

Why EDEM?

A Technologically Guided Explanation of

Regulatory Change in Defence Equipment Markets

by

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In loving memory of Fiorina Marchio
(1945-2009)

'E ancora mille volte, mille anni,
ci scommetto, mi ringrazierai
per quel sorriso ladro e per i giochi,
i mille giochi che sapevi già,
e ancora mi dirai che non vuoi essere cambiata,
che ti piaci come sei
e puoi chiamarmi ancora
amore mio'.
(Francesco De Gregori, Bene)

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List of Abbreviations

ACARE- Advisory Council for Aeronautics Research in Europe

AECMA- European Association of Aerospace Industries

ADIC- *Agentur für Disruptive Innovationen in der Cybersicherheit und Schlüsseltechnologien* (German Agency for Disruptive Innovations in Cyber security and Key Technologies)

AET- Agency Establishment Team

AID- French National Agency for Defence Innovation (*Agence de l'Innovation de Défense)*

ASD- Association for Aerospace and Defence Industries of Europe

ASEB-Aeronautics and Space Engineering Board

BA- British Aerospace

BAA- Buy American Act

BAE- British Aerospace Systems

BICC- Bonn International Centre For Conversion

BOE- *Boletín Oficial de España* (Spanish Official Journal)

BPP- Balance of Payment Programme

BRITE- Basic Research in Industrial Technologies for Europe

Cap Techs- Capability Technology Activities (previously CEPAs)

CASA- *Construcciones Aeronáuticas Sociedad Anónima* (Spanish Aeronautical Industrial Champion)

Cat-A Category A (EDA R&D projects)

Cat-B Category B (EDA R&D projects)

CATIA- Computer Aided Three-Dimensional Interactive Application

CEPA- Common European Priority Areas

CEC- Commission of the European Communities (in post-2000 phase European Commission)

CEIS- Compagnie Européenne d'Intelligence Stratégique (European Strategic Intelligence Company)

CEU- Council of the European Union

CFIUS- Committee on Foreign Investments in the US

CFSP- Common Foreign and Security Policy

CIM- Computer Integrated Manufacturing

CM- Command Papers

CoBPSC- Code of Conduct of Best Practice in the Supply Chains (by EDA)

CoDP- Code of Conduct on Defence Procurement (by EDA)

CoCO- Code of Conduct on Offsets (by EDA)

COST- European Cooperation in the field of scientific and technical research

CP- Common Position

CPU- Central Processing Unit

CSDP- Common Security and Defence Policy

CJEU- Court of Justice of the European Union

C4I- Command, Control, Communication, Computer and Intelligence

DARPA- Defence Advanced Research Projects Agency

DASA- Deutsche Aerospace

DG- Directorate General of the European Commission

DG-COMP- Directorate General for Competition of the EC (ex DG-IV)

DG-ENTR – Directorate General for Enterprise of the EC (ex DG-III, today DG GROW)

DG-GROW- Directorate General for Entrepreneurship, Internal Market and SMEs (having merged DG-ENTR and DG- MARKT)

DG- MARKT- Directorate General for Internal Market Affairs of the EC (today DG-GROW)

DG- Relex- Directorate General for External Political Affairs of the EC (ex DG-I/A today EEAS)

DG-RTD- Directorate General for Research of the EC (ex DG-XII)

DGA- *Direction générale de l'armement (*French General Armaments Directorate)

DisCap- Disruptive Capabilities

DLR- *Deutsche Forschungsanstalt für Luft und Raumfahrt* (German Research Institute for Aerospace)

DoD- US Department of Defence

DSAI- UK Defence and Security Accelerator Initiative

DSD- Defence and Security Directive (e.g. Dir. 81/2009/EC)

DTIBs- Defence Technological and Industrial Bases

EADS- European Aeronautics and Defence Space Company

EARP- European Aeronautical Research Programme

EASRA- European Armaments and Strategic Research Agency

EBB- European Bulletin Board (EDA)

EC- European Commission

ECAP- European Capability Action Plan

EIU- Economist Intelligence Unit

ECU- European Currency Unit (previous to Euro)

EDA- European Defence Agency

EDAP- European Defence Action Plan

EDEM- European Defence Equipment Markets

EDIDP- European Defence Industrial Development Programme

EDF- European Defence Fund

EDIG- European Defence Industrial Group

EDRP- European Defence Research Programme

EDTIB- European Defence Technological and Industrial Base

EEAS- European External Action Service

EG- Evaluation Groups

EI- European Integration

EP- European Parliament

E.PA.SE.RE.TE - EU cooperation programme for advanced research and technology

ESDI- European Security and Defence Identity

ESPRIT- European Strategic Programme for Research and Development in Information Technology

ESRP- European Security Research Programme

ESS- European Security Strategy

EU-European Union

EUCLID- European Cooperation for the Long-Term in Defence

EUGS- European Union Global Strategy

EUHA- European Union Historical Archives

EUISS- European Union Institute for Security Studies (previously Institute for Security Studies of the Western European Union)

EUMC- European Union Military Committee

EUMS- European Union Military Staff

EUR- Euro Currency

EURAM- European research on advanced materials

EUREKA- Exceptional Unconventional Research Enabling Knowledge Acceleration Program

EUROCONTROL- European Organisation for the Safety of Air Navigation

EUROMART-European Cooperative Measures for Aeronautical Research and Technology

EW- Electronic Warfare

FA- Framework Agreement

FACS- Future Air Combat System

FINSA- Foreign Investment and National Security Act

FOA- Försvarets forskningsanstalt (Swedish Defence Research Enstablishment)

FP- Framework Programme for Research and Development

FPP- Force Protection Programme

FRG- Federal Republic of Germany

GATT- General Agreement on Tariffs and Trade

GDP- Gross Development Product

GIE- *Groupement d'Intérêt Economique* (Group of Economic Interest)

GoP- Group of Personalities

GP- Green Paper

GPA- Government Procurement Agreement

GRIP- *Groupe de recherche et d'information sur la paix et la sécurité* (Group for Research and Information on Peace and security)

GTG- Government to Government

HLG- Headline Goal

HoC- House of Lords (UK Parliament)

HoL- House of Commons (UK Parliament)

