivery model and the e-borders project, context is all important:

⁹² ENSFI forensic DNA database statistics published on 4.11.2013, but no longer publicly accessible on the ENSFI website.

⁹³ General Secretariat of the Council, 'Council Decision 2008/615/JHA of 23 June 2008 on the stepping up of cross-border cooperation, particularly in combating terrorism and cross-border-crime, Council Decision 2008/616/JHA of 23 June 2008 on the implementation of Council Decision 2008/615/JHA of 23 June 2008 on the stepping up of cross-border cooperation, particularly in combating terrorism and cross-border-crime ("Prüm Decisions") statistics and reports on automated data exchange for 2014'.

⁹⁴ National Audit Office, above n.54, paras 8 and 14. Exact comparisons cannot be made, but by Year 7 (2010, with latest/2015 data in parenthesis) e-borders had achieved the following information flows: 50/(100)% outbound passports and 50/(80)% inbound passport, but unknown/(20)% for the intelligence 'richer' booking data (paras 1.15-1.16).

... IT projects in general, and large public IT projects in particular, indeed tend to fail. IT projects display an alarming rate of failure in terms of both schedule and cost overruns. Perhaps even more severely, large projects have a tendency not to deliver the promised value, and some are abandoned with a huge net loss, having failed to realize any value at all. Large scale public IT projects are typically triggered by policy reform and consequently highly visible in the media as taxpayer's money is on the line.⁹⁵

It is also important to recognize, commonly misplaced criticism of the activities of states and supra-national bodies, that in many of the cases where the public sector 'failed', it was trying to do something much more difficult than what many private businesses do...⁹⁶

Prüm is not solely a European achievement. It benefited from the policy of successive US administrations that made a crucial unilateral contribution to international cooperation, by sharing without charge (except for installation team costs) FBI CODIS (Combined DNA Index System) software. This is used in over 50 countries globally to identify matches among DNA profiles, both nationally and also in Prüm countries for international sharing.⁹⁷ Such dependence on USA technology has not come without technical and scientific problems. As indicated in Figure 4, US multiplex do not rely on Amelogenin to determine gender for source attribution purposes. This can cause problems within Europe. Gender mismatches are ignored and amelogenin is included in the automatic counting of the minimum number matching loci.⁹⁸ Although not on the same scale as the loci overlap problem, this will result in some additional erroneous automated hits, thus continuing to add to the cost of the monitoring and validation processes described earlier. This disadvantage, however, is probably outweighed by the benefits of building the Prüm system around a single and proven set of DNA comparison software. As the new generation of increased loci multiplex profiles become more common it is likely to cease to be a significant problem for Prüm exchanges.

As indicated above, despite the technical success of the Prüm model, achieving full connectivity has been slow. By the end of 2014 (Year 6) it had reached 29 per cent for fingerprints, 36 per cent for DNA and 55 per cent for vehicle/driver registration data.⁹⁹ This is probably explained by the time required for settling the national legislation needed to govern the operation of the Prüm system in each member state, the need sometimes to co-ordinate the cooperation of many different national agencies that will share data and, in the case of fingerprints, intra-national database interfaces between regional and specialist data collections. Something of the process can be appreciated from Prüm implementation processes in Poland. This is presented in Figure 6 as three distinct and consecutive cycles of activity.

⁹⁵ K. Holgeid and M. Thompson *A Reflection on Why Large Public Projects Fail* 11 Available at https://www.jbs.cam.ac.uk/fileadmin/user_upload/programmes/emba/downloads/A_Reflection_on_Why_Large_Public_IT_ProjEcts_Fail_-_Kjetil_Mark_Thompson_s_chapter.pdf (accessed 7 April 2016).

⁹⁶ M. Mazzucato, above n. 87 at 25.

⁹⁷ Federal Bureau of Investigation, 'CODIS Brochure'. Available at https://www.fbi.gov/about-us/lab/biometric-analysis/codis/codis_brochure (accessed 14 July 2016).

