

1. Introduction

1.1 Preliminary remarks

At a time when the diffusion of knowledge into society and the utilisation of science by industry is as high as ever some types of research may undergo restrictions on the basis of ethical principles and security imperatives. The role of this doctoral study is to clarify the legal obligations affecting research activities and explore the level of awareness of proliferation risks within the scientific community. National law provisions and especially international law would normally reflect and codify long-lasting ethical principles and patterns that guarantee the smooth functioning of societies. The study by no means intends to stigmatise specific areas of research and direct a purely ethical discussion on what should be considered as moral or not when conducting research. Instead, its main purpose is to identify the implications of export controls of dual-use items and technologies for legitimate research and equip researchers and research organisations with a strategy to cope with the challenges posed by the combat against the proliferation of Weapons of Mass Destruction (WMD).

A second clarification concerns the motives of this study. While the role of technology and subsequently, of knowledge is generally acknowledged in the literature dealing with the ‘proliferation-problematic’ it seems that there is a lack of impetus to study and tackle some intricate issues stemming from the application of export controls in the transfers of dual-use technologies and know-how¹.

From a scientific point of view and focusing on nuclear proliferation, there are scholars and theories explaining why States aspire to acquire nuclear weapons and how recognised and latent nuclear powers have managed to develop nuclear weapon capabilities². Furthermore, there are scholarships examining how nuclear assistance shared for peaceful purposes can be diverted to military purposes³ while other studies and reports shed light on how proliferation takes place by identifying the main patterns of illicit trade in nuclear materials and equipment⁴. Lastly, there are studies and handbooks presenting the export controls fundamentals and providing to potential exporters guidance and ‘best practices’ for complying with arms and dual-use export controls rules⁵. However, there are no extensive studies examining the implications of export controls for the academia and the whole research community. This might be true for diverse reasons such as the highly technical nature of the export controls field, the controversial character of issues touching upon restrictions in the diffusion of information and the containment of sensitive research as well as the partly right perception that research is or should be excluded from the scope of export controls.

Despite the lack of interest in the relationship between export controls and research in the literature, the question whether research activities can contribute to nuclear, biological and

¹ Meier, 2014; Fuhrmann, 2012; Kroenig, 2009; Reed, 2009.

² Sagan & Waltz, 2012; Singh & Way, 2004; Davis & Frankel, 1993; Rhodes, 1988.

³ Stulberg & Fuhrmann, 2013; Fuhrmann, 2012.

⁴ Albright, Stricker, & Wood, 2013; Albright, 2010.

⁵ Rosanelli, 2014; Michel et al., 2013; Joyner, 2006.

chemical proliferation and how deliberate misuse of research for criminal and terrorist purposes can be averted is a hotly-debated issue lately. Especially as regards the possible misuse of emerging technologies relating to biology and chemistry there is a rather vast body of literature on the so-called ‘dual-use dilemma’⁶. Most of these studies see the topic from an ethics perspective or, highlight physical security and safety parameters whereas examine the role of export controls to only a limited extent. Apart from the ethical dimension, ‘trading’ in sensitive materials may bring economic and criminal sanctions to those disregarding export control rules either purposefully or by ignorance regardless of whether they are States, entrepreneurs or scientists. The debate taking place in the US and most interestingly, the legal dispute over the claim of the Dutch licensing authority to ask an export authorisation for the publication in a well-known journal of a research study -exploring the transmissibility of H5N1 virus between mammals- has recently caught public attention and brought to the fore the problematic lying in the interferences between export controls and research in the most unequivocal manner.

From a political point of view, it is increasingly acknowledged that an effective non-proliferation strategy should target not only State-sponsored proliferation but also illicit networks, terrorist groups and individuals willing to carry the cost of proliferating or acquiring WMD capabilities. This broader scope of today’s non-proliferation concept is captured adequately by the United Nations Security Council Resolution (UNSCR) 1540 which obliges all UN member States to refrain from providing any form of support -including financial assistance- to non-State actors that attempt to develop, and acquire WMD and their means of delivery⁷. The resolution commits UN members to adopt and enforce effective and appropriate laws, national export and trans-shipment controls and physical protection measures securing thereby the production, use, storage, transport, export and transit of such items.

At the EU level, the proliferation of WMD and delivery systems was identified as ‘potentially the greatest threat to European security in the landmark document inaugurating the ‘European Security Strategy’ and titled ‘A Secure Europe in a Better World’⁸. The EU’s commitment to strong national and internationally coordinated export controls and the need to enhance them in view of rising threats such as the ‘new terrorism’ and challenges such as a diversified economic and technological environment is omnipresent in all relevant policy documents. Moreover, export controls are considered as a suitable tool for curbing the diffusion of

⁶ See indicatively: Rath, Ischi, & Perkins, 2014; Tucker, 2012; Miller & Selgelid, 2007.