H2020- Horizon 2020

ICs- Integrated Circuits

ICT- Information and Communication Technologies

IEPG- Independent European Armaments Group

IG- Inter-governmental

IGC- Intergovernmental Conference

IPE- International Political Economy

IPPD- Integrated Product and Process Development

IPRs- Intellectual Property Rights

IR- International Relations

ISTAR- Intelligence, Surveillance, Target Acquisition, Reconnaissance

JA- Joint Action

JSF- Joint Strike Fighter

JTI- Joint Technology Initiative

JU-Joint Undertakings

LI- Liberal Intergovernmentalism

LoI- Letter of Intent

LoIc- Letter of Intent countries

LSIs- Large Systems Integrators

KONVER- European Union Conversion Programme

MBB- *Messerschmitt-Bölkow-Blohm*

MC- Management Committee

MEP- Member of the European Parliament

MFF- Multiannual Financial Framework

MNE- Multinational Enterprise

MOSA- Modular Open Systems Approach

MSs- Member States

MTR- Military Techno-Revolution

MoU- Memorandum of Understanding

M&As- Mergers and Acquisitions

NAD- National Armaments Directors

NATO- North Atlantic Treaty Organization

NASA- National Aeronautics and Space Administration

NCW- Network Centric Warfare

NF- New Functionalism

NI- Neoliberal Institutionalism

NRD- National Research Directors

NRC- National Research Council

OECD- Organisation for Economic Co-operation and Development

OCCAR- Organisation for Joint Armament Cooperation

OJ- Official Journal

ONERA- *Office National d'Etudes et de Recherches Aérospatiales* (National Office for Aeronautical Research and Studies)

OSRA- Overarching Strategic Research Agendas

PADR- Preparatory Action for Defence Research

PC- Programme Committee

PESCO- Permanent European Structured Cooperation

PMC- Political Military Committee

POLARM- Council Working Group on Armaments Policy (European Council)

PP- Pilot Project

PRAG- Programme Agreement

QMV- Qualified Majority Voting

RAM- Random Access Memory

RAND- (American) Research and Development Corporation

R&D- Research and Development

R&D+T+E – Research and Development plus Testing and Evaluation

R&T- Research and Technology

RTD – Research Technology and Development

RMA- Revolution in Military Affairs

SEDE- Security and Defence Subcommittee (European Parliament)

SB- Steering Board

SESAR- Single European Sky's Air Traffic Management Research

SIA- Socio-institutional Adjustment

SIPRI- Stockholm International Peace Research Institute

SMEs- Small and Medium Enterprises

SoS- Security of Supply

SRA- Strategic Research Agendas

S&T- Science and Technology

TEC- Treaty of Rome

TED- Tender Electronic Daily

TEU- Treaty of the European Union

TFEU-Treaty on the Functioning of the European Union

TEP- Techno Economic Paradigm

TFR- Total Force Requirement

TRLs- Technology Readiness Levels

US-DSB – United States Defence Science Board

US-OTA- United States Office for Technological Assessment

US- NRC- United States National Research Council

USD- US Dollars Economic Currency

VAT-Value Added Tax

VLSIC- Very Large Scale Integrated Circuits

WEAG- Western European Armaments Group

WEAO- Western European Armaments Organization

WEU- Western European Union

WG- Working Group

WTO- World Trade Organization

WWI- World War One

WWII- World War Two

3D- Three Dimensional

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CHAPTER 1

Introduction

This thesis seeks to explain the emergence of an EU-rule based regime for European Defence Equipment Markets (EDEM). The core piece of this new regime for EDEM is contained in Directive 2009/81/EC (OJEU 2009a), part of the European Commission's (EC) 2007 Defence Package[1], which regulates Member States' (MSs) defence and security procurement in the European Union (EU). This development seems, at first sight, paradoxical because the armaments policy area has historically remained under the direct control of MSs and outside the competence of the EU's institutions and policy-making processes. The politico-economic strategic importance of defence markets has traditionally led Governments to over-extend authority in the defence sector by cumulating a number of roles, namely acting simultaneously as costumers, sponsors, and regulators of military markets and their industries (Gansler 1980; Heidenkamp et al 2013a;b;c).

The MSs' decision to concentrate the whole set of regulatory competences and distributive powers in their hands found institutional manifestation in the reiteration, from the Rome Treaty until today, of a primary law provision, contained in art. 346 TFEU[2], exempting defence markets from the application of the European Union law. As a consequence of this constitutional choice, the involvement of European institutions, and most prominently the EC, in this specific policy area has been

[1] Besides Directive 81/2009/EC on the co-ordination of procedures for the award of certain works contracts, supply contracts and service contracts by contracting authorities or entities in the fields of defence and security, the 2007 EC's Defence Package also comprised 2009/43/EC simplifying terms and conditions for transfer of defence related products within the EU (OJEU 2009b) and the EC's Communication entitled: 'A Strategy for a Stronger and More Competitive European Defence Industry' (EC 2007d).

[2] Article 346 TFEU (ex art. 296 1.b, TEC, prior art 223 1.b EC) reads: 1. The provisions of this Treaty shall not preclude the application of the following rules:
(a) no Member State shall be obliged to supply information the disclosure of which it considers contrary to the essential interests of its security;
(b) any Member State may take such measures as it considers necessary for the protection of the essential interests of its security which are connected with the production of or trade in arms, munitions and war material; such measures shall not adversely affect the conditions of competition in the common market regarding products which are not intended for specifically military purposes.
2. The Council may, acting unanimously on a proposal from the Commission, make changes to the list, which it drew up on 15 April 1958, of the products to which the provisions of paragraph 1(b) apply.

precluded, with the relegation of defence markets outside the framework of principles and rules governing the European internal market project (Trybus 1999:31; Georgopoulos 2004:4, 57). On the contrary, MSs have opted to advance collective political efforts in this policy domain on intergovernmental grounds, by endorsing a high-politics, as opposed to low-politics[3], European integration logic, as the evolution of a Common Foreign and Security Policy (CFSP), and of an autonomous Common Security and Defence Policy (CSDP) documented.