⁹⁸ C.P van der Beek, *The Prüm framework on DNA data exchange Present status and remaining issues*, presentation at the PIES Conference held in Brussels on 29 September 2015.

⁹⁹ General Secretariat, above n. 92.

Figure 6: The Prüm implementation cycle in Poland¹⁰⁰

(a) Transposition/legislative implementation cycle [2005] to 2012	(b) Technical implementation cycle 2011 to 2015			
<p>Relevant existing legislation prior to Prüm (June 2008):</p> <ul style="list-style-type: none"> • The Police Act (1990) • The Polish Constitution (1997) • The Code of Criminal Procedure (1997) • The Protection of Personal Data Act (1997) <p>Legislative changes made to create the legal framework that governs the technical facilitation of Prüm exchanges:</p> <ul style="list-style-type: none"> • Order no 1565 of the Police Commander in Chief dated 29 December 2005 [DNA only, and appears to have been issued in anticipation of Prüm] • The Act for the Exchange of Information with the Law Enforcement Authorities of the Member States of the European Union (2011) • The Ordinance of the Minister of Internal Affairs (2012) <p>Other legislative changes relevant to Prüm exchanges:</p> <ul style="list-style-type: none"> • The Act on Proceedings against Persons with Mental Disorders...(2013) <p>Other legislative changes relevant to the probative significance of forensic bioinformation in Poland:</p> <ul style="list-style-type: none"> • Amendments to the Code of Criminal Procedure (2013 & 2015) 		Assessment EU Prüm member states' experts	Initiation of routine data sharing	By early 2016, sharing data
	VRD	28-29 Nov 2011	Jan 2012	17 countries
	DNA	23-25 Oct 2012	Jan 2013	17 countries
	Fingerprints	24-26 Nov 2014	Nov 2015	8 countries
	<p>(c) Operational initiation /match filtering cycle 2012 onwards</p> <p>It was recognized that a decision making process needed to be initiated to determine which verified matches should be prioritized (alternatively which cases to 'filter out for no immediate action) for further action. Relevant factors, in addition to criminologically determined priorities, such as the seriousness of the offence, will include the avoidance of potential legal inhibitors to further investigation or prosecution. For example, it will be important to have regard to date on which crimes were committed in order to avoid investigations/proceedings becoming time barred should the verified match result in strong case for prosecuting the suspected person/suspect.</p>			

While the Prüm transposition and implementation processes may have been complicated and complex in many member states, Prüm implementation will have rarely taken place in a legislative or criminal justice policy vacuum. Again, taking Poland as an example and confining the observations to directly relevant legislation, concurrently with the Prüm work there were major amendments in 2013 and 2015 to the Code of Criminal Procedure. Under the Polish Constitution this regulates criminal procedure in some detail.¹⁰¹ These changes culminated in July 2015 with a switch to a more adversarial approach that appears to have created significant challenges for prosecutors, the police and the forensic science community.¹⁰² The Code of Criminal Procedure also governs the collection and use of forensic biometric data, including uploading it to a national database. Further new legislation (The Act on Proceedings against Persons with Mental disorders....) involving forensic biometrics dealing, inter alia, with, unidentified bodies and persons who attempt to conceal their

¹⁰⁰The author is grateful to Professor zw. dr hab C. Kulesza and Dr. D. Kuzelewski, Faculty of law, University of Bialystok for their detailed and patient introduction to the relevant Polish criminal justice legislation at a UKPFE workshop held in Warsaw on 23.10.2014 and later an officer from the International Information Exchange Department, International Police Cooperation Bureau, Police National HQ at the United Kingdom Prüm Fingerprint Evaluation (UKPFE) Project, End of Project Conference, The Hague, 14-15.01. 2016. Any subsequent error or omission is solely attributable to the author.

¹⁰¹ C. Nowak and S. Steinborn, 'Poland' in K. Ligeti (ed.), *Towards a Prosecutor for the European Union, Volume 1: A comparative Analysis* (Hart, Oxford: 2013) at 498-539.

