Do academic activities contribute to WMD proliferation?

Quentin Michel
Ordinary Professor, European Studies Unit,
Liege University, Belgium.

Christos Charatsis
Expert on trade controls and International security.

Lia Caponetti
Researcher assistant, European Studies Unit,
Liège University, Belgium.

Sylvain Paile
Senior researcher, European Studies Unit,
Liège University, Belgium.

Emanuela Marrone
Export Control Manager – Corporate at Rolls Royce, UK.

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Contents

1. WHY 7

1.1. IS/SHOULD ACADEMIA BE CONCERNED BY TRADE CONTROLS? 7

1.2. ATTEMPT TO DEFINE BASIC SCIENTIFIC RESEARCH AND PUBLIC DOMAIN IN REGARD WITH ACADEMIC ACTIVITIES 13

1.3. OPEN AND EVOLVING COLLABORATION BETWEEN RESEARCHERS AND RESEARCH CENTRES LOCATED ALL OVER THE WORLD. 19

1.3.1. Introductory note 19
1.3.2. Why controlling? Technology that serves society: Technology Transfer Offices (TTO) and industry 19
1.3.3. Why controlling? Let's get funded! Public contracts and research 22
1.3.4. Why controlling? United in research: EU-USA cooperation 24

2. WHAT does exist already and what should be better defined 25

2.1. GUIDANCE MATERIALS RATHER THAN ICP MODELS: GET INSPIRATION FROM INDUSTRIES 25

2.1.1. What can universities and research organisations learn from private industries to more smoothly and effectively fulfil legal and regulatory obligations? 26

2.2. ADAPTING THE INDUSTRY EXPERIENCE TO UNIVERSITY SETTINGS: POLICIES–PROCEDURES–TOOLS 33

2.3. OTHER INSTRUMENTS THAT CAN ACT IN SYNERGY WITH EXPORT CONTROLS 39

2.3.1. Levers for a bottom-up approach 39
2.3.2. Levers for a horizontal approach 41
2.3.3. Levers for a top-down approach 44

3. HOW to proceed and with whom to engage with? 47

3.1. ASSESSING MOTIVATIONS FOR ADOPTING AN ACTIVE COMPLIANCE STANCE 47

CHAPTER 1

WHY

1. IS/SHOULD ACADEMIA BE CONCERNED BY TRADE CONTROLS?

Do academic and research activities contribute to WMD proliferation? This might sound as a naïve question if one considers that scientific knowledge and its production can be used for both benign and evil purposes. Historically, perhaps, the most compelling example is nuclear fission, a discovery which led to several civil applications for power production, medical diagnosis and treatments, agriculture and other industrial purposes, but it was also exploited for building the first atomic bomb.

From an export control angle, the risk for research activities involving or delivering knowledge and artefacts of dual nature to be misused for nefarious purposes has been increasingly acknowledged by the authorities, industry and scholars[1].

This section sheds some light on the scope of trade controls, past and recent examples of proliferation cases involving scientists as well as information concerning the nexus of academic activities with export controls as traced in licensing data and other sources.

The EU trade control list targets a great variety of dual-use items having certain technical parameters and ranging from nuclear material, metals, alloys, pathogens and toxins to manufacturing equipment, electronics and telecommunication equipment, lasers to

1 C. Charatsis, Dual-use Research and Trade Controls: Opportunities and Controversies, Strategic Trade Review, Volume 3, Issue 4 (Spring 2017), pp.47-68.

sensors navigation and aviation equipment and more. The scope of export control provisions is equally comprehensive covering different types of activities including transfer of technology and software and provision of technical assistance and economic operations as transit, transhipment, brokering, export and re-export.

Whereas there are specific exemptions for basic scientific research and public domain information as well as trade facilitations easing the trade with the most important and safe trade partners, research activities are unavoidably captured in the scope of the law. Universities and research institutes are holders of technologies, materials and processed which are or could be controlled. If one counts in the possibility for end-use/end-user controls of non-listed items and additional measures that apply complementary to export controls such as country/entity specific sanctions, then the probability for research intensive universities of applied science to deal with some sort of restrictions is quite high.

The table below summarises general examples of activities pertinent to research and having some bearing on export controls.

SCENARIOS		
I. Transfers of equipment and materials	**Tangible means**	Provision of equipment, materials (*e.g.* under international collaborations)
		Decommissioning of reactors and dismantling of labs (*e.g.* selling or giving away used equipment)
II. Transfers of technical data and software	**Tangible & intangible means**	Sharing data/ software by electronic means (*e.g.* e-mail, upload on web-sites) or by post
		Publishing scientific research (*e.g.* in printed or e-versions)
III. Provision of technical assistance	**Intangible means**	Provision of technical services in third countries (*e.g.* specialised trainings & conferences)
		Oral provision of assistance from the EU (*e.g.* consulting services)

Are there specific cases of proliferation concern involving scientists? It is known for a fact that knowledge gained in European universities and know-how developed in research facilities in EU countries have been misused in relation to WMD proliferation. Most notably, A. Q. Khan -considered by many as the father of the Pakistani uranium enrichment programme- received education and worked in different EU countries during the 60s and the 70s. During his employment in URENCO, a uranium-enrichment consortium of British, German and Dutch companies, he gained access to gas-centrifuge technology prior to returning to his country. Khan not only led the efforts of Pakistan to develop nuclear weapons by using designs and suppliers originated from European companies, but also, in the mid-80s, he set up a black-market network selling nuclear and missile equipment and know-how to countries such as Iran, North Korea and Libya, routed via front companies in several countries all over the world[2]. Indeed, the revelation of this network in 2003 was among the main reasons for strengthening export controls worldwide and adopting the UNSCR 1540.

However, if one inquires for cases where professors or researchers and students were prosecuted in Europe he will hardly find any[3]. That said, stories concerning possible inadvertent export control violations by universities have surfaced in the press and it is known that export control authorities in countries such as Netherlands and Germany have sent warning letters or even imposed economic sanctions to research centres following their

2 A. Q. Khan was the head of the Pakistani uranium enrichment program from 1976 to 2001. For more information on the profile of the Abdul Qadeer Khan and the activities of his illicit network please see: https://www.britannica.com/print/article/1009243; https://carnegieendowment.org/2012/01/23/a.q.-khan-network-and-its-fourth-customer-event-3505.

3 Criminal investigations concerning universities have been confirmed at least in Sweden and Germany.

weakness to be aware of or conform fully to the law[4]. A valuable source of information when it comes to export control prosecutions comes from the US DOS (BIS), and its annually updated publication with actual investigations of export control and anti-boycott violations[5]. Among the cases contained there, there are a few concerning researchers and universities whereas the most known is about J. Reece Roth, Professor Emeritus at the University of Tennessee. Between January 2004 and May 2006, Professor Roth engaged in a conspiracy to transmit export controlled technical data subject to US arms export controls (ITAR) to graduate students from China and Iran. In July 2009, Roth was sentenced to 48 months in prison and two years of supervised release[6]. In Europe, the debate concerning the role of export controls for dual-use research came to the forefront when the Dutch licensing authority imposed an authorisation requirement to a life science article which was submitted for publication to a renowned peer-reviewed journal (Science)[7]. Even though the licence was granted and the article was finally published, the concerned scientist argued that his article qualifies as basic research and falls, therefore, within the relevant exemption of the EU regulation. The scientist took legal action which, however, did not lead to the full legal clarification of the basic research exemption in a decision taken by the Appellate Court in Amsterdam.

The right to freely share and publish the results of potentially sensitive scientific research remains the most controversial case where export control might apply.

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4 Discussions with export compliance officers and authorities during the 9th ESARDA Export Control Working group, Luxembourg, May 16, 2018.