⁷ UN Security Council Resolution 1540 on Non-Proliferation of Nuclear, Chemical and Biological Weapons, S/RES/1540, 2004.

⁸ The document was adopted by the European Council on 13 December 2003 and drafted under the responsibility of the EU High Representative Javier Solana. It provides the conceptual framework for the Common Foreign and Security Policy (CFSP), including what would later become the Common Security and Defence Policy (CSDP) and, singles out five key threats:

- terrorism
- proliferation of weapons of mass destruction (WMD)
- regional conflicts
- State failure
- organised crime

sensitive technology and know-how by both tangible and intangible means. In fact, the inclusion of intangible transfers of technology (ITT) within the scope of the European export controls dates back to 2000 and the discussion on their effectiveness is a recurrent topic on the agenda for more than a decade.

Furthermore, it is increasingly realised that the non-proliferation efforts should address and actively engage two sets of 'key stakeholders' as called by Husbands in the 'Technology Transfers and Non-proliferation', the industry and the international scientific community⁹. The role of these stakeholders and their ever increasing responsibilities *vis-à-vis* export controls in the context of modern globalisation is implied in the literature and European policy texts alike. For instance, the introduction of awareness raising models for undertakings, scientific and academic circles as well as financial institutions was mentioned already in 2008 among the priorities set by the 'New Lines for Action in Combating the Proliferation of WMD and their Delivery Systems' (NLA), the EU's action plan for implementing the 'EU's Strategy Against the Proliferation of WMD'¹⁰. Likewise, the strengthening of cooperation in terms of consular and scientific vigilance and the development of professional codes of conduct for scientists are further initiatives foreseen in the NLA of 2008 and the more recent 'Council's Conclusions on Ensuring the Continued Pursuit of an Effective EU Policy on the New Challenges Presented by the Proliferation of WMD and their Delivery Systems'¹¹. Despite the forceful language, the EU institutions and the EU Member States have not yet succeeded in implementing all the prescribed measures, let alone the ongoing debate on the effective implementation of technology transfers controls. Apart from a list of 'sensitive disciplines' agreed upon by the competent Council committees back in 2009 and a report including ideas and best practices for strengthening consular vigilance, the progress is limited to the implementation of awareness raising seminars and the adoption of codes of professional conduct by only some MS enforcing such measures in their respective national jurisdictions.

⁹ Oliver Meier, *Technology Transfers and Non-Proliferation of Weapons of Mass Destruction: Between Control and Cooperation*, Oxon: Routledge, 2014.

¹⁰ The EU Strategy against the Proliferation of WMD adopted by the Council in 2003 declares the resolve of the Union to use all instruments and policies at its disposal, to prevent, deter, halt and, where possible, eliminate programmes for the proliferation of WMD and missiles and, sets out an action plan towards this target. The document can be consulted in:

<http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2015708%202003%20INIT>

¹¹ The Foreign Affairs Council meeting of 21 October 2013 identified the main areas where action should be taken or stepped up by the EU institutions and the Member States with the view to responding to the new dimensions of the proliferation threat. The main points included the following:

- effectively protecting the access to proliferation-sensitive knowledge and know-how in the EU, and ensuring their peaceful use
- reacting to rapid developments in science, technology and communication which provide proliferators with easier access to the knowledge and know-how required for the design of weapons of mass destruction by proactively adapting EU instruments for combating proliferation

With regards to the implementation of export controls, the European Commission has launched the process for the review of the regulation 428/2009 -henceforth the Regulation or the dual-use regulation- establishing the EU trade control system and regulating inter alia ITT¹². The Commission with its Communication to the Council and the European Parliament has identified a number of possible policy options and steps forward for the modernization and of the EU export controls system. The application of export controls to the ITT and the ‘research of dual-use concern’ are among the areas that could potentially require reforming or further actions to be taken: “The Commission could examine options to promote a specific strategy to ensure ‘immaterial control’ and address the challenges posed by ITT, including the need to clarify the control of ‘dual-use research’, while avoiding undue obstacles to the free flow of knowledge and the global competitiveness of EU science and technology”¹³. In fact, this could be a first class opportunity to address identified malfunctions and establish a modern export control system compatible with the constantly changing external environment. Having said this, this doctoral study seeks also to contribute to this policy-oriented discussion on how EU initiatives could better address challenges inherent to the control of dual-use research and ITT.