The emergence of EDEM and the ending of protectionism on military markets have been explained in different ways in the available literature. Political scientists have generated three orders of explanations. The first one has identified the end of Cold War as the main variable which influenced the evolution of the EU-US strategic relationship and consequently the emergence of EDEM, intended as mere intergovernmental cooperation in armaments amongst Europeans, which would take place as an act of '*reformed bandwagoning*' on US power. A second block of explanations has recognized the constitutive roles of ideas, discourse, informal practices and ideational processes, channelled via narratives and socialization activities, in constructing new realities determining incentives for States to align their policy preferences around the creation of the EDEM regime. Finally, a third set of contributions, which came to overlap with the economic literature, has identified structural factors, namely globalization and trade-related dependencies, as multi-causal drivers for closer defence markets and industrial integration in EDEM. The present analysis will move from the third explanatory account, namely the structuralist one, to elaborate, in theoretical and empirical terms, on the role of technological change and innovation dynamics in creating politico-economic incentives, via the transformation of the defence industrial productive organization, for the emergence of new regulatory regimes ruling on defence equipment markets in Europe. Despite the pervasively intense technological nature of EDEM, none of the recalled existing explanations, including legal analyses, have stressed the role and significance of technology and innovation in reconstructing the explanatory puzzle beyond EDEM.

It has been indicated that the acquisition or procurement of defence goods, works and services is a very politically loaded and economically sensitive activity.

[3] The differentiation between high and low-politics domains has been coined by Terrence Guay (1998) in his book 'At arm's length' proposing a new functionalist reading of the process of European integration in armaments.

The reason for this is that, when purchasing military products, States normally express a set of intertwined politico-strategic and economic-related considerations. In general, all countries, regardless of their level of technological advancement, when procuring defence equipment, seek to ensure the continuous protection and projection of their national sovereign power attributes by guaranteeing the security of their own supplies. That notwithstanding, only those countries retaining an advanced national defence industrial capacity have, over the decades, kept nurturing a mechanism, under which a consistent volume of public financial resources are allocated to military research and development (R&D) in support to product development activities.

The final products, works and services which originate on these capital-intensive markets have normally advanced the finest state of the art in technological development and innovation. Technological change is an attribute inherently connected to the achievement of technical superiority in the operational performance of the military, which in turn determines its power projection capacity and war-fighting advantage. Strategic support of the competitiveness of the national defence technological and industrial base (DTIB) has come to characterize the condition of those same countries possessing a wide spectrum of cutting-edge military capabilities. For this reason, arms-producing countries have supported a symbiotic relation with their own defence primes[4], which have normally equipped not only their own domestic markets, but also the markets of arms-importing countries, within and outside Europe, not presenting an autonomous technological development capacity. Clearly, such conditions have permitted major defence powers to pursue, via credits and other measures which support exports, larger markets and economies of scale, as well as to activate foreign policy levers, with the decision to equip or not equip countries in certain geostrategic areas.

This jigsaw has rendered evident the fact that the complexity linked to the fragmentation of military markets in Europe cannot be grasped or recomposed by producing a descriptive, compilatory account of their special features, if compared to other public markets. Recognizing that there are economic, political and legal barriers to the liberalization and harmonization of these markets (Trybus 1999:7-11, 24-27;

[4] Primes is a colloquial expression in use in the military field to refer to prime contractors or top/first-tier defence corporations retaining the most advanced military capabilities development capacity, and normally accessing the big share of advanced defence economies procurement. In the defence sector SMEs are normally operating as second and third-tiers accessing defence markets as subcontractors to primes. For a descriptive illustration see: Trybus (2014:22-27). Defence corporations have undergone a process of transformation, which will be reconstructed in Chapters 5 and 6.

Georgopoulos 2004:4,14) does not justify per se *a priori* an EU legislative intervention in the field replicating regulatory frameworks suitable for other public markets (Trybus 1999:21-24; Georgopoulos 2004:28ss, 301ss). On the contrary, the acknowledgement of their strategic and political nature represents simply the point of departure of an analysis which should dig further into causes of such resistance and fragmentation, with a view to articulating a truly contextualized reflection on future regulatory reform options for defence equipment markets, beyond circular considerations. In addition, because, the intersecting layers between research and development (R&D) and procurement are several and overlapping in markets which ultimately embody by definition the essence of leading advancements in the latest world innovation frontier, it makes no sense whatsoever to insert an artificial partition between these two activities while analysing EDEM, because a defence market without technology does not exist. This arbitrary partition, which is also reflected in the text of Dir. 2009/81/EC, and in the legal reflection on the topic, will be recomposed in the present multidisciplinary analysis by refocusing the attention on the technological significance of defence markets.

The argument being advanced here is that technological change and innovation dynamics play a crucial role in explaining regulatory change in EDEM via the intermediate step of the transformation of military markets and their productive structures. As will be illustrated, defence industries represent the nerve centre of a mechanism, which has witnessed the strong convergence of a set of politico-strategic and economic interests linked to the preservation of States' security and the competitiveness of defence enterprises on the market. For this reason, there would be, in principle no incentive of sort for Governments and defence companies to break such a win-win equilibrium. This would be possibly true only if both political and economic actors were to operate in the vacuum of space. Instead, they are part of, and have been historically part of, a politically overloaded innovation ecosystem where R&D-driven technological advancements determine both countries' force projection capacity in the battlefield, and their economic competitive advantage in the marketplace. It is easily deduced that, under changing technological and innovation conditions, Governments and defence industries can find incentives to progressively refine or amend their own policy and corporate preferences. Ultimately, the manifestation of new policy preferences, strategic corporate decisions, but also the access of new policy and economic actors, and the same emergence of new policy

regulatory regimes can all be read as manifestations of a purposive adaptation on major transformations occurring in the technological environment, that these actors are, simultaneously, part of and dependent on.

The study of technological changes and innovation dynamics will therefore guide a detailed reconstruction of processes and mechanisms, which led to a progressive shift in the traditional power architecture which had ruled on the defence sector organization for several decades. By tracing major evolutions in the defence technological environment, the analysis will disentangle the several political and economic layers which have gradually supported a major transformation in the regulatory formula for defence equipment markets. This activity will be directed towards addressing the main research question of this thesis which is *why EDEM*, namely *why has an EU regulatory regime for the procurement of defence and security in the EU emerged* in a field which has traditionally represented the stronghold of States' national sovereignty. In subordinate position, a second research question will demand *whether EDEM is the only regulatory output worth studying*, anticipating that a further socio-institutional adaptation beyond this regime will take place in the direction of supporting the affirmation of a European Defence Technological and Industrial Base (EDTIB). Such a subordinate question allows elaboration on a crucial aspect, still highly controversial today for policy-makers, concerning the relation between EDEM and EDTIB, in the light of generated theoretical and empirical findings.