¹⁰² For a brief synopsis of the changes see: M. Mączka-Pacholak, *Guest Post: New Polish Criminal Procedure Code*, 1 July 2015, < <https://www.fairtrials.org/press/guest-post-new-polish-criminal-procedure-code/> > accessed 31 March 2016. The author was able to discuss these changes directly with legal academics, a prosecutor and forensic scientists on three research visits to Poland.

identity will also have placed extra demands on forensic database management and staff during the Prüm implementation period.¹⁰³

Discussion: The Potential Advantages of the Prüm Model and will it be able to Withstand Shocks?

Prüm's technical architecture and the project implementation strategies developed by the Commission, other EU institutions and member states, even with 2014 levels of connectivity, appear to reflect successful decision making and implementation management for a project of this type. At first sight, there would seem little need to distinguish between Prüm design and implementation as an exemplar for the delivery of international criminal justice cooperation as an intermediate input into global public goods and, in its legal structure, a model likely to satisfy the capability and necessity stages of a proportionality test. Such a view could be mistaken. It should not be overlooked that EU institutions have also successfully introduced high volume central databases for external border control purposes: the Schengen Information System (SIS), the VISA Information System (VIS) and the asylum applicants and third country irregular entrants records (EURODAC). All of these contain and make use of forensic biometric data and are accessible to member states for criminal justice and security purposes. There is a distinction, however, that may be relevant to the socio-cultural issues identified by Loader and Walker. All the EU centralised systems, with the exception of SIS, hold data exclusively about third country nationals, though potentially, post-Brexit, also UK citizens.

A further important question is whether the Prüm decentralised model is preferable from a legal human rights, and data protection perspective? Soletto Muñoz and Fiodorova, after noting the 'huge difference' in the greater volume of forensic biometric exchanges facilitated by Prüm compared with the Interpol system, even at the date of their research (completed in July 2013), did not attribute this to technical choices and implementation skills. Instead, they suggested that better national control over the data under the Prüm System, confidence in data protection, a tendency to search for information within the Schengen area first and above all mutual trust between EU countries compared with the arrangements for and context in which the Interpol system operates might explain these differences.¹⁰⁴ It should perhaps be emphasised that, as far as their first point is concerned, Prüm operations offer much more transparency to national data supervisory authorities and will directly reflect how each state has chosen to make use of the accepted wide margin of appreciation over the use forensic bioinformation. In these respects there are qualitative and constitutional reasons in favour of the Prüm model. This view is reinforced by a potentially powerful socio-cultural resonance, especially in a country like the UK that is cautious about ceding sovereignty or the control of aspects its international activities to supra-national bodies, such as Interpol, that are bureaucratically managed, lack transparency and are not democratically accountable. The maximum degree of legal autonomy, reserved governance and interface with suspect rights under the Prüm model of cooperation, is comfortably like the cross-jurisdictional relationship described in the second part of this article between England and Scotland and accepted by the UK with the Rome Statute. However, it is important to stress that their other points about the success of

¹⁰³ The Act of 22 November 2013 on Proceedings against Persons with Mental Disorders Posing a Threat to the Life, Health or Sexual Freedom of other Persons....

¹⁰⁴ Soletto Muñoz and Fiodorova, above n.32 at 153.

the Prüm model reflect what was suggested earlier about EU criminal justice stem from how it has developed as a system and not a series of discrete projects.

It is possible to go further and suggest that perhaps another socio-cultural factor may also be relevant for understanding the Prüm project. This suggestion is based on extended and frequent observations of the key players in Prüm implementation.¹⁰⁵ Key experts from Europol, Eurojust, the Netherlands Forensic Institute (NFI) and the German Federal Criminal Police Office (BKA), together with colleagues from highly proactive member states, especially Austria, formed a small and, as far as other member states have experienced, inclusive community to resolve implementation problems. This observation is consistent with global public goods research - albeit concerned with a different stage in the policy cycle – about the importance for national delegations to intergovernmental negotiations to be able to ensure continuity, interdisciplinary knowledge and skills within the team, together with the ability to develop and exploit an institutional memory.¹⁰⁶ It also has some similarities to what Zaiotti has described as practical learning after analysing the personal interactions behind some of the convergence between EU and US security policies.¹⁰⁷