To conclude, both my supervisors Pr. Dr. Q. Michel and Dr. F. Sevini, as well as I are convinced about the drivers thrusting this doctorate. The limited literature examining the potential implications of technology controls for research activities and, the urgency to tackle legal and policy questions along with pragmatic problems stemming from the application of export controls to the transfers of ‘proliferation sensitive knowledge’ provide the main impetus for this intellectual endeavour.

¹² EU, *Council Regulation No 428/2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items*, Official Journal of the EU (L134), Brussels, 2009. The consolidated version as amended of 12/06/2014 can be found in: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02009R0428-20140702&qid=1461583498859&from=pl>.

¹³ EU Commission, *Communication to the Council and the European Parliament: The Review of Export Control Policy: Ensuring Security and Competitiveness in a Changing World* (COM(2014) 244 final), 2014, 7.

1.2 Main questions and methodology

‘Export controls’ or, as increasingly referred to ‘strategic trade controls’ are considered to be as one of the lynchpins of the international non-proliferation enforcement strategy along with the international safeguards and physical protection frameworks¹⁴. In the arms control, disarmament and non-proliferation context, strategic trade controls could be defined as “a State’s regulation and activities to control international trade that represent direct or indirect threats to its national strategic security”¹⁵. Export controls function as a trade measure serving security imperatives (economic vs. security interests) and ‘dual-use goods’ are defined as primarily civil items which may also have military applications (military vs. civil application). From the preamble, it is clear that export controls of dual-use items are in the centre of ostensibly or actually contrasting principles and notions that necessitate the attainment of fine balances. If one attempts to draw simple ‘competing pairs’ relating to export controls, he or she will most probably come up with the following table:

Table I: ‘Competing pairs’ in strategic trade controls

Strategic Trade Controls: Competing Pairs		
<i>‘high politics’</i>		<i>‘low politics’</i>
<i>security interests</i>		<i>economic interests</i>
<i>trade restrictions</i>		<i>trade liberalisation</i>
<i>Common Foreign & Security Policy</i>	<i>versus</i>	<i>Common Commercial Policy</i>
<i>military nature</i>		<i>civil nature</i>
<i>technology controls</i>		<i>diffusion of knowledge</i>
<i>restricted research</i>		<i>academic freedom, openness and communality</i>

¹⁴ Some scholars prefer to use the term ‘trade’ rather than ‘export’ as the former appears to capture better the broad scope of activities, items and actors concerned by trade controls. Indeed, if one looks at the dictionary definitions export seems to have a more restrictive understanding –to carry or send a commodity abroad- whereas trade is defined as ‘the activity or process of buying, selling, or exchanging goods or services’. It is characteristic that the sole peer-reviewed Journal dedicated specifically to export controls is named ‘Strategic Trade Review’. However, formal texts and guidance usually prefer to use the long-standing term of export controls. Therefore, the study uses both terms interchangeably without implying any difference. Definitions drawn from Merriam-Webster online dictionary, available in: <http://www.merriam-webster.com/dictionary/export> and, <http://www.merriam-webster.com/dictionary/trade>.

¹⁵ Renaud Chatelus, “The Role of Customs in Strategic Trade Controls: Challenges and Potential, Taking a States’ Enforcement Perspective,” Center for International Trade and Security (University of Georgia), 2012, 6, retrieved from: http://cits.uga.edu/uploads/documents/chatelus_customs.pdf.

Some of the foregoing dipoles are not necessarily contrasting or ideally should act in complementarity. Generally speaking, foreign policy decisions are not taken in isolation from economic and trade interests and *vice-versa*. The discussion on the broader role of foreign policy and the impact of economic interests in shaping foreign policy decisions, is not new and relates to a more fundamental debate concerning the prevalence or not of what is traditionally considered as ‘high politics’ (e.g. foreign policy-security aspect) on ‘low politics’ (e.g. economic policy-trade aspect)¹⁶. From a non-proliferation standpoint, “economic and security interests among and within parties to non-proliferation agreements often clash. Reviews of the non-proliferation treaties and reforms on export control arrangements can damage international security should they be driven mainly by profit interests.”¹⁷

Export controls of dual-use items represent an intriguing case where trade imperatives and economic interests should be balanced against security and foreign policy considerations. However, export controls are not the only measure reflecting both economic and security objectives; trade agreements and sanctions are relevant examples not least due to the fact that the latter are largely enforced through export controls. What makes dual-use export controls particularly interesting is the nature of the controlled items as primarily civil products, without necessarily direct military applications, originating from any industry sector. Dealing with this special case in the EU context poses further challenges due to the complex institutional setting and the different decision-making modes applying to the policy areas involved. International security and non-proliferation concerns traditionally fall in the realm of Common Foreign and Security Policy whereas dual-use trade controls are governed by the Common Commercial Policy¹⁸.