The complexity and multi-dimensionality of activities and mechanisms characterizing the EDEM's shaping process, and the later adaptation in the EDTIB, have resulted in the predisposition of an integrated two-step research design[5] based on a qualitative methodological strategy. As a first step, the main thesis argument will be generated inductively by elaborating on the abundant empirical materials collected via desk research and exploratory scoping activities, as opposed to a deductive ex-ante formulation of a set of hypotheses. Process tracing[6], a methodology coined for social scientists by Beach and Pedersen (2013) and resembling evidence-seeking activities

[5] Namely the research will move from the empirical dimension to build a theory, and it will consequently test it via case study analysis following this pattern: empirics to theory- theory to empirics.

[6] According to Beach and Pedersen (2013:3) process tracing methods are tools used to study causal mechanisms in a single case research design. Despite the present research design being a multi-case one, process tracing has served preliminarily to enlarge the analytical focus on mechanisms explaining EDEM with a view to isolating the technological variable and building a theory (before inexistent) around it.

within criminal investigations and judicial processes[7], will be employed for theory building purposes (Beach and Pedersen 2013:3,11-12,60ss; Bennett 2010:208; Rohlfing 2012:150; Bennett and Checkel 2014:18) to trace historically the mechanisms beyond the multi-causality[8] characterizing processes and activities leading to EDEM, and isolate the technological variable from alternative explanations. The technological explanation, which finds theoretical articulation in the analytical framework contained in Chapter 3, is generated on the elaboration of a first set of empirical data organized across a single extended timeframe, which will make it possible to trace and unveil two intertwined processes, namely: a) the technological significance of defence industrial consolidation activities and; b) the technological dependency of preferences and strategies formulated by a plethora of politico-economic actors involved in defence policy-making.

This mapping activity performed via process tracing reveals the general mechanism beneath the historical explanation. In other words, while politico-economic forces are part of the environment where technological change and innovation dynamics originate, their activity, taken individually, cannot impact on the collective material reality where regulatory regimes emerge, unless a change in the techno-economic paradigm occurs and creates the conditions for that to happen. In this sense, one could claim that the mechanism supporting the provided explanation is endogenous and semi-deterministic, namely it recognizes the significance of policy entrepreneurialism within a certain techno-economic ecosystem in correspondence with a shift in the techno-economic paradigm (TEP) ruling on that specific ecosystem, and which previously other policy entrepreneurs contributed towards moulding under the thrust of the antecedent shift in TEP. Such an endogenous and semi-deterministic based explanation generated on process tracing evidences the opening of a gap in existing scholarly analyses, since, as anticipated, a technologically-driven account of regulatory change in EDEM does not find reflection in the available legal and political science literature to be reviewed in Chapter 2.

As a second step, and building on the evidence produced via the exploratory scoping and process tracing activities used to isolate the technological variable and

[7] What social scientists call theory is for criminal lawyers a set of arguments causally supporting at least a piece of evidence beyond reasonable doubt.

[8] A causal mechanism is defined as a complex system which produces an outcome by the interaction of a number of parts (Glennan 1006:52 in Beach and Pedersen 2013). Investigating causal mechanisms enables us to go a step further when studying causal relationships, allowing us to peer into the box of causality to locate the intermediate factors lying between some structural case and its purported effect (Gerring 2007 in Beach and Pedersen 2013).

the underlying mechanism, the methodological strategy will combine data collection activities based on semi-structured interviews with defence élites as well as historical archival research, to support a (theory-centred) case study analysis for theory verification purposes (Ying 2002:19; Gerring 2004:349; Bennett and Alexander 2005: 138-139; Rohfling 2012:62). Specifically, the empirical part of the thesis will comprise an exploratory multiple-case research design (Yin 2002:23,46ss; Gerring 2007:27,35), namely four case studies (Chapters 4 to 7) jointly covering a five-decade time period (1980s-2020s), and bringing to confirmation both layers of the theory formulated in Chapter 3. At this second stage, the complex or multi-causality characterizing EDEM (e.g. dependent variable of analysis) will fully unravel the endogenous and semi-deterministic underlying mechanism which reveals the autonomous significance of technological change(s) within each techno-economic paradigm (e.g. the independent variable of analysis) and the subordinate role played by politico-economic factors (e.g. the intervening variables of analysis).

Following an exploratory case study research design (Yin 2002:23), which can develop a descriptive theory without the need for the formulation of formal hypotheses (Yin 2002:30ss), each case studied will verify the two levels of causality: the first main level will connect technological change to transformations in the politico-economic structures; the second, and causally dependent, level will provide an explanation of socio-institutional adjustments on different forms of policy entrepreneurialism. The technological dependence of political and economic processes in defence leading to EDEM, and beyond it, will be tested against both failed and successful outcomes across the case study analysis. Indeed, while the first two cases contained in Chapters 4 and 5 will test the theory against a negative outcome, the second two cases, contained in Chapters 6 and 7, will provide verification of a positive policy outcome in and beyond EDEM. There is also symmetry in the empirical analysis, from another view point: while the first (Ch.4) and the last (Ch.7) case studies trace the evolution from a non-EDTIB towards EDTIB, the second (Ch.5) and the third (Ch.6) cases evidence a variation from a non-EDEM towards EDEM.

The level of intricacy in processes mapped out throughout the thesis has required the undertaking of a wide and integrated data collection activity. While, as indicated, in an earlier phase, exploratory interactions took place in Brussels with a view to identifying the right interlocutors in a policy and business domain normally

inaccessible to civilians, in a second phase, when key processes had at least been historically traced, semi-structured interviews (Bryman 2012:212-213,283) to defence élites were conducted with representatives of the defence industrial and policy-making environment, both at the national and at the European level, for theory verification purposes. The angle of my intellectual enquiry, namely 'Why EDEM', and the lack of dedicated scholarly analyses to reply to such question in the panorama of academic studies on the topic, substantiated the need for explanations to be 'sought and found' beyond circular arguments, which had instead descriptively referred over the decades to the special features of defence markets and industries to justify exemptions from EU law. The choice to engage qualitatively, via the exploring and interviewing activity involving humans (e.g. defence élites), in reconstructing processes relevant for the scholarly explanation, required since an early stage in the project to choose a sampling approach (Lewis-Beck et al 2004:521; Bryman 2012:286,416ss) as well as to consider the consequences of selections made for the reliability, validity and generalizability of scientific results generated (Seale 1999:107; Bryman 2012:389-390,406). The prominent empirical dimension of this doctoral investigation imposed to operate 'theoretical sampling', namely to develop a strategy to select participants on the basis of the data collection activities by flexibly fine-tuning and continuously adapting selection in line with the advancement of data supported discoveries and partial results generated throughout this process (Glaser and Strauss 1967:47,76-77; Seale 1999:92). In other terms, the process of data collection is controlled by the emerging theory, and the selection ends when it reaches 'theoretical saturation' (Glaser and Strauss 1967:61; Seale 1999:94; Bryman 2012:419-421), as *'the new data no longer stimulates new theoretical understanding or new dimensions of the principal theoretical categories*' (Charmaz 2006 in Bryman 2012)