5 US DOS (BIS), Office of Export Enforcement, "Do not let this happen to you, Actual Investigations of Export Control and Anti-boycott Violations," 2017, retrieved from: https://www.bis.doc.gov/index.php/documents/enforcement/1005-don-t-let-this-happen-to-you-1.

6 *Ibid*, p. 60.

7 For a full review of the case see: Christos Charatsis, "Setting the Publication of 'Dual-use Research' under the Export Authorization Process," Strategic Trade Review, 1:1 (Autumn 2015), pp. 56-72.

Another relevant question to ask is whether there are indications of the impact of export controls on academic activities in relevant licensing data. In the EU, the European Commission (EC) publishes only aggregated data and those Member States (MS) which make public licensing data normally do not provide detailed data about licenses granted to research institutes/ universities and firms. In some discussions (including an internal questionnaire) held by the EC two years ago, almost none of the responding MS acknowledged to have granted a licence for an intangible transfer of technology (ITT) to a university. Nonetheless, during the same discussion, there were a few references to firms which have applied for and were granted with licenses in the context of their collaboration with universities. In addition, it is known that research institutes and universities have applied for licences such as for software applications in Germany (most notably the EC JRC), Netherlands (NRG) and Belgium. Reasonably, a number of research institutions are concerned and have applied for transferring tangible dual-use commodities as well.

The underlying question here is whether university-based research is only remotely concerned by export controls as most of the time is exempt from the scope of controls or, universities are not aware of the law and therefore fall short of expectations to act responsibly and in compliance with the relevant legal framework.

The US is home to sophisticated research institutes and it applies a stringent system of export controls including the notion of deemed exports for foreigners accessing controlled technologies within the US territory. Again, also in the US, only a low portion of the total of 33,195 license applications for tangible items, software and technology reviewed by BIS is filled by universities[8]. Prior to drawing broader conclusions, one needs to take into account the

8 Data as of 2016 published by the Bureau of Industry and Security (DOC), available in: https://www.bis.doc.gov/index.php/statistical-reports/licensing-analysis.

interpretation of basic scientific research in the US (what is not proprietary information or classified information under national security provisions is eligible for publication) and the fact that federally funded research is also reviewed through other means such as classification procedures and the National Science Advisory Board for Biosecurity (this latter is in charge of biosecurity implications of dual-use research).

A last parameter to consider is how academics and the research community perceive the risk for their research to be misused for WMD purposes. Generally speaking, it seems to be a common place that research can have more than one uses, some of them legitimate while others not. In that regard, anyone who has access to sensitive information, know-how and material may be willing to run the risks to pursue unlawful actions. The academia and the research community are particularly conscious and concerned by risks and ethical dilemmas inherent to certain areas of science such as artificial intelligence, biotechnology and nuclear engineering. However, when it comes to export control objectives, researchers, many times, are not aware of the proliferation implications when developing and sharing sensitive technologies. When exposed at first to the concept of export controls, scientists cannot always realise that their research can have some relevance to WMD proliferation, especially if they are not working in a defence context or in the nuclear area. The weaponization of dual-use technologies is technically a complex process, the knowledge that dual-use items with broad civil applications have been used in the past for proliferation purposes is not diffused and export controls can be perceived as a discriminatory mechanism. For these reasons reaching out to academia is an important yet not an undemanding mission.

2. ATTEMPT TO DEFINE BASIC SCIENTIFIC RESEARCH AND PUBLIC DOMAIN IN REGARD WITH ACADEMIC ACTIVITIES

All trade control regimes - except the Zangger Committee - have included in their guidelines, as basic principle, that controls on transfers do not apply to information in the *public domain* or to *basic scientific research*[9]. If these two exceptions have been considered necessary to avoid the burdensome of controlling items that are widely available, we could wonder if those terms and more specifically the basic scientific research exemption still correspond to the realities of the research community.

In the following paragraphs we intend to analyse both exceptions and analyse how it has been understood by the research community.

The definition of public domain is almost equivalent in the different regimes, it includes technology or software that has been made available without restrictions upon its further dissemination. Copyrights restrictions do not exclude such items to be in the public domain.

Further, in their Annexes, the MTCR and the Australia Group add that controls on software do not apply to software which is generally available to the public. The difference between this last paragraph and the first one is rather unclear. It essentially restates the exception. However, by qualifying that selling of software by

9 See:
- Wassenaar Arrangement (Public Documents, Vol II – List of Dual-Use Goods and Technologies and Munitions List), definition, p. 215;
- NSG Guidelines (INFCIRC 254Rev10 part 2 and INFCIRC 254Rev13 part 1), technology controls and definitions;
- Australia Group (Volume I and II: Chemical Weapons-Related Common Control Lists), definition of terms;
- MTCR Guidelines and technical annexes, definitions.

any systems of financial transfer does not exclude the transaction to be covered by the exception clarify the understanding.

Nevertheless, considering academic research activities, one could wonder if such exception is useful and implementable. Trade controls are grounded on lists of items to be controlled as well as for certain States on catch-all clause provisions focusing on potential problematic end-users. Therefore, the fact that an item is available without restriction confirms that it is not listed and not submitted to transfer authorisation unless the authorities are aware or have been made aware by the exporter that the end-user might misuse it. One can take the example of a research centre which develops a new software not related to any weapons or military end-uses and thence considering the raise of interests from industries, it decides to sell the software via its website. After a few months of successful commercial deployment, it becomes evident that this software could contribute to the development of a chemical weapons. In such a scenario does the exception of public domain still apply?

Like the definition of public domain, the four international trade control regimes have adopted a similar definition of basic scientific research that consist in experimental or theoretical work undertaken principally to acquire new knowledge of the fundamental principles of phenomena and observable facts, not primarily directed toward a specific practical aim or objective[10]. The basic scientific research concept emerged in the 20th century and until the end of the second world war it meant primarily long-term research in the natural sciences that was ultimately expected to solve problems. The concept acquired, over the years, several functions. First, it became a criterion to obtain state research funding to guarantee the sustainability of research when the outcome and

10 See for example, Australia Group (Volume I and II: Chemical Weapons-Related Common Control Lists), definition of terms.

potential applications could not be clearly established and private funding could not be obtained. Secondly, it permitted scientists to not take position on the various dilemmas about the purpose of science and subsequent political implications. The cold war and the need of new weaponry to counter the development of the arsenal of USSR encourage NATO member countries, in particular the US, to fund academic research aiming directly or indirectly at the development of military applications. Consequently, the condition of secrecy was imposed on large areas of research relevant to military projects whatever it might be considered by the scientific community basic research or not.

The Atomic Energy Act of 1946 constitutes an interesting example of how US authorities have attempted to cope with this dilemma. If one of the objectives of the Act is to provide "a program of assisting and fostering private research and development to encourage maximum scientific progress", it includes as well "a program for the control of scientific and technical information which will permit the dissemination of such information to encourage scientific progress, and for the sharing on a reciprocal basis of information … **as soon as** …. safeguards against its use for destructive purposes can be devised"[11]. Therefore, if the need to allow the dissemination of knowledge is recognized, decontrol will be conceivable only when it will be technically and politically possible. The concept of basic research and the possibility of an exception is not established by the Act. The situation remains almost unchanged until the adoption of the NSG Nuclear related Dual Use Guidelines, in July 1992, where the exception for basic scientific research has been introduced and adopted successively by the other trade control regimes. The evolution of nuclear trade control regime from especially designed nuclear items to nuclear dual-use items has consequently changed the concept of control from systematic control of all activities of a very specific

11 Section 1b of Public law 585, 79th Congress.

sector to selected items of large spectrum of activities. In other words, the principle of control was changed from a presumption of control to a possibility of control. Initially, items related to nuclear activities were not under control only if a provision in the legislation organised the exception for such transaction. After 1992, an activity was submitted to control only if it was specifically listed or later targeted by a catch-all clause provision. Consequently, it was necessary to define precisely the scope of control. The criterion used by regimes to add items on their lists was based on its potential contribution to the elaboration of a nuclear, biological, chemical weapons or its means of delivery (missile). Considering that potential contribution of basic research to such weapons is almost impossible to identify as long as, by principle, this research is not directed toward a specific practical aim or objective, they have been excluded from the scope of control.