This study draws on another less anticipated ‘competing pair’ namely, the imperative to curb the diffusion of proliferation sensitive knowledge and technology without disturbing unduly the conduct of research. Striking a balance between academic principles underpinning the free diffusion of information and non-proliferation imperatives calling for the safeguard of sensitive knowledge and technology from misuse seems to be an extremely difficult task. In today’s world, knowledge and technology that is to say the application of knowledge to the practical needs of societies, is at the heart of both academic and entrepreneurial activities. Apart from the control of raw materials and substances which are available in nature, non-proliferation efforts may concern technology in all its aspects (technological equipment, and technical assistance) including what is deemed as ‘proliferation sensitive knowledge’. The control of knowledge and technology on the basis of proliferation concerns is arduous also

¹⁶ For the multifaceted role of the EU foreign policy please see: Stephan Keukeleire and Tom Delreux, *The Foreign Policy of the European Union*. Basingstoke: Palgrave Macmillan, 2014.

¹⁷ Meier, *Technology Transfers and Non-Proliferation of Weapons of Mass Destruction*, 252.

¹⁸ The author has explored the interconnection between CCP and CFSP in the case of dual-use export-controls for his master thesis concluding inter alia that: “it is impossible to say if trade or security imperatives prevail in the policy formulation and implementation of the dual-use export control system. What is clear is that the interdependence between trade and foreign policy demands the concerted collaboration of policy actors and instruments from different policy areas across the EU edifice, *i.e.* regardless the remaining confines of the abolished pillar structure”.

from a practical point of view given that knowledge and technology flows are increasingly enabled through intangible means of transfer.

This problematic provides the impetus to set a fundamental question pervading the whole reasoning of the study:

How would it be possible for a system of norms, rules and decision making procedures to avert the diffusion of proliferation-sensitive knowledge and safeguard it from misuse? This question can be reformulated and answered also as a normative one: Is it acceptable to impose controls in the dissemination of proliferation sensitive information?

The practice shows that risks relating to the proliferation of WMD are perceived by politicians and citizens—at least in the West- as quite high and, the international and European law deal with this issue by setting certain constraints in the diffusion of sensitive knowledge and technologies. Therefore, a pragmatic approach should be adopted in order to come up with a realistic and workable answer.

To that end, it is expedient to set two more specific research questions:

First, what are the obligations of scientists and research organisations stemming from the international non-proliferation framework and how are these reflected in the trade controls system of dual-use items of the EU?

Second, how could researchers and research organisations comply with the existing regulations and respond to non-proliferation and export control imperatives?

Taking into account the intrinsic challenges in the implementation of technology transfer controls, fostering the accountability of research organisations through the adoption of internal compliance mechanisms, in synergy with further governmental initiatives, could reflect an appropriate and workable option for addressing requirements set in the non-proliferation law. In that regard, the study seeks to verify the validity of the following hypothesis:

Given the peculiarities of research and the challenging application of export controls in technology transfers, the implementation of internal compliance programmes by research organisations may represent both a fitting and a compelling response to heightened proliferation concerns.

Internal Compliance Programmes (ICPs) are useful tools towards both the attainment of a climate of awareness and responsibility within exporting organisations and the fulfilment of export control requirements by the exporters. Effective ICPs may function in synergy with codes of conduct or other agreed guidelines and comprise a clear policy and standardised

procedures ensuring that all employees are aware and compliant with any export control obligations relating to their work. Furthermore, the adoption of ICPs constitutes a common practice for industry already for a number of years already. On the contrary, most academic and research institutes -at least in Europe- do not have in place compliance mechanisms and awareness-raising tools *vis-à-vis* the export control legislation albeit they are not always untouched by legal consequences deriving from such laws. Enhancing the accountability of the research community and achieving compliance with non-proliferation and other security imperatives may presuppose a mix of self-governance measures tailored to the needs of researchers, In that regard, the ultimate goal of this doctoral study is not to validate or refute a hypothesis in view of a theory or a conceptual framework. Instead, the main purpose is to test if an ICP could be adapted accordingly so as to function efficiently in a research setting.