In line with the theory, three macro-stages in sampling can be isolated. In a first stage, desk-based research was completed in Nottingham in preparation to my first data-collection exploratory trip to Brussels, which took place in Spring 2015. At the time, the theoretical elaboration for this PhD was at a very early stage. The gap highlighted in the available literature, in tandem with the shortage of empirical elaborations concerning a number of processes of key importance for the evolution of defence markets and industries in Europe, and policies attached, prevented the isolation of an independent variable to support the development of both a theoretical

framework and a coherent case-study analysis. Such situation imposed to generate empirical knowledge with a view to fill these shortages. For this reason, this first engagement encompassed internet-based investigative activities aimed at mapping the universe of players in this field, as well as to specifically target professionals, from the industrial, policy-making and research environments, having acquired significant first-hand experience in these processes. Such activity was accomplished by consulting relevant profiles of conference speakers in specialized military *fora*, as well as by engaging directly with professional industrial associations, specialised think thanks and policy centres. It furthermore leveraged on the rich portfolio of professional contacts in the military and foreign affairs environments established while serving as a defence and security administrator for a leading national innovation centre, as well as previously being part of the diplomatic representation of my own country to an international organization. In mapping this universe, and also later, I made use of the professional social media 'Linked-in' which helped to showcase my research endeavour, acquire detailed information on the dense career history of these personalities, their own networks, and that in turn created the conditions for a selection strategy to coherently rely on a carefully built and refined samples.

In a second stage, a transition was made with the selection of fifteen informants to adequately contribute to the outlining of a number of processes remained under-researched in the available literature, as well as to the isolation of the independent variable of analysis. As anticipated, scoping activities comprised informal interactions in Brussels with selected personalities from professional circles I could reach on the basis of the preparatory activities described, and that included personalities from the Belgian and Portuguese military and industrial environments, as well as a number of diplomats from national Foreign Affairs offices. These interactions helped to trace macro-drivers beyond key historical processes in this field, and specifically to detail underlying causes justifying States' protectionisms over defence markets. That notwithstanding, this first engagement documented the impossibility to articulate an in-depth reconstruction of these processes, beyond recognizing the politico-economic significance of technological dependencies in the defence sector, due to the specificity of the national perspectives of informants. This evidenced the inadequacy of the sample and the need to enlarge the research perspective, so to reproduce the position of those countries that most significantly

invested in military innovation processes to support the modernization and competitive advantage of their defence industries. Indeed, these same countries, the arms producing countries of Europe, systematically attached the costly support, via dedicated defence R&D investments, towards a highly performing DTIB to the generation of advanced and autonomous military capabilities. The projection of their operational superiority in the battlefield and competitive advantage in the marketplace has normally been accompanied by protectionist procurement policies and intense commercialization activities to achieve economies of scale. The same order of considerations emerged in the context of the interaction with a number of diplomats, at the time seconded to the international institutions, who commented on the failure to pass a EU regime for defence markets in post Cold-war period referring to the incidence in the rise of national defence industrial champions within main arms producing economies. Given the need to expand further on these aspects and overcome limitations intrinsic to these national perspectives, it became essential to expand ties across-nation with the broader world of defence élites in Europe. This was done once informants made available a basket of military and industrial contacts in their own network, facilitating interactions of extreme relevance for the planning of the subsequent interviewing activity of this PhD.

In a third stage, leveraging on fiduciary channels open by informants, and making continuous employment of specialized internet-based tools such a Linked-in to facilitate first-class interactions, a list of sixty-five interviewees to contribute to this research project was produced, and refined over time, strategically expanding the size of samples and the depth of categories sampled using a combination of purposive and 'snowball' techniques (Bryman 2012:422-427). Unlike the sampling activity supporting the process-tracing exercise, the selection of interviewees in this stage, and also their number, reflected the articulated organisation of the PhD empirical activities to cover in longitudinal terms a four-case study analysis, across a 50-year timeline. In line with the peculiar orientation of the PhD intellectual enquiry, which tests the explanatory value of changes in the technological and innovation environment on the organization of the defence industry and decision-making processes towards this sector, the sampling strategy for each case study aimed at reproducing the perspective of actors in a position to directly report over time on techno-dependent processes in the industry and the policy making environment under each techno-economic paradigm studied.

It is logic that, since this policy area has remained for long a purely national business, the validity of empirical results supporting the explanation provided was dependent on the possibility of engaging with professionals having acquired first-hand experience on those specific processes within their national defence establishments. In light of considerations spent concerning the different levels of military industrial capacity in Europe and the fragmentation of DTIBs, it proved essential to sample in first place on those countries, such as the UK, France and Germany, with the most sensitive and articulated set of politico-economic interests towards the preservation of the competitive performance of this strategic sector. The perspective of these countries simultaneously allowed acquiring a structured understanding of key processes of consolidation of the defence industry, as well as to elaborate in a detailed fashion on incentives accompanying political processes of socio-institutional adaptation at the national and European level. A sampling strategy based on minor defence economies in Europe would have not allowed collecting these data, and generating the same level of accuracy in the empirical elaboration produced. Consequently, a selection based on minor players would have left the main causal mechanism (layer 1 of the theory) untested, and research results non generalizable towards and beyond EDEM.

For the first two older cases study contained in Chapters 4 and 5, the selection relied heavily on indications received by informants, and specifically targeted personalities who held a position of power in arms producing countries and/or could refer to transformative processes within the industrial sector of major military economies of Europe, as well as on the evolution of public policies towards this sector. It has been furthermore complemented by the close scrutiny of archival materials, which included the processing of lists and information, systematically cross-checked with informants, for the purpose of refining the selection process. Because there has been a tremendous degree of intersection in roles within national defence communities, getting access to a national representative in the defence domain would mean gaining an ‘entry ticket’ to engage with other national personalities across-countries in the same professional circle. At the same time, the plurality of responsibilities undertaken by these individuals across their professional careers placed them in a position to report and elaborate simultaneously on a variety of processes within the industry, the national government and the international institutions. The sampling strategy for this PhD highly capitalized on these

intersections across its extended historical timeframe covering 50 years of European history.