Research activities conducted by universities have been considered for long as not sensitive and broadly covered by the basic research exception unless they are related to nuclear especially designed items or, in some cases, funded by the Ministry of Defence.

However, confronting the definition of basic research as highlighted with the historical perspective explained above, a main question merits further examination: do university activities still match – if they never had – this concept of basic research dating back to the 20th century?

Traditionally, activities conducted by universities are usually divided between research and lecturing. In that regard, the academic staff should see themselves as professors and researchers who enrich their lectures with research findings and vice-versa. However, facing the reduction of public funding for research and the call to be more involved in the economic development of the society, academics have been constrained to develop some kind of entrepreneurship to disseminate their research results and

demonstrate their usefulness for citizens and society. This new role has led to the creation of an increasing number of university spinoffs to commercialize their research results. Universities have even institutionalised such process via an interface business-university organisation. Therefore, the margin between basic research and applied research fades partly away as well as the assumption that universities are conducting only fundamental research.

This trend has also strongly influenced the concept of research unit or service that was initially limited to one or two academics supported by a staff of assistants and PhD researchers focusing on topics related to academic courses. Presently, if it is still under the supervision of academics, it includes also research and researchers not necessarily related to unit courses and conducting applied research and even applied PhDs. A part of those activities might lead to the creation of independent research centre or a spinoff if they could be financially sustainable. Therefore, the concept of research centre partly related or not to a university will not guarantee that only basic research is conducted.

In the field of dual-use export control, the EU P2P project aiming to enhance the effectiveness of export control systems of dual-use items so as to combat the proliferation of weapons of mass destruction and related materials, equipment and technologies constitute a good example of this trend. This applied research project that includes activities like the drafting of relevant export control legislation, provision of training for customs or licensing officials, train-the-trainer exercises is implemented by a consortium mixing universities, research centres and public authorities. It is led by Expertise France which includes the French Ministry of Economy, Industry and Numerics, represented by the Export Control Office on Dual-Use Goods (SBDU), King's College London, the Swedish Inspectorate of Strategic Products, the Customs authorities of France and Belgium, the United Kingdom National Nuclear Laboratory and the University of Liège.

Finally, cooperation with industries has become more and more necessary to finance or develop new research projects and might even constitute an asset to win a call for a large research project. Therefore, several industries could be integrated in a large consortium including university research units from different countries to implement a project that is essentially fundamental research even if it might have potential applications.

The ITER project dedicated to prove the feasibility of fusion as a large-scale source of energy constitutes a good example of mixed cooperation between authorities, research centres and industries in a large international fundamental and applied research project.

To conclude, if initially it was conceivable to consider activities conducted by universities as essentially basic research and therefore, not concerned by trade controls, the evolution of their activities and their increasing involvement in the economic development of the society renders such exception presently irrelevant.

Moreover, from a trade control point of view, the notion of basic research as internationally defined presently by the international trade control regimes might even be misleading. Save so some very specific cases, the distinction between fundamental and applied research is almost irrelevant for most of university activities. In that regard, it is not the locus of research that matters but its specific nature and possible applications. Activities conducted by academics should not be exempt by default from the scope of controls and research conducted by operators might also fall within the exemptions. However, it might be relevant to adapt the trade control process to the specificities of the academic world. As it was stated, even though the nature of academic activities does not always differ from those undertaken by economic operators, the university decision-making process and internal structure are not comparable to the ones of operators.

3. OPEN AND EVOLVING COLLABORATION BETWEEN RESEARCHERS AND RESEARCH CENTRES LOCATED ALL OVER THE WORLD.

3.1. Introductory note

Research activities (and at a minor degree teaching activities) are, by nature, open and evolving. The principle of academic freedom, the importance of sharing and confronting research results, together with the increasing imperative, especially for young researchers, to publish "no matter what" do not perfectly fit the principle of (trade) restriction. Still, the necessity to fit in a closer and faster world is pushing universities and research centres to get equipped to face the challenges of the new millennium, notably to act responsibly while producing and exporting knowledge. A responsibility that, in some cases, calls for self-censorship and, in others, for self-aggrandizement.

3.2. Why controlling? Technology that serves society: Technology Transfer Offices (TTO) and industry

Universities and research centres are increasingly called to respond to the needs of a society that grows connected in a technological network. Industries, pioneers of societal solutions and generators of societal needs, look at universities to find new and fresh ideas in order to keep the pace. On the other side, universities and research centres find in external funding a vital source of sustenance.

Some European universities have established "knowledge and technology transfer" units (often called "technology transfer offices" - TTO) whose focus is not on technology transfer control, but on the valorisation and promotion of research results.

The partnership between industries and universities/research centres is one of the reasons why the last ones are or should be concerned by trade controls. In fact, in this context, what is considered as "basic research" (not submitted to trade controls according to the European legislation) might evolve to "applied research", "experimental research" and finally "market exploitation".

Still, it is worth it to consider two key elements:

1. even without transiting the different phases, "basic research" could involve dual-use items;
2. frequent times, the boundaries between "basic or fundamental research" and "applied/experimental research" are susceptible to varying interpretations.

In addition, the progression of basic knowledge from the library or the laboratory to societal application is far from linear and questions of more fundamental or applied nature might be raised in different phases[12].

Trade controls towards academic research should be implemented for two main reasons:

1. academic research can involve or produce dual-use materials and equipment as well as software and know-how regardless of its basic or applied character;
2. universities are increasingly collaborating with industry in order to produce applied research. In this context, partnering with firms requires being a responsible business actor by implementing some kind of internal control measures, referred usually as Internal Compliance Programmes (ICP).

12 Duderstadt, "The Changing Nature of Research and the Future of the University," 77.

While in the first case, the responsibility to apply internal control relies on the university/research centre conducting potentially dual-use research/teaching activities, in the second case, it might be a shared concern between the university and the firm. It is important to remind here that implementing ICPs is not mandatory for either universities, research centres or firms in the EU. However, several EU Member State authorities have acknowledged that they asses the compliance credentials of an exporter prior, during and after the licensing process. Breach of licensing conditions or unlawful export either wilfully or by negligence results to administrative and sometimes criminal sanctions in all EU Member States, according to present EU legislation. The main difference between the industry and the university world is that the first enjoys a much higher degree of awareness of export control risks compared to universities.

If the present EU Commission proposal for the Recast of EU dual-use Regulation[13] is approved, ICPs will become explicitly a mandatory condition for all exporters applying for a global license in the EU. This emphasis on internal controls could mean that universities and research centres which do not implement ICPs represent fewer appealing partners for compliant and aware economic operators. It implies also that industry might have a role to play in informing and encouraging research organisations to implement ICPs.

In this view, the constraint for universities/research centres to comply with export controls would come indirectly from the industry side.

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13 Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL setting up a Union regime for the control of exports, transfer, brokering, technical assistance and transit of dual-use items (recast), Brussels, 28.9.2016 COM(2016) 616 final 2016/0295 (COD). Available on: https://eur-lex.europa.eu/resource.html?uri=cellar:1b8f930e-8648-11e6-b076-01aa75ed71a1.0013.02/DOC_1&format=PDF.