With a view to answering the aforementioned research questions, the study is structured along three main axes:

A. The first part seeks to achieve three main objectives. The first is the conceptualisation of ‘scientific research’, including the description of the different organisations (*e.g.* industrial, academic, and research institutes) where research takes place. The second is to identify restraints posed by the non-proliferation treaties and international export control regimes and their potential impact on research activities. In addition to this, the analysis will evidence the intricate nature of dual-use trade controls by examining the various understandings of the dual-use term as well as the scope and the content of the trade control legislation and pertinent control lists. The main driver behind this is to provide a definition of the ‘dual-use research’ from an export control point of view. Finally, the third objective concerns the very heart of the problems in question that is to say the implications of export controls for the academia and research institutions. In that respect, the EU trade control system will be set under close examination for clarifying the nexus between trade controls and research activities. With a view to understanding better the challenges and opportunities connecting with the implementation of export controls in a research setting, the American approach will be set under probation, as well. The analysis in Part A will rely mostly on the review of the related literature and an extensive analysis of legal documents for providing argumentation and broader conclusions. In addition, a case study will be used for elucidating the practical implementation of export controls *vis-à-vis* academia in the European and the American context.

B. The second part intends to elucidate the concept of export compliance and suggest a way forward for complying with legal requirements identified in the first section. Why ICPs are considered as a necessary tool for ensuring compliance with export control requirements and especially ITT controls? What are the drivers and main motives behind the adoption of ICPs and what one can learn from the experience of industry implementing such programmes already for years? Part B will offer an analysis of the main principles and key elements for building ICPs by illustrating different compliance practices followed by industry, universities and other research organisations. This part will explore also whether American and European universities are aware of export controls and the predominant attitudes of the research community in that regard. The ultimate objective here is to define a basic method for

identifying export control risks and designing internal compliance measures tailored to academic and research organisations. In order to succeed in this, the Part B will utilise a mix of online surveys, inquiries and in-depth interviews with export compliance practitioners, researchers and academics. This way information gained through online surveys will be cross-checked and upgraded with insights provided by experienced professionals.

C. The third Part aims to elaborate and test in practice the method conceived in part B for identifying export control risks and designing compliance systems fitted to research organisations. The Joint Research Centre (JRC), the European Commission's in-house science service will be used as a test case. The JRC constitutes a plausible option since it represents a European organisation undertaking research in a wide array of disciplines - including proliferation sensitive ones- and employing thousands of researchers in different sites. What are the components that an export control compliance management system for the JRC should definitely have in place? Should such a system be integrated in the existing compliance structure of the organisation or not? What are the main challenges in implementing such a system and how these could be overcome? How an effective strategy increasing the awareness and responsibility of the JRC researchers *vis-à-vis* export controls could be designed? With a view to responding to these questions, an online survey will be addressed to the JRC employees including scientific and administrative staff. In addition, for aspects requiring technical expertise and a solid background in various JRC research areas and institutional processes, I will resort to interviews with JRC experts and competent staff. Visibly, the last two parts of the thesis are closely interrelated since the ultimate goal is to suggest a methodology for enforcing export control compliance in a research environment, in this case at the Joint Research Centre.

Last, it must be underscored that the present thesis is particularly concerned with exploring how certain legal terms and provisions are interpreted and how proliferation-related concepts are understood in different contexts. This means that framing concepts and commenting on the interpretation of definitions and other legal provisions will be a recurrent issue all along the study. Apart from providing answers to the foregoing questions and verifying the study hypothesis, the concluding section will also attempt to come up with policy initiatives and measures that could be taken by government authorities in concert with the efforts of research institutions for furthering export control objectives.

1.3. Data collection and data analysis

The present study is a practice oriented and policy driven study. It is above all a scientific enterprise utilising a variety of data sources and data collection methods with a view to yielding evidence-based findings. To that end, the study relies on both primary and secondary data. The political, legal and highly technical and practical character of the issues in question require the use of primary data such as:

- personal and phone interviews with policy-makers, technical experts and scientists
- online surveys targeting scientists and export control practitioners
- participation in international conferences and symposia in the area of non-proliferation and export controls.

Also, secondary data sources are used as follows:

- available literature and peer reviewed journal articles
- legal and archival documents available from the EU institutions, international organisations and national governments
- information available on websites

It goes without saying that for issues relating to practices and problems of the scientific community as well as some technical questions the study draws also from the experience and expertise accumulated within the JRC. Likewise, the author relies on his personal insight acquired through earlier professional experience and participation in various Council and Commission Committees on dual-use export controls as well as seminars organised regularly by the Joint Research Centre for analysing the various issues addressed in the study.

Last, the research strategy comprises both inductive and deductive reasoning. Deductive in the sense that basic concepts and main elements are first defined against the broader context prior to being analysed from an export control point of view. Inductive in the sense that different case studies and actual experiences are used as a basis for drawing general conclusions on the interpretation of the legal framework or, the compliance practices and attitudes adopted by different organisations.