For the two most recent case studies contained in Chapters 6 and 7, the strategy towards the selection of interviewees leveraged on the historical dependencies generated on interactions held with informants in the exploratory phase and with interviewees whose empirical contribution supported the elaboration of the first two case studies. Sampling activities received also important inputs by personalities in the EU policy-making environment, of today and of the past. These personalities, who I met during my Blue Book traineeship with the EC Defence, Maritime and Aerospace Unit at DG-GROW, made in turn available a portfolio of names and contacts that opened new avenues and shed new light on a number of intra-institutional processes which were studied for the first time, and from a new perspective. The historically sensitive elaboration on the origins and evolution of EC's entrepreneurialism in the defence sector provided a further angle enriching the explanation on EDEM, which coherently integrated the reflection on the consolidation of main military economies in Europe and their implications for policy making processes. A sampling strategy not accounting for the role of EU institutions, most prominently the EC, in framing new policies for this sector would have affected the validity of results concerning the testing of the second layer of the theory, which specifies conditions for policy entrepreneurialism to determine socio-institutional adaptation.

In overall terms, the choice to select participants for this project reproducing across an extended historical timeframe a wide set of perspectives, namely arms producing countries, the industry and EU institutions, made that the rich and detailed amount of empirical materials generated with this project could validly support theory testing activities. In further support to the validity and generalizability of conclusions reached with this study, two dedicated focus groups were organized within the defence industry, as a follow up to individual interviewing activities with a view to double testing and triangulating the complexity of some historical and political processes concerning the first and second industrial consolidation phases and attached political developments. The gathering of a cluster of personalities who have witnessed those facts first-hand permitted the reconstruction and expansion of a number of technologically-related aspects of crucial importance for the explanation provided, by capitalizing on the unique opportunity provided by a chorus of voices and

perspectives, interacting and confronting their views, in a real-life situation. The simultaneous presence of the old and the new guard in these focus groups allowed the unveiling of details from the past and well as their connection with most recent evolutions, projecting for the very first time a set of new trajectories on the topic under investigation. This strategy proved particularly successful in delivering a clear and articulated reconstruction of technologically dependent dynamics of consolidation in main arms producing countries, as well as to document their direct incidence on the evolution of the policy making process.

The richness and originality of data collected has been complementarily supported, with regard to the two oldest cases studies, contained in Chapters 5 and 6, by archival investigations conducted at the Historical Archives of the European Union (HAEU) in Florence (IT) in September 2015 and 2017, as well as at the European Commission (EC) Library and Historical Archives in Brussels (BE) in Spring 2017. Archival data have sustained a detailed empirical reconstruction of technological trends in the European arms industry, also with a view to highlighting the technological race with the United States of America (US), and providing for an integrative account of analyses generated in the US-led literature on Revolution in Military Affairs (RMA). These materials have furthermore grounded a detailed analysis of the EC's first policy entrepreneurial attempt to pass EDEM in the post-Cold War period, which elaborated on information contained in Ambassador Antonio Vinas' private files and made the public collection preserved at the HAEU. The same set of documents has furthermore underpinned, in tandem with the interviews to defence élites, the reconstruction of the origins of the defence industrial representation activity in Brussels and the early involvement with the EC in policy formulation and negotiation processes. As anticipated, theory-testing activities with reference to most recent developments reconstructed in the last two case studies, contained in Chapters 6 and 7, have been supported by the direct interaction, had in Brussels throughout 2016 and 2018, with key personalities in the EU policy-making environment. These personalities were involved in the preparation of the 2007 and 2016-2017 Defence packages, which originated, respectively, EDEM and EDTIB.

This thesis consists of eight chapters. After the introduction contained in Chapter 1 substantiating the research puzzle, question, objectives, methodological choices and limitations, Chapter 2 will provide for a review of the legal and political science debate on the subject matter of European defence equipment markets. A

multi-disciplinary literature review, connecting law to politics, will map the *status quo* in scholarly contributions towards EDEM, by generating an extended cross-disciplinary inventory of existing explanations. The analysis will evidence a lack of theoretical consideration in the literature of the role of technological change and innovation dynamics in determining patterns of institutional change/regulatory reform.

Chapter 3 will present the theoretical framework. The chapter is divided into two parts. The first part will offer an articulated conceptualization of EDEM, which is absent both in the literary debate and in the political communication of European institutions. A multi-disciplinary and integrated conceptualization of EDEM bolsters the analytical framework, which will be developed in the second part of Chapter 3. Stressing the fragility of alternative explanations which have emerged in the literature reviewed, the analytical model contained in Chapter 3 will elaborate on the two blocks of the theory and on the underlying semi-deterministic mechanism supporting the explanation (see above). Specifically, the model will expand on the incidence of shifts in techno-economic paradigms (TEPs) in accompanying socio-institutional adaptations (SIAs) (layer n. 1 of the theory), under the techno-dependent and intervening role of the EC's policy entrepreneurial activity (layer n. 2 of the theory).

Chapters 4 to 7, as anticipated, articulate the empirical case study analyses by testing the two layers of the theory against, respectively, two failed and two successful policy outcomes. The first case study contained in Chapter 4 will analyse the experience of the European Aeronautical Research Programme (EARP) to provide evidence of an unsuccessful SIA, namely a non-militarily relevant policy outcome, in the absence of a fully accomplishment shift in TEP (layer n. 1), regardless of the level of elaboration in the EC's policy entrepreneurial initiative (layer n.2). Chapter 5, the second case study, will reconstruct the EC's first policy entrepreneurial attempt to pass EDEM in the post-Cold War period, providing further evidence for the two layers of the theory, namely evidencing the insignificance of the EC's entrepreneurialism (layer n. 2) in the face of an unaccomplished change in TEP (layer n. 1). The third case study, contained in Chapter 6, will test the theory against the successful making of EDEM in the 2000s under the first shift in TEP, namely the entry of TEP-2 (layer n. 1) which sets the conditions for the EC to advance a low risk strategy, seize a window of opportunity and seal a politico-economic agreement on the regulatory EDEM (layer n. 2). Chapter 7, the last case study analysis, will

evidence, in line with the theory, the materialization of a further policy outcome beyond EDEM, which is EDTIB, framed via a structured and purposive EU policy entrepreneurial coalition (layer n.2) under a new emerging TEP, namely TEP-3 (layer n. 1).