3.3. Why controlling? Let's get funded! Public contracts and research

Another strategic and "older" partner of universities and research centres is the public sector and more particularly, the Government. Strategic departments of the national governments, such as the military and defence ones, have often drawn from academia to acquire expertise and research results. As for the industry, research results concerned in this framework involve applied research which is not exempted from trade controls. However, the very nature of this kind of military/strategic research requires a certain degree of secrecy and a high degree of control. In most cases, this is achieved through classification of the research results and other review requirements as set in the relevant agreements between the government agency and the university. Moreover, the dual-use component here leaves the peace to the military one, avoiding any possible misunderstanding on the end-use of the research. For this reason, universities and research centres working in this field are well equipped to face trade controls, especially technology transfers.

The situation is different for other types of contractors, such as the EU which, through large funding schemes such as the Horizon 2020 (H2020)[14], covers a wider spectrum of research fields (*e.g.* health, space, transport, ICT, energy, biotechnology, etc.) where the dual-use component does exist. In the Article 14 of its founding Regulation, the programme clearly establishes that "the Commission shall systematically carry out ethics reviews for proposals raising ethical issues. That review shall verify the respect

14 For more information on H2020, please see the European Commission's website: at the following address: https://ec.europa.eu/programmes/horizon2020/what-horizon-2020.

of ethical principles and legislation (...)"[15]. Practically, the EU requires H2020 applicants to fill in an ethics self-assessment where, one of the topics to consider by the applicant is research involving dual-use items[16]. A specific guidance-note on research involving dual-use items is also provided to help the applicant to assess if his/her research involves dual-use items[17]. The Guidance asks the applicants to consider whether their research "develops, produces or uses any dual-use items, technology or software"[18] and if it is the case, it informs of the possibility to apply for a licence, according to Regulation 428/2009[19] and national legislation (especially in case of intangible technology transfers – ITTs, an authorisation is required buy some Member States to publish research findings in a journal from outside the EU).

If after self-assessment, the applicant estimates that his/her research involves dual-use items, he/she has to state which items could come under the dual-use rules and how he/she will comply and what actions will be taken in case the national authorities do not grant any authorisation.

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15 REGULATION (EU) No 1290/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013, laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)"and repealing Regulation (EC) No 1906/200, Article 14.

16 Horizon 2020 Programme Guidance *How to complete your ethics self-assessment*, EUROPEAN COMMISSION Directorate-General for Research & Innovation, Version 6.0 23 July 2018. Available on: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/ethics/h2020_hi_ethics-self-assess_en.pdf.

17 Guidance note — Research involving dual-use items, EUROPEAN COMMISSION Directorate-General for Migration and Home Affairs Directorate-General for Research and Innovation Directorate-General for Trade. Available on: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/guide_research-dual-use_en.pdf.

18 *Ibid*. p. 1.

19 Council Regulation (EC) No 428/2009 of 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items, Official Journal of the European Union, L134/1 of 29/05/2009. Available on: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32009R0428.

3.4. Why controlling? United in research: EU-USA cooperation

If European legislation does not provide explicitly legal constraints for researchers to control dual-use items, ironically and only partly surprisingly, legal constraints for EU researchers to control come from the outside, from the USA. In fact, US legislation is several steps ahead in terms of trade controls as applied to research and teaching activities, at the point that, in case of involvement of "US components" in EU research, US legislation still applies. By "US components" is meant here:

- US-funded research;
- Involvement of US researchers/institutions;
- Use of materials or technology originating from the US.

Application of US legislation in this regard may entail that people of a certain nationality are not allowed to take part in the research, or that the further dissemination of the results is subject to authorisation from the US government.

It is worth highlighting that US legislation follows the principle of deemed exports (US Export Administration Regulations (§734.2(b)(2) of EAR).

An export of technology or source code (except encryption source code) is "deemed" to take place when it is released to a foreign national within the US.

Technology is "released" for export when:

- it is available to foreign nationals for visual inspection (such as reading technical specifications, plans, blueprints, etc.);
- when technology is exchanged orally; or
- when technology is made available by practice or application under the guidance of persons with knowledge of the technology.

CHAPTER 2

WHAT does exist already and what should be better defined

1. GUIDANCE MATERIALS RATHER THAN ICP MODELS: GET INSPIRATION FROM INDUSTRIES

Generally speaking, export controls apply to the research communities just as they apply to individuals, private industries and other organisations. Following on this axiom, when academic research collides with commercial interests, the effectiveness of a robust compliance program can boost scientific and technological advancements by preventing their misuse[20].

Given the complexity of the export controls regulations and the blurry boundaries between "basic scientific research[21]" and "non-fundamental research", it is becoming critically important for academia, students, researchers, professors and administrative personnel to be able to identify when their activities may trigger export controls issues. Mistakenly, we might forget that products still in the R&D phase, that are transferred for testing purposes and no-charge customer samples, face the same requirements as commercial products. Growing focus on technical knowledge is then justified by the intrinsic power of technology to lead production and/or enhancement of an unlimited amount of controlled sensitive goods. Thus, nowadays, safeguarding sensitive technologies and

20 Guidance on Export Control Legislation for academics and researchers in the UK: guide for academics. March 2010.

21 As defined by the UK Export Control Order 2008 – Article 18 (Software and Technology Exception) and by Council Regulation (EC) n.428/2009 – General Technology Note.

software may require more stringent and creative control methods compared to material controls.

Given the breadth of the research, the university environment versus an industry setting is a very different matter. However, there should not be an automatic exemption or dispensation for research or researchers.

1.1. What can universities and research organisations learn from private industries to more smoothly and effectively fulfil legal and regulatory obligations?

The current Council Regulation (EC) n.428/2009 does not contain any specific Internal Compliance Program[22] requirement save the reference of Art. 12(2) for *[...] application by the exporter of proportionate and adequate means and procedures to ensure compliance [...]* when applying for a global license. Indeed, to facilitate the adoption of an Internal Compliance Program, different national government guidance documents targeted at academia and research institutions are available[23].

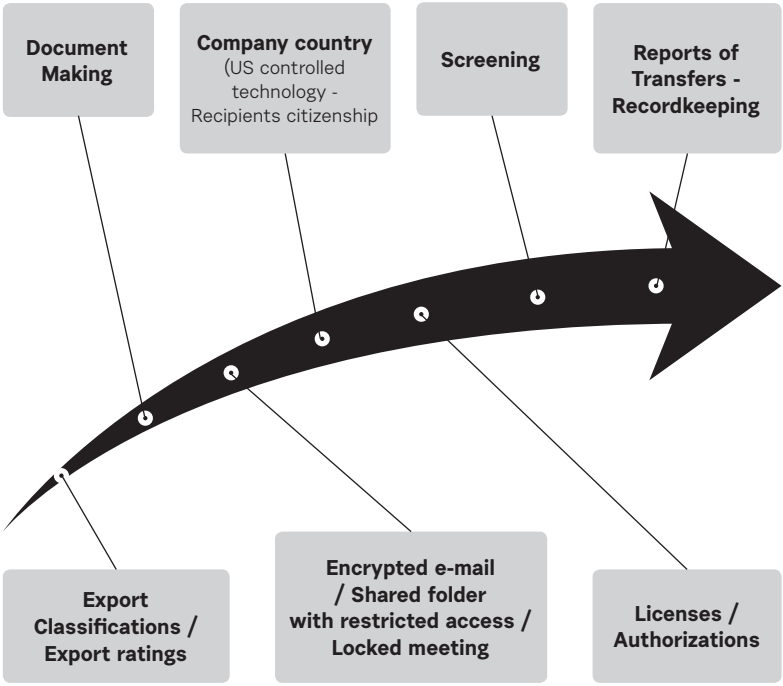
Academic organisations that are just starting to establish an embryonal export compliance program may find it a daunting task, not knowing from where to begin. The abundance of legal terms and regulatory terminology does not afford academic actors the luxury of not abiding by the regulations. Researchers, professors, scholars, should be backed up by export control specialists within industries, or external consultants able to provide a higher level

22 Generally, the Internal Compliance Program includes aspects of management commitment, responsible officials, risk assessment, export compliance policies, procedures and communication, systems, relations with governments, record keeping, monitoring and control, and regular training.