These arguments do not address an important political consideration: equity in the distribution of ‘publicness’ in the distribution of net benefits (e.g. in the allocation of input costs between richer and poorer countries and decision making).¹⁰⁸ In terms of the specific context of this article, does the Prüm legislation oblige states of (migratory) origin to undertake the cost of databasing criminal justice information for the benefit of destination states? In other words, does it force the internalization of externalities? Certainly during the initial years of Prüm concerns were expressed in Portugal about how its promotion by more influential member states might distort criminal justice expenditure priorities in that country.¹⁰⁹ At a more extreme level of influence, academic discourse about international security and policing cooperation warns of the potential risk of subtle ‘re-colonisation’?¹¹⁰

There is certainly an element of the internalization of externalities in Prüm and, as in all economic and political relationships with significantly asymmetrical distributions of influence. Various funding models have been developed in recognition of these issues. For example, ‘a common pool’ approach based on assessed contributions reflecting national wealth and vulnerability.¹¹¹ Alternatively,

¹⁰⁵ These observations are derived from periods as a senior UK civil servant (2003-5) and a researcher (2006-2010 and 2012-16).

¹⁰⁶ P Chasek and L Rajamani, ‘Steps Toward Enhanced Parity: Negotiating Capacity and Strategies of Developing Countries’ in Kaul *et al.*, above n.4 at 245-262.

¹⁰⁷ Zaiotti, above n.78 at 328-346.

¹⁰⁸ I. Kaul, P. Conceição, K.Le Goulven and R.U. Mendoza, ‘How to improve the Provision of Global Public Goods’ in Kaul *et al.*, above n.4 at 21-58.

¹⁰⁹ C. I. McCartney, T. J. Wilson and R. Williams, ‘Transnational Exchange of Forensic DNA: Viability, Legitimacy, and Acceptability’ (2011) 17 *Eur J Crim Policy Res* 309; and H. Machado and S. Silva ‘Portuguese forensic DNA database’ in R. Hindmarsh and B. Prainsack (eds), *Genetic Suspects: Global Governance of Forensic DNA Profiling and Databasing* (CUP: Cambridge MA, 2011) 233-234; and H. Machado and S. Silva ‘Trust, morality and altruism in the donation of biological material: the case of Portugal’ (2009) 28 *New Genetics and Society* 103–104.

¹¹⁰ M. den Boer, review: ‘Crafting trans-national policing. Police capacity building and global policing reform’ (see above n. 6) (2009) 19 *Policing and Society*, 325-328.

¹¹¹ Sandler, above n.30 at 194-216.

internalizing states might directly bear modest costs, thus acting like consumers exercising solidarity following normative reflection about climate change¹¹². Prüm has been implemented under what appears to be a reasonable hybrid model with 'significant financial and technical support' from the Commission or other European institutions and followed by additional low operational costs for national criminal justice systems that aspire to have access to the investigative and probative power of forensic science.¹¹³

There are clear mutual advantages to be gained from criminal justice cooperation generally, as indicated, for example, in the Scott-Baker Review of Extradition:

... extradition operates on the basis of mutual benefit and obligations. Given the ease of movement of people throughout the world, the United Kingdom needs the help of the international community to fight serious crime within its borders, just as much as other states need the assistance of the United Kingdom to deal with crime affecting their interests.¹¹⁴

Hence, the European Arrest Warrant (EAW) was defended by Prime Minister (then Home Secretary) May, in a move foreshadowing her advocacy of Prüm, even against fierce criticism from Eurosceptics in her own party.¹¹⁵ Beyond such instrumental considerations, however, the deontological and retributive significance of the criminal law distinguishes it from administrative regulation.¹¹⁶ Such considerations are evident in the extra-territorial jurisdictional powers of English criminal courts for a limited number of serious crimes. These offences range from murder or manslaughter (since 1861) to offences under the Bribery Act 2010. This may sometimes result in powerful congruence with global public goods, such as good governance. Indeed, the universal jurisdiction given to English courts over acts of torture – irrespective of the nationality of perpetrator and victim or location of the offence – goes so far as to transcend normal conceptions of criminal jurisdiction in the protection of universal human rights.¹¹⁷