While Chapters 5 and 6 will directly provide empirical verification of the theory assembled against EDEM, Chapters 4 and 7 serve respectively as 'entry' and 'exit' doors of an overall mechanism which, under the same theoretical premises that host and test EDEM, allows an explanation of a broader socio-institutional adjustment in EDTIB. In other words, the peculiar architecture of the empirical case study analyses permits the connection of different socio-institutional variations under the same theoretical construct, namely: an attempted EDTIB (Ch.4), an attempted EDEM (Ch.5), a successful EDEM (Ch.6), and a successful EDTIB (Ch.7). Observed in longitudinal terms, the completed analysis proves empirically and intellectually enriching as it suggests not only that EDEM is an output of a trajectory ultimately culminating in EDTIB, but also that the theory proposed is suitable for further generalizations (beyond the dependent variable EDEM).

The thesis will end in Chapter 8 with a conclusion which reflects on both the theoretical and empirical contributions achieved through the present research. As was mentioned and will be further expanded on in the course of the thesis, a technologically guided explanation of EDEM is an element of absolute novelty in the panorama of existing studies on the subject of defence equipment markets. For this reason, as often in the case of pioneering research works, limitations are intrinsic this same effort of pushing the limits of existing scholarly knowledge on the subject. In this case, the theoretical connection established between evolutionary economics and EU public policy-making literature (see Ch.3), and developed inductively via the empirical material, should be read simply as the first step in a new direction, a direction which intends to offer manifestation/reflection, at a theoretical level, of the central role played (in real life) by technological change and innovation dynamics in military markets. This choice allows one to project the contribution outside the existing dichotomy which has been generated by the European Integration literature of political science tradition, between liberal intergovernmentalist and new functionalist derived approaches. Furthermore, the macro-economic and long-term orientation features of the presented theoretical framework make it suitable for

supporting scholarly analyses of regulatory regimes beyond EDEM, on the generalization that they will emerge more quickly as a consequence of the rise of new TEPs and the shortening of their cycles (see more in Ch. 3). The conclusion of the present PhD will not indulge on the consideration that the model presents prospects to be scholarly employed and refined to study (and predict) regulatory change in this policy field; instead, it will reflect, with a critical eye, on a number of challenges being currently placed, in the context of the generated explanation, by latest advancements in the global technological and innovation environment, under the rise of a new TEP, on the future organization of the defence sector, as well as on the political viability of the EU-led EDTIB-oriented project.

CHAPTER 2

The Legal and Political Science Debate on Defence Equipment Markets

2.1 Introduction

The introductory chapter has reconstructed the research puzzle, the research question and objectives, and the methodological choices supporting the present academic analysis. This chapter is mapping out the status quo in scholarly approaches towards the study of defence equipment markets, adopting a combined legal and political science perspective. The decision to address two different disciplinary fields reflects not only the formal structure of the present PhD programme in Law and Politics but also the universe of existing scholarly contributions on the topic of investigation.

On the legal side the analysis of EDEM has remained under the intellectual monopoly of a small niche group of scholars in the public procurement law tradition, whose contribution over the past several decades has addressed and disentangled a set of doctrinal and jurisprudential technical questions. Section 2.2 will provide a review of some of the most important intellectual subjects within the multi-decade legal debate on EDEM, including the topic of applicability of EU law to defence markets and its constitutional obstacles (Section 2.3.1), as well as an analysis of steps towards the newly established EU regulatory regime contained in Dir. 2009/81/EC as core piece of EDEM (Section 2.3.2). A structured analysis of regulatory provisions specifically adapted under the new procurement regime to the specificities of defence and security markets will be provided in the context of Chapter 7 (Section 7.2) offering a detailed assessment of the limits of EDEM, beyond provisions delimitating its field application.

The second part of the chapter will analyse contributions on EDEM from political science. The literature review of political science approaches to the study of EDEM will trace an analytical divide between IR theories (Section 2.3.1) and the literature having blossomed in European Integration studies and the EU public policy disciplinary field (Section 2.3.2). Section 2.3 will conclude by evidencing a shift from IRs to EI in the internal balance of theoretical approaches in the political science debate on EDEM. Such a shift has occurred under the thrust of highly empirical contributions having most recently disentangled the complexity of the EU public policy making machine in delivering regulatory outcomes. It will finally be argued that this emerging EDEM-related piece of literature in EI tradition has established an autonomous intellectual scholarship from the CSDP/CFSP gran-debate.

After having recapitulated the main merits of each intellectual scholarship to the debate, the present literature review will conclude by pointing at the very missing element in all existing provided intellectual contributions, namely a theoretically structured elaboration on the role of technological development and innovation dynamics in explaining patterns of institutional change.

2.2 EDEM in the Legal Debate

2.2.1 Applicability of EU law and art 346 TFEU

As explained in the introductory chapter, defence markets, which are public markets *par excellence*, have historically registered a strong degree of national fragmentation and political resistance to attempts at economic liberalization. The reluctance displayed by Governments of main arms producing countries to open up defence markets to supplies provided by another Member State (MS) has deep and complex historical, economic and political justifications.

Since the early 1990s, the rise of the field of EU public procurement law has led to the formation of a specialized body of academic research on the subject of European defence equipment markets. European legal scholars with an intellectual interest in defence public markets have concentrated on addressing a set of questions concerning, inter alia, the applicability of EU law to the defence armaments sector and the potential articulation of administrative regulatory regimes for the

harmonization of defence equipment markets across Europe (Trybus 1996-today, Georgopoulos 2003-today, Heuninckx 2006-today; Butler 2013-today). In the same intellectual scholarship, a parallel articulation has deepened over legal aspects, including applicability of law, concerning forms of collaborative procurement and procurement via international organizations in the European Union (Heuninckx 2008a; 2011a, 2015a, 2017). Another recent sub-stream of scholarly research has elaborated on legal aspects concerning transatlantic defence procurement activities under existing legal frameworks, and most prominently the US and EU defence procurement regulation (Butler 2013; 2017).