23 S. Bauer, K. Brockmann, M. Bromley and G. Maletta, 3. Sector and actor specific compliance-related challenges, *Challenges And Good Practices In The Implementation Of The Eu's Arms And Dual-Use Export Controls,* SIPRI JULY 2017 https://www.sipri.org/sites/default/files/2017-07/1707_sipri_eu_duat_good_practices.pdf.

of professional support on comprehensive compliance processes and systems.

This chart summarises the path which leads to the compliant transfer of technologies:



Based on private sector models, universities mandatory policies should govern at a high level how export control activities are set and work across the organisation. Policies, possibly linked or embedded in code(s) of conduct and IT security policies, will provide a solid structure for the organisation's overall commitment to export control compliance. Simplified written working instructions and lower level procedures should then locally instruct on how to carry out specific export control activities within specific

departments. The main goal for a work instruction, is to set up the *conditio sine qua non* prior to the transfer of technology/ies.

Valuable working instructions must be at the same time easy to read and easy to follow without neglecting subjects relating to:

1. **Export control ratings:** the first important step is determining whether an export authorisation/licence is required. Guessing or overclassifying an item is not the right call. An internal database should be made available; it will contain the most common classifications used within the department. It can be a Department-based database or a database acting on a higher level. It must be a dynamic tool to be fed and updated continuously. Experts (internals or externals) who can help in identifying export classification have to be selected and trained. They could be affiliated to one specific Department, and in this case, they could be trained accordingly to the internal needs of the Department they work in to become eventually functional (export control) experts on their research topics, or they could be professionals acting from a higher level in cooperation with scientific scholars, academics and researchers.
2. **Document marking guidance:** how, where, when a document needs to be visibly marked and what is the minimum information required (e.g., classification, country and date).
3. **Transfer of export-controlled technology:** a list of allowed and not allowed electronic means to share sensitive data is fundamental. Users need to know which are the available tools (whether in-house solutions, such as spreadsheets, or "off the shelf" ones). Work instructions should explain how to set these tools to secure the transfer (e.g. point-to-point encrypted emails, shared folders with restricted access, locked video conferences and others available). It is easy to understand that an effective training program takes on a crucial importance. Every person who is potentially able to share and/or spread controlled data/technology must be trained on how to compliantly transfer materials.

4. **Travel.** All personnel, students, researchers, professors must have a signed permit for taking IT equipment overseas when export controlled technology and/or software are stored. All exports of controlled IT devices, software or technical data must be made under a valid export authorisation (including a re-export licence if content of US-origin is involved). In case of access to controlled technology from another country, individuals must make sure (prior to accessing the technology from overseas) that the country where the technology resides has a valid license which authorises access from the country they are in.

5. **Screening.** Screening activities should not be considered as one-time actions but they must be undertaken on a regular basis and especially where there is the possibility that the contact is from a country, entity, company or institution hit by a sanction regime. Make sure that recipients (including any intermediaries) and destinations of goods, technology, software or services are not restricted or debarred under any regulatory regime.

6. **Record keeping.** A register of "exports" whether physical shipments or electronic transfers, should be maintained, in a central storage location where possible. The register should meet the spirit of record keeping requirements i.e. being fully functional for search when required by internal/external audits. What do governments want to know during audits?

- What is being exported;
- Where it is being sent;
- Who is receiving the export;
- Why it is being exported;
- How it is being exported;
- When and for what period it is being exported;
- Under which license/authorisation the export/transfer took place;
- Quantity and value of the export (if goods, not applicable to technology).

That is the primary information that needs to be kept for at least 3 years[24] from the end of the calendar year in which the export/transfer took place (or longer based on national requirements e.g., 5 years from the end of the calendar year in Singapore).

7. **Voluntary disclosure:** promoting a culture which encourages voluntary disclosure of red-flags, potential problems/violations should be considered as part of an internal transparency program and should be seen as an important part of the internal governance. Reporting compliance gaps helps to mitigate risk and implement corrective and preventative actions. Personnel need to take responsibility for the performance of due diligence activities and there should be a clear escalation route for any issues highlighted that require governmental disclosure.

8. **U.S. export control overview:** because of the peculiarity of nationality criteria and extraterritorial aspects of the U.S. export control framework, which impacts foreign-owned companies and universities in complex ways beyond the boundaries of the U.S soil, the Federal Bureau of Investigation (FBI) is very interested in universities and research institutions activities worldwide. Taking the correct precautions before travelling with and/or sharing US export-controlled content, should avoid breach of the US regulations[25] (EAR and ITAR).

Other specific procedures/work instructions can be addressed by identified departments whose activities may involve export controls requirements e.g. Human Resources should issue a procedure for visiting scholars' categories.

The long-term effectiveness and efficiency of an export control compliance program cannot be fully driven without a sustained involvement of both key process owners, who are responsible

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24 Council Regulation (EC) 428/2009 Art. 20(3).

25 See Federal Bureau of Investigation website https://www.fbi.gov/news/stories/advice-for-us-college-students-abroad.

for executing day-to-day controls according to the "proximity principle", and senior leaders, who should "lead by example" by taking the legal obligations of export control seriously. It is worth stressing the awareness concept concerning export control matters: those who manage daily processes (operational activities) and associated workflows must be aware of the key requirements of the regulations and the strong commitment to compliance by the university's president/chancellor and senior professors.

As a minimum, basic export control awareness training should be mandated for all staff in order to have personnel ready when an export control matter arises, such as during travels, conferences, technical presentations, publications etc.

Tailored training and guidance should be then delivered to key stakeholders[26] across universities to support the integration of export control principles into their research activities and administrative tasks. The subject of export control needs to become something discussed regularly within functions and when arranging meetings, calls, presentations and projects. Compliance should be embedded as part of the academic culture. Tailored solutions, for gathering support, will then help enhance and stabilise compliance across the entire organisation.

Last but not least, executing a systematic, clear risk assessment is meaningful and truly adds value for the organisation, enabling focus to be correctly assigned to the identified top risks.

The application of the Pareto 80/20 rule[27] will help the accountable organisation to close out the key risks and support research continuity, without slowing the establishment down as the gaps are closed.

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26 Stakeholders for trade compliance include (but not limited to) shipping, IT, engineering, human resources, finance and manufacturing departments.

27 The 80/20 rule was originally mentioned by Italian economist Vilfredo Pareto (therefore it is often referred to as the Pareto Principle). Pareto wrote that in economics, 80% of your greatest results often come from 20% of your efforts.

To conclude, a trustworthy reputation built on a strong compliance program, which includes export controls, can benefit the bottom line of companies and universities in multiple intangible and tangible ways like technology licensing opportunities and other entrepreneurial endeavours of researchers in both industry and academia.

Departments within universities do not need to work in silos. An export control committee or Task Force, who can help understand what is controlled and what is not, can be a university enabler of a collaborative environment between students, researchers and professors and export control point of contact. Establishing export control community of practices and surgeries, where sharing experiences, common practical scenarios and good knowledge, can be a suitable path to raise awareness in individuals working at, and for academia.