The shock (in the sense used in the economic and political sciences), from the number of deaths attributable to terrorist crimes in France (234 from 7 January 2015 to 14 July 2016¹¹⁸), is testing the robustness of such congruence between legal doctrine, particularly on human rights, and global public goods. Such events are reinforcing the securitization trajectory of the EU criminal justice cooperation policy making agenda (or alternatively blurring the distinction between criminal justice cooperation and security as global public goods). Since 9/11 cooperation between the USA and the EU, and in North America cooperation between the USA and Canada with, sometimes, also Mexico

¹¹² For example, consumers may be willing to internalize the externalities of energy production (health, climate change and energy insecurity) by the payment of higher prices for green energy production. See A. Longo, A. Markandya and M Petrucci, 'The internalization of externalities in the production of electricity: Willingness to pay for the attributes of a policy for renewable energy' (2008) 67 *Ecological Economics* 140-152.

¹¹³ Commission, 'Stronger and Smarter Information Systems for Borders and Security' COM (2016) 205, 9.

¹¹⁴ *A Review of the United Kingdom's Extradition Arrangements* (Scott Baker Review) Home Office, London: 2011), 10.

¹¹⁵ HC Deb, 10 July 2014 vol 584, cols 486-491

¹¹⁶ See, for example, P. Roberts and A. Zuckerman, *Criminal Evidence*, 2nd edn (OUP: Oxford, 2010) 9-14.

¹¹⁷ s. 134 of the Criminal Justice Act 1988; see R.A. Duff, *Answering for Crime: Responsibility and Liability in the Criminal Law* (Hart: Oxford, 2007) 54-56.

¹¹⁸ 'Deaths in terror attacks in France linked to Islamists' *The New European*, July 22-28 2016, 9.

has seen the emergence of overlapping perimeter security for North America and the EU on a quasi-Schengen shared intelligence model, though for political reasons this is often described as ‘zones of confidence’.¹¹⁹ Some of the North American discussions, initially sparked by concerns about physical safety, have also appear to have been intermittently extended to cover a wider globalisation induced agenda of economic security, environmental protection, and food and product safety.¹²⁰

This is an area where congruence between security as a global public good and legal doctrine have already been severely strained. Reactions to US practices, such as extraordinary rendition and secret detention facilities, mass surveillance activities and discrimination (eg in the selective application of the visa waiver programme) have divided European institutions. The EU-US Passenger Name Record (PNR) agreement is good example of such turbulence. The first agreement (2004) was invalidated by the ECJ. Negotiations about a revised (2007) PNR agreement struggled and were only finally supported by the European Parliament in 2010. Major questions about an asymmetrical relationship remain, however, with some American criticism of the European stance on data protection when the huge US intelligence resources that Europeans could not expect to match, also defends Europe.¹²¹

Some (even transatlantic) observations suggest that European officials have through forging close and practically orientated working relationships come to ‘tame’ some of the US unilateralist tendencies.¹²² The entering into force of the EU-US ‘Umbrella Agreement’ on data exchanges for law enforcement was made dependent on the passage of US legislation in 2016 to enable EU citizens to bring civil actions under the US 1974 Privacy Act against the relevant US government agencies for unlawful disclosures of law enforcement records transferred to the USA. While, when reacting to European political pressures, the Commission has indicated that the Paris and Brussels (2015-16) terrorist crimes require the urgent completion of full connectivity for data systems such as Prüm and improved database interoperability for the police and border guards of all data held through single search interfaces with, thus, potentially biometric identification across all EU databases. This has been balanced by an emphasis on human rights and data protection.¹²³ It would be unwise to underestimate the greater influence of the USA in its clearly asymmetrical relationship with the EU and the political impact on Europe of shocks from terrorist crime. Such circumstances give traction to policy convergence, as can be seen, for example, in the eventual EU-wide PNR with mandatory information about flights into and outside the EU, and discretionary powers for similar data exchanges on intra-EU travel.¹²⁴ This proposal was rejected in 2013 by the European Parliament (on grounds of ‘necessity and proportionality’), but following the first 2015 terrorist murders in Paris, it called for such a directive to be adopted by the end of that year.¹²⁵

¹¹⁹ Above n.78 at 341.