2. ADAPTING THE INDUSTRY EXPERIENCE TO UNIVERSITY SETTINGS: POLICIES–PROCEDURES–TOOLS

A basic premise reads that each organisation be it a firm or a university or other research institute is in charge of defining what fits best its organisational structure, overall profile and needs. "No one size fits all" and this is a consolidated perception also among industrial operators and particularly SMEs who have to come up with inventive ways in order to tailor ICP main elements to their scales and resources. Academic organisations are characterised by a great degree of autonomy and represent often times decentralised governance models. As explained in chapter 1, academic research stands out for its own traditions, motivations and objectives placing the freedom of research and a "publish or perish" mentality in the heart of a university organisation[28]. These features hint at a need to rethink ICP components discussed at an industry context and assess their usefulness in a university context. Besides, export control authorities from different countries (UK, Belgium, Germany, US) have opted so far to clarify legal aspects of the application of export controls to academia and research communities without defining ICP guidelines targeting specifically the academia. For instance, the recent draft of the EU-wide guidelines on best practices for ICPs, presently under approval by the EU MS, clarifies that such guidance applies equally to research, academic and other entities[29]. It appears

28 For the differences and similarities between the different types of research organisations (universities, firms, other research centres) see: C. Charatsis, "Interferences between non-proliferation and science: 'exporting' dual-use know-how and technology in conformity with security imperatives", Liege: European Studies Unit, December 2017, pp. 20-34.

29 Footnote 1 of the Guidelines clarifies that: "For the purpose of this document the term 'companies' should be understood in a broad sense. It includes research, academic and other entities," retrieved from: http://trade.ec.europa.eu/doclib/docs/2018/september/tradoc_157336.pdf.

that authorities in the EU and beyond see the basic principles and components for ICPs as valid for any type of organisation.

The quest for a reliable and efficient export compliance system initiates with an initial risk assessment. As a company has to rate its exporting products against export control lists and determine whether an authorisation requirement is relevant, a university has to clarify whether its research activities are captured in the scope of regulations. Therefore, conducting a basic risk assessment is a useful thing to do for evaluating the relevance of export controls to a given university or faculty and identifying priorities. In order to do so, one should (a) be aware of and understand the export control imperatives and ensuing obligations set out in the law, (b) identify most risky areas of research performed and training provided by the university (c) taking also into account the type of activities involved in undertaking such research such as international collaborations, online courses and teaching abroad. According to the US experience, "using a sliding scale, based upon research subject, amount of foreign participation and international collaboration along with reviewing funding source requirements allows for areas of greatest exposure to be reviewed first"[30].

The triptych "Policies-Procedures-Tools" can guide us through the necessary options to be considered and steps to be taken when setting up an internal export compliance system for a university. A university main policy stating its commitment to comply with the export control law respecting at the same time the academic freedom appears to be a fundamental element. The same policy could highlight why export compliance matters for the organisation, what are its main principles/requirements and what are the potential consequences of non-compliance. Such a main policy statement will underpin the specific policies to be developed for applying internal control procedures. It shall be

30 C. Charatsis, "Interferences between non-proliferation and science: 'exporting' dual-use know-how and technology in conformity with security imperatives", Liege: European Studies Unit, December 2017, p.176.

made available to all scientific and administrative staff potentially cornered and, it could be also enshrined in different documents such as internal regulations, main research missions and internal codes of conducts for ethical and lawful research. As a part of the university's commitment to export compliance students and other scientific staff could be required to take knowledge and sign the university's compliance policy when accepting a contract or being admitted to a study programme of proliferation concern. Overall, a sound and clear stance towards export compliance as demonstrated with a policy statement can have a bearing in infusing an export control compliance culture across a university or a firm.

A relevant question to ask here is what specific policies and guidance can be required for implementing the universities polices. Admittedly, existing institutional procedures may need to be adapted and new ones might need to be devised in rendering an ICP operational. Along with these elements, clear responsibilities need to be allocated to staff for performing the main export compliance tasks. In an ideal world, a university could invest in preparing detailed export compliance manuals containing policies for all relevant export control procedures and responsibilities for all export control roles. Such relevant export control procedures requiring a certain degree of attention may include the following:

- collaborating with foreign partners
- screening procedures for exporting and procurement of tangible items,
- making available software and data
- travelling abroad to provide onsite technical assistance and lectures,
- publishing and applying for patents
- admission of new staff, students and visitors

A pragmatic approach would emphasize on adapting existing university policies and procedures (such as those concerning safety and security, financial scrutiny and transparency) for

accommodating export control objectives and tasks. This is also the advice of experienced export control officers from the American universities. For instance, Mark Peters, compliance officer at Oregon State University (OSU) has noted that "for a standalone export compliance system, it would be very difficult to get the user's attention; however, if presented as part of shipping or dangerous goods compliance it receives much more attention and buy in"[31].

Concerning main compliance roles, an export control compliance structure would require someone from the top-level management to assume overall responsibility and a chief export control officer to function as the main coordinator and point of reference concerning export compliance questions. In addition, the lead researcher of a research group conducting research of dual-use interest has to refer/report an export control issue to the main chief compliance officer and apply for a license if necessary. In the US, this role is entrusted with the principal investigator who shall be in position to identify risks and inform personnel involved in their research for such risks and subsequent obligations[32]. In several cases in Europe, staff of the research office or the legal department has this coordination role and again the main responsible of a research project has the obligation to take the necessary steps for complying with the law. This compliance landscape is subject to the peculiarities and needs of each institution. For instance, a large, research intensive university with activities of concern may need to maintain different points of contact for each department or faculty and invest increased resources for training and internal tools. Export compliance requires both legal and technical expertise and this must be reasonably reflected in the compliance structure.

Awareness raising and training as well as a procedure for record keeping are two further components of every compliance system targeting either industry or academia. A university may need

31 *Ibid*, p.175

32 *Ibid*, p.179.

assistance in gaining experience and preparing material for training and awareness raising events. In some countries, authorities can provide training upon request on top of regular outreach activities that they may organise. Training is not only useful for familiarising staff with export controls and internal procedures but also is necessary for keeping up to date concerned staff with export control developments and lists updates. It also strengthens regular contacts between the main export control office and the researchers. Their close collaboration and trusted communication are necessary for identifying risks and addressing possible areas of concern at an early stage. Reporting possible export control issues such as any suspicions or red flags concerning a specific project or activity and defining a way forward passes through the close collaboration between the export control officer and the researchers. Record keeping is also of paramount importance since can assist the university to (a) fulfil obligations set in the law, (b) alleviate consequences in the case of proven noncompliance (c) enable internal review of the compliance system and audits and (d) feed useful findings and information to databases for risk assessment.

Last but not least, academics and researchers have a need for practical tools and instructions in order to be better positioned to assess the export control relevance of their research. Such means can include:

- Informative publications with links to relevant legislation and other training material such as checklists with red flags, guides with examples of controlled items, technologies and software including real prosecuted cases, online videos and distance learning;
- Flowcharts with instructions for understanding who can help with their query each time and what is the relevant export control process to be followed;
- Databases for items and technology classification as well as for end-use/user screening, and E-Systems for managing

approvals for internal export procedures and record keeping obligations.

Quite interestingly, a League of 23 European Research Universities (LERU) has recently highlighted in its position paper the need for a user-friendly interface, backed up by an accurate, easy to use and up to date database with the aim to help researchers to navigate through the EU control list and assess whether their research falls under the scope of the regulation[33]. Identifying whether a research poses some sensitivities and in particular judging on its basic or applied nature is not always crystal clear at least on the basis of existing legal provisions and available guidance. The Technology Readiness Levels scale (TRLs) along with an objective technical evaluation can be a useful tool in that regard[34]. In addition, for export risk assessment against EU restrictive measures (sanctions), the government of Estonia has made publicly available an online tool for checking against sanctioned countries and entities by sanctions' thematic area[35]. In connection with tools to be applied in the future, modern approaches like Distributed Ledger Technologies (blockchain) are expected to facilitate compliance procedures such as logistics and document access all along the supply chain and consequently can have some value for university compliance structures as well[36].

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33 The LERU position paper is publicly available in the following link: https://www.leru.org/files/Publications/LERU-Dual-Use-Note-July-2018.pdf.

34 The TRLs are a nine-step scale for assessing the readiness of a given technology to be used for practical purposes. The TRLs metric was first developed by NASA scientists in 1970s and adopted by the Air Force Research Laboratory as a means of evaluating the readiness of technologies to be incorporated into a weapon or other type of system.

35 The open source tool can be accessed here: https://www.sanctionsmap.eu/#/main.

36 For an overview of the role of blockchain theologies in the global supply chain including connecting challenges please see: Blockchain in the supply chain: where are we now? Trade Security Journal, Issue 8 (2018) 9-11.

3. OTHER INSTRUMENTS THAT CAN ACT IN SYNERGY WITH EXPORT CONTROLS

In the absence of robust frame specifically designed for applying control on the dissemination of academic and scientific dual-use knowledge, and although it is not their primary function, other policy instruments may be used as levers for inserting, implementing or enforcing controls in the research and education sphere. These "dual-use" instruments are corollary to the performance of the academic and scientific activities and can be found in the environment in which these activities take place.

Taking inspiration from the "supply chain compliance" in place in the industry, which globalizes the approach of controls a company shall exercise on its own trade, this section investigates the possibility to make use of a comprehensive approach regarding the controls to be performed by the academic – and scientific - actors on education or research activities. The following listing of potential levers for applying controls does not pretend to be exhaustive. However, it shows that, for these specific activities, both top-down and bottom-up approaches may be fruitful and may either apply in synergy with trade controls *per se* or contribute to set forms of incentives - or deterrence - with a view to preventing diversion of academic and scientific knowledge.

The following categories and levers could be identified, described in their current relevance for contributing to the fight against the proliferation of weapons of mass destruction, and prospectively discussed for further enhancing their relevance *vis-à-vis* controls.

3.1. Levers for a bottom-up approach

Instruments set up for policing the academic and scientific activities at the level of the institutions, such as the universities, can be relevant in the sense that they already apply or promote

self-control on the dissemination of knowledge, or that they could do so if the adequate conditions were met.

In general, universities and research centres commit to ethics and conduct principles in the course of their activities. These commitments, which are considered as rules and bind the academic and scientific personnel, usually take the form of charters, codes of conduct or guides which are to be followed by all the members of the profession. Each university, or even department, may develop or adapt its own material through a real "bottom-up" approach. Very often, however, the basic principles are common to the entire profession as they are set at the national – or federal – level, thus mitigating the bottom-up approach into a more horizontal one. France, for instance, has elaborated a National Charter for Ethics in Research Professions[37] and a Guide[38] for supporting the implementation of the Charter by the relevant institutions. In the European practice, it is not common ground to find in the contents of such guidance on ethics provisions about the potential risk of diversion of research and teaching outputs to WMD proliferation – or even arms' development, in general –. They tend to concentrate on misconducts such as possible conflicts of interests or plagiarism. A few exceptions can be found, however, and efforts are currently made in Europe by the relevant institutions, individually or collectively, for inserting also measures aimed at preventing the misuse of academic and scientific products. It is possible, therefore, to strengthen counter-proliferation measures through these instruments. The enforceability of these sources or rights and obligations for the profession can be questioned from a legal perspective: their content is prescriptive but their form is not directly binding on individuals. However, these can be made

37 Available: http://www.cnrs.fr/comets/IMG/pdf/charte_nationale__deontologie_signe_e_janvier2015.pdf (consulted 20/06/2018).

38 Available: http://www.cnrs.fr/comets/spip.php?article181 (consulted 20/06/2018).

mandatory through their reproduction or insertion as annexes into the employment contracts of the academic and scientific personnel.

Another instrument that can be used by the academic and scientific institutions for preventing the misuse of their products for proliferation purposes is the vetting of the students. The selection of the students who may have access to the knowledge accumulated by the academic and scientific institutions before these students benefit or take part to learning or researching activities is a practice that is commonly shared by the European institutes. In a very few exceptions, however, this selection is also performed on criteria covering the possible misuse of the knowledge acquired. The research centres, owing the economic value and possible sensitivity of their activities, are more prone to set conditions for the access to their knowledge but the universities, the primary mission of which is to disseminate "public domain" knowledge, may be less accustomed to such controls on in-flows. Notable exceptions, such as the internal guidance developed by the King's College London[39] in coordination with the national licensing authority, demonstrate that the selection process for research or academic institutes can comprise preventive controls on the risks related to the country of origin, the proliferation of weapons of mass destruction and the application of the knowledge to be acquired.

3.2. Levers for a horizontal approach

The institutions defining or implementing the policies in scientific research and academic activities are also found organizing themselves horizontally for preventing abuse or misuse of their products.

National advisory boards, or academies of science, or even professional fora where the target institutions seat or take some guidance from, are arenas which can be used for elaborating good control practices and outreaching the relevant stakeholders.

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39 Website: https://www.sieps-france.fr/ (consulted 20/06/2018).

University associations, for instance, are adequate fora for creating a level-playing field for designing controls to be implemented by competitors in academic and scientific activities. The example of the initiative launched by the universities of the Belgian Flanders and the regional authority of setting common guidelines for the controls through a Committee for Ethics on the Dual-Use Research is particularly highlighting the relevance of such horizontal approach. Similar projects for gathering a "critical mass" of academic and scientific knowledge "exporters" have been initiated, notably in Sweden, on the model of the processes set in the – even more competitive – world of the industry. The model of dual-use "exporters' unions", such as the *Syndicat des Industries Exportatrices de Produits Stratégiques* (SIEPS) in France, or the lobbying scheme, such as the initiatives taken in the framework of the think-tank *BusinessEurope*[40], may legitimately inspire the knowledge providers.

A horizontal approach could also be used taking advantage of another important link in the relationship between the different academic and scientific institutions: funding. In the scientific sector specifically[41], the activity of the institutions - *e.g.* universities or other research centres – often depend on external funding opportunities. In the European practice, these are rarely conditioned by any sort of asserted compliance with dual-use goods' trade controls. The flagship research programme of the European Commission "Horizon 2020"[42], which seeks to promote and facilitate the dissemination of research deliverables on a very wide range of disciplines worldwide, creates – as developed in previous chapters - an obligation for the benefiters of its funding

40 See for instance: https://www.businesseurope.eu/publications/businesseuropes-key-points-communication-export-controls-dual-use-items (consulted 20/06/2018).

41 The academic actors for the teaching part of their activities, do not depend in the same way on external funding programmes.

42 The programme is described in a previous chapter on the reasons for controlling the transfer of dual-use items and technology in the specific academic and scientific activities.

to self-assess the link between their activities and the control of the flows of goods and information, as soon as during the phase of application to the programme. This obligation, which is defined as an ethical one, is enforceable by the European Commission[43] through performing assessment of the applications, checks and audits. Hence, despite the possible lack of knowledge - or even of simple awareness - of the researchers and of their institutions on dual-use trade controls, and despite the declaratory form of the ethics commitment that is requested in the application process, a legal obligation of contractual nature is undoubtedly set for the benefiters in the framework of this programme.