¹²⁰ Ibid. at 339.

¹²¹ Parliament, ‘EU-US cooperation in Justice and Home Affairs – an overview’, PE (2016) 580.892

¹²² Above n. 78 at 331 and 338.

¹²³ Commission, ‘Stronger and Smarter Information Systems for Borders and Security’ COM (2016) 205 final 3-4, 8 and 11.

¹²⁴ Directive 2016/681 of the European Parliament and of the Council of 27 April 2016 on the use of passenger name record (PNR) data for the prevention, detection, investigation and prosecution of terrorist offences and serious crime.

¹²⁵ Parliament, Completing the adoption of an EU PNR Directive, PE (2016) 580.8 86.

Against such pressures the opportunity provided by judicial review for reflection and reconsideration of security and criminal justice cooperation measures is clearly essential. The CJEU has reserved to itself the power to invalidate a Commission finding that a third country arrangement for the transfer of personal data is lawful. Its case law, however has established the justiciability of challenges to the lawfulness of such arrangements, including the proportionality of security cooperation with the USA, before national data protection authorities and courts.¹²⁶ This is the final example in this article of the importance of congruence between global public goods and legal doctrine. Exceptional and threatening circumstances may reduce obstacles to policy convergence, particularly in an asymmetrical relationship, reducing the normal power of both socio-legal inhibitors and muffling the more clearly articulated political arguments about political and legal autonomy. Such circumstances also serve as a reminder about the ultimate public good: wise government. This relies on the third branch of government, the courts, undertaking their role in what should be a tripartite system of checks and balances. If democracy is to survive crises in an age of media fed anxieties, it is not simply a matter of majoritarian will. Its foundations are an endowment based on the experience of generations of voters, politicians, policy makers, legislators and jurists that is known as the rule of law and without which the public goods that matter will be scantily supplied.

Conclusions

This article has sought to examine the sharing of forensic bioninformation in order to answer a series of questions. In the author's view several can be dealt with very briefly.

Prüm is an effective model as an intermediate input into the production of a global public good(s). This stems from a number of reasons, in particular the way that it respects national political and legal autonomy over the regulation and use of sensitive personal data in a manner that can be effectively regulated by national courts. Also the governance of the system's operation remains at a national level. Though this may need to be reinforced by international cooperation among national data protection supervisors. It is clearly unsatisfactory, however, that the published statistics for DNA sharing are probably exaggerated by duplication and do not distinguish between automated (not necessary valid) hits and scientifically validated matches.

Compared with interpol's centralised approach and mindful of the problems of major IT project delivery, Prüm implementation appears to have been highly successful. This may be partly a matter of choice over the decision of a decentralised system, but it also owes some of this success to mutual confidence in the European Union's legal and insitutional structure, of which member state interrelationships are a key element, as well as the form that the working relationships have taken among key experts from European insitutions and member states who cooperated to ensure its success. Clearly, achieving full connectivity is now important and the Commision has rightly proposed that this should be as a priority in order to make criminal justice and security cooperation more effective at a time of frequent and serious terrorist crimes.

Having considered the consequences for the increasing securitisation of criminal justice cooperation and in particular growing EU-US policy policy convergence, the stability of the Prüm model can be seen to depend on the checks and balances of the European insitutions and their relationship with

¹²⁶ Case C-362/14 *Maximillian Schrems v Data Protection Commissioner* [2015] ECLI:EU:C: 650.

national institutions. In this respect congruence between the global public good objects that Prüm serves and legal doctrine is important and compared with Interpol or bilateral cooperation offer the vital safeguards of justiciability before national courts, CJEU and ECtHR.

On the debit side doubts have been raised about whether the influence of market fundamentalism within the UK may have possibly resulted in little or insufficient long-term benefit for the UK national interest from its pioneering role in the forensic use of DNA. It is suggested, in terms of the Walport remit for identifying how significant emerging technology might be exploited either directly or indirectly for this purpose, that policy makers may need to understand better how US technological innovation and economic growth rely on the state

Finally, given the Walport focus of this special issue, what are the implications of the EU Referendum results for UK law and policy making towards this model of international criminal justice cooperation? At the time of writing (August 2016) and the immense uncertainty over (a) what Brexit might mean and, whatever that is, (b) whether it is achievable in a rational manner, this is clearly a more difficult question.

Criminal justice and security need to be broadly treated in common and such cooperation should not be approached as simply a subordinate question to this country's future relationship with the European Union. An attempt has been made in this article to explain how the UK is too integrated within a globalised economy not to be affected by the negative spillovers of transnational crime and offending. Its physical borders and greater bureaucratic impediments to movement, therefore, are unlikely to have a significant impact on the comparatively small number of internationally mobile criminals who have committed serious crimes or who pose grave threats. A clear example of how the lack of mandatory cooperational obligations (on the EU model) can frustrate justice is the 'wall of protection' provided by Russia for the two suspects named by Sir Robert Owen in his report into the death of Alexander Litvinenko.¹²⁷ The conclusions in the inquiry report about the fact of and responsibility for the murder of Mr Litvinenko (paras 10.10 - 10.13) are expressed in terms used by the Inquiry Chairman to indicate his personal judgement to the criminal standard of proof (see para 2.20).

The UK lost some of its global influence on 23rd June 2016. With securitization increasing pressure for EU-US convergence on criminal justice and security issues, there will be no scope (even if there were the time and resources to pursue them) for UK bespoke solutions. Moreover, it is possible to discern, even in North America, a growing appetite for zones of security and/or criminal justice cooperation on an integrated Schengen model; and, possibly, picking up another Walport theme, eventually environmental and consumer protection goods regulation. International relationships among G8 countries and their immediate neighbours appear to be moving away from shopping lists with access to a database here or mutual assistance there. Physically and legally the UK is and will remain in the EU sphere of influence in such matters and policy makers need to carefully study the nature of the relationships achieved in this respect by Prüm members such as Iceland and Norway.

Obviously such analyses must be updated to take account of some of the more recent developments noted in this article, such as the recently conceded rights to EU citizens to be able to litigate against

¹²⁷ *The Litvinenko Inquiry: Report into the death of Alexander Litvinenko*, HC (2015-16) 695, para 9.179

Accepted version, as corrected at proof stage and with final funding statement.

US government agencies for the misuse of criminal justice or security data sharing. Serious thought also needs to be given to possible socio-cultural reactions, if the price of a summer holiday in Spain for a British citizen might in the future be the retention of sensitive personal information on a central EU database. Particularly where that data could be used by a policeman or border guard with access to any EU criminal justice or security system, and without any UK national governance of the data or the use of such information being justiciable in this country's courts.

Acknowledgement

The author wishes to thank colleagues and criminal justice professionals at a Sage-sponsored seminar for their helpful comments and questions about an earlier draft of this article. Other more specific acknowledgements are to be found in the footnotes.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Research on which this article is based was undertaken as a result of participation in two projects: The Prüm Implementation, Evaluation, and Strengthening of Forensic DNA Data Exchange (PIES) and The United Kingdom Prüm Fingerprint Evaluation (UKPFE). Both projects were supported by the ISEC Programme Prevention of and Fight Against Crime of the Directorate General Home Affairs of the European Commission (project numbers: HOME/2011/ISEC/AG/PRUM/4000002150 and HOME/2012/ISEC/AG/4000004396). Responsibility for the content of this article lies solely with the author. The European Commission is not responsible for the contents of this article or any views expressed herein.