Beside the Horizon 2020 programme and even though it is not aimed at developing science, funding in the framework of the Centres of Excellence of the European Union on the mitigation of the risks related to chemical, biological, radiological and nuclear material and equipment is important for research activities that can be affected by proliferation concerns. However, it is not subjected to any of such obligations or commitment. Prospectively and in line with the Horizon 2020 programme, all these instruments set by the European Union, should legitimately and equally be used for giving effect to the principles contained in the European Regulation through a contractual "non-proliferation clause" in the arrangements between the donors and the researchers or implementers. As a temporary measure and before these could become effectively contractual, these principles could even be introduced as best practices in possible "users' manuals" and the selection criteria, where relevant.

43 Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 December 2013, laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)"and repealing Regulation (EC) No 1906/200, Article 14.

3.3. Levers for a top-down approach

Finally, instruments of a political nature can be found relevant for inserting controls in the practice of "exporters" of academic or scientific knowledge. These actors, indeed, are subjected to the Law, as is often reminded in the commitments they have elaborated or taken in the field of ethics.

A vector for promoting controls in the dissemination of knowledge could be to integrate this particular form of flow – or transaction – in the considerations related to the internal and external security of a country. In practice, examples of countries putting on equal footage the risks related to the misuse of "national" knowledge and the misuse of national items in their national security strategies, for instance, are rare, if even existing. However, every country sets regulations for controlling inflows and outflows of intelligence and controlling classified information. The dissemination of information which is in position to harm the national – and international - security is limited and constrained by special, penal, defence-related legislations or even a combination of all these, such as in France. The practical challenge, nonetheless, lies in the status of the academic or scientific "information", especially given the innovative purpose of scientific research: "Information" or "knowledge"? "Public domain", "basic scientific research" or "restricted information"?

Prevention of the misuse of knowledge with proliferation intent can also be implemented through national inflow controls in the form of visa screening. These controls can be performed after an infringement has been committed, notably in banning the offender from the national territory, such as in France, but it is also possible to include the proliferation risk into the visa vetting scheme before an individual enters the territory, such as in Germany. Potentially, it can be envisaged to harmonise these practices throughout the Schengen area in order to highlight the importance of consistently performing specific controls on the dissemination of dual-use knowledge.

It could be also considered to use the economic instruments available to the public authorities for inserting controls on the possible diversion of the academic and scientific knowledge. Although the trend is in favour of the development of foreign investments in the European education and science, a relevant form of preventive mechanisms could be to insert proliferation-centred control into the foreign direct investment policies and legislations.

CHAPTER 3

HOW to proceed and with whom to engage with?

1. ASSESSING MOTIVATIONS FOR ADOPTING AN ACTIVE COMPLIANCE STANCE

An interesting question to think about is how a university or a faculty comes to the realisation that some kind of internal control mechanism is necessary. Often times, a communication by the competent authorities such as a warning letter or a verified violation including a subsequent penalty will make an exporter including a university to pursue actively an internal compliance structure. Generally speaking, in the EU academia is still unaware of export control implications that may affect its activities and, targeted outreach by the authorities towards academia is not as much common as it should be due to limited resources and little experience in dealing with export controls in an academic context. This points to the blunt conclusion that the rigorous enforcement of export controls including imposition of sanctions can lead to increased awareness and compliance.

However, if the objective is to establish a trusted relationship with the academia and research communities, some constructive thinking and motivation is very much required. Authorities need to approach the academic community in very thoughtful manner and with comprehension of researchers' specific needs and peculiarities of research environments. LERU and other university compliance officers in Europe have brought out certain common compliance issues that can be particularly cumbersome in a research setting. This is the case for example with research projects involving

multiannual research and an increased fluctuation of researchers as new partners might enter research consortia in the course of such long-term projects. Trade facilitations such as general licences could mitigate additional compliance costs for joint research ventures and act as a stimulus for the implementation of internal controls by those universities who wish to contract with international partners from industry and/or other universities.

As explained in section 2.4, funding schemes may have leverage for raising awareness on dual export control issues and identifying potential risks at an early stage. In addition, compliance obligations coming through such funding sources can lead to enhanced compliance practices for export controls. For instance, in the UK, the Economic and Social Research Council (ESRC) may require from universities to have some sort of internal mechanism for ethical review of all research funded under its framework. Similarly, in Germany the National Academy of Science "Leopoldina" sets specific standards for security related research[44]. These avenues may need to be adapted in order to reflect export control obligations as well.

Furthermore, global supply chain compliance can have a positive effect in incentivizing universities to be responsible and follow the letter and the spirit of the export control law. It is a common practice for several large firms and SMEs to apply due-diligence procedures for all third parties involved in their supply chain. In that view, economic operators and are eager to enter into and maintain business with reliable and compliant actors and thus universities have additional reasons to activate their reflexes. It has been also acknowledged that thanks to partnerships between firms and universities, academics are becoming aware of export control requirements set in the law and start querying on the topic.

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44 C. Charatsis, "Interferences between non-proliferation and science: 'exporting' dual-use know-how and technology in conformity with security imperatives", Liege: European Studies Unit, December 2017, p. 187.

Therefore, joint ventures including universities can contribute to awareness raising among the research community[45].

Engaging research and academic communities to the policy making for export controls is a key to enhancing their understanding and commitment to the non-proliferation cause. A more inclusive decision-making process can bring several benefits as it will allow researchers to familiarise themselves with export control objectives and processes and it will provide to policy makers insightful expertise concerning forthcoming technological advances that may need to be addressed in the control lists. Universities function as beehive of technological novelties and ground-breaking findings that can tap into industrial applications and they are well positioned in identifying the next generation of technologies having a dual-use potential.

Interrelated to the previous, introducing export control training and awareness modules in the curricula of the most sensitive disciplines and research areas can help greatly in forging an export compliance culture within the academic community and beyond. In that respect, the Targeted Initiatives by the EU under the Instrument contributing to Stability and Peace have the aim to develop master courses and promote export control awareness in central Asian and GUAM countries.

There are also other ideas with regards to how researchers can become more aware and sensible to export control objectives. For instance, expanding the scope of the AEO designation to be available to any actor meeting certain security and reliability criteria was one of the suggestions discussed in the Chaudfontaine seminar. Presently, only economic operators are eligible to apply for the AEO status[46]. Providing some kind of compensation such as tenures

45 *Ibid*, p. 160-170.

46 More information on the AEO concept is available in the following link: https://ec.europa.eu/taxation_customs/general-information-customs/customs-security/authorised-economic-operator-aeo/authorised-economic-operator-aeo_en#what_is.

and promotions to researchers dealing with very sensitive research and having limited possibilities to publish was a further innovative idea discussed during the Chaudfontaine conference.

Graphic Design : Philippe Dieu (Extra Bold)

The "Chaudfontaine Group" was established in 2010 as an annual two-day meeting group gathering young Europeans with diverse academic backgrounds – lawyers, economists, political scientists – from relevant national authorities, European institutions, industry and researchers from European scientific centres. Its members are invited to discuss their respective viewpoints on strategic issues faced by the European trade of sensitive goods in a constantly and rapidly evolving international context.

In November 2015, at its sixth conference, the Group met, confronted views and analysed the effect of international restrictive measures on the trade of strategic goods, notably "dual-use", as well the legal penalties set by the States in case of infringements to the rules of the trade control system.

The authors herein analyse and debate the diversity of principles and provisions that can be met internationally as well as the practices in terms of implementation by the States and the economic actors.

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