Legal scholars have placed at the heart of their intellectual agenda the applicability of European Union Law to the defence sector *tout court* considered (Trybus 1998:194; 1999: 79-80; 2004; 2005:229-230; Koutrakos 2001:165), and more specifically to defence procurement (Trybus 1999:62-63, 2002:692; Georgopoulos 2004:25-26; Heuninckx 2006:212,219ss). The subject-matter of the applicability of EU law to the armaments sector hides a Constitutional legal barrier and an interpretative Gordian knot: while in principle legal academia and the Court of Justice of the European Union (CJEU) have recognized that the European Treaties and the European Union Law would apply to the defence procurement sector (Wheaton 1992:432; Trybus 2002a:694, 2005:250; 2014:105; Heuninckx 2006:212; Heuninckx and Arrowsmith 2018:157), in practical terms, all EU Treaties, from Rome to Lisbon, have reiterated a provision today contained in art. 346 TFEU[9] (1)(b) which provides for a primary (e.g. Constitutional) law general exemption[10] from the application of the European Union law to the production and procurement of defence equipment for the

[9] Article 346 TFEU (ex art. 296 1.b, TEC, prior art 223 1.b EC) reads: 1. The provisions of this Treaty shall not preclude the application of the following rules:
(a) no Member State shall be obliged to supply information the disclosure of which it considers contrary to the essential interests of its security;
(b) any Member State may take such measures as it considers necessary for the protection of the essential interests of its security which are connected with the production of or trade in arms, munitions and war material; such measures shall not adversely affect the conditions of competition in the common market regarding products which are not intended for specifically military purposes.
2. The Council may, acting unanimously on a proposal from the Commission, make changes to the list, which it drew up on 15 April 1958, of the products to which the provisions of paragraph 1(b) apply.

[10] The other general public security exemption relating to crisis situations is contained into art. 347 TFEU (ex 297 TEC) which states that:' *Member States shall consult each other with a view to taking together the steps needed to prevent the functioning of the internal market being affected by measures which a Member State may be called upon to take in the event of serious internal disturbances affecting the maintenance of law and order, in the event of war, serious international tension constituting a threat of war, or in order to carry out obligations it has accepted for the purpose of maintaining peace and international security*. Unlike art 346 TFEU, this article contains a general derogatory provision from the application of EU law in the (remote) case of manifestation of exceptional circumstances such as serious international disturbances affecting the maintenance of law and order, circumstances of war, circumstances of serious international tension constituting a threat of war, and in order to carry out obligations which the State has accepted for the purpose of maintaining peace and international security.

protection of an 'essential security interest' of the State, under the negative condition that such measure should not adversely affect the state of competition in the common market (Trybus 1999:15-16; 2005:142; 2014: 87; Georgopoulos 2004:82; Butler 2014:25 Heuninckx 2018:51: Heuninckx and Arrowsmith 2018:159)[11].

In the context of the present literature review of the EDEM-related legal debate, an analysis of art 346 TFEU has played a substantive role in tracing perimeters and setting foundations for the EDEM regulatory construct to emerge. The point of departure in the process has been a restrictive interpretation proposed by legal academia of art 346 TFEU according to which provisions contained in art. 346(2) TFEU recalling the 1958 Council list of defence products[12] would apply to hard defence materials on the list only, and not to soft and dual use products (Weathon 1992:434; Trybus 1999:14-15; 2002a: 693; 2005:143-149; 2014:88-94; Eikenberg 2000: 125-128; Butler 2013:30-31) and the same material should be destined for military purposes only (Heuninckx 2018:64-65). A general argument supporting the exhaustiveness of the 1958 military list as per art 346 (2) TFEU can be drawn from the rule expressed in *Johnson*[13] commented in Trybus (2005:148; 2014:73-76) according to which any exemption to the functioning of the internal market should be interpreted narrowly. More eloquently in *Fiocchi Munizioni*[14], also commented on in Trybus (2014:103-104), the CJEU, invested to rule on a lamented failure - ex 265(3) TFEU[15] - by the EC to fulfil its obligations to act in compliance of the Treaties in a situation involving an aid granted by Spain to a corporation named Santa Barbara under 346 TFEU, indicated that the defence exemption cannot operate for materials not included in the recalled military list.

[11] For a most recent legal analysis on defence derogations from the Treaty and case law thereto see Trybus (2014: 85-136); Heuninckx and Arrowsmith (2018:159-183); Heuninckx (2018:51-74).

[12] The List of Military products has been established with Council Decision 255/58 of 15.04 1958. In 1978 a new interpretation of the list was issued to take into account the degree of progress in technology having occurred in the meantime. The complete list was not officially published until 26/11/2008 as an extract of the Council Decision 255/1958, but it was intended to be in the public domain as reproduced in academic publications. The complete description of the 22 list categories is contained in Trybus (1999:14-15 footnote 41). The List is also recalled in the EC Guidance Note for the Dir. 2009/81/EC Field of Application with the following mention: ' The 1958 List was translated in November 2008 into all languages of the EU and is publicly available since then' (EC 2009a:4 footnote 11)

[13] Case C–222/84, Marguerite Johnston v Chief Constable of the Royal Ulster Constabulary [1986] ECR 1651 para 26.

[14] Case T–26/01, Fiocchi Munizioni SpA v Commission of the European Communities, 30 September 2003 para 59 and 61.

[15] Art. 265(3) TFEU (ex. 232 CE) reads: 'Any natural or legal person may, under the conditions laid down in the preceding paragraphs, complain to the Court of Justice that an institution of the Community has failed to address to that person any act other than a recommendation or an opinion'.

Additionally, in *Augusta Helicopters*[16], the EC, after having filed a complaint in pre-litigation procedure, opened two infringement procedures ex art. 258 TFEU[17] against the Italian Republic for having denied complying with the competitive tendering obligations under the procurement legal provisions at the time in force[18] while procuring helicopters from the national supplier, Augusta. It was indicated that the exemption should not be invoked for the procurement of equipment the use of which for military purpose is hardly certain or only a possibility, or when the equipment is procured for the military for civilian use (Trybus 2009:982; 2014:96-97; Heuninckx 2008b:N189; 2018:64-65). In further support of the argument proposed, *Werner*[19] and *Leifer*[20] judgements, reported in Georgopoulos (2004:84), in defining a preliminary ruling[21] on art 207 TFEU[22] recognized direct and exclusive competences to the European Economic Community (today European Union) on the regime of authorizations/restrictions in the circulation of dual use materials outside the European territories, with the consequence that MSs can no longer shelter those products safely under art 346 TFEU.

In line with a restrictive judicial reading of art 346 TFEU, confirming the exhaustiveness of the 1958 list for hard defence products destined for military purposes only, the doctrinal analysis provided a further degree of articulation in the interpretative reading of the defence exemption ex 346(1)(b) TFEU. Art.346 TFEU

[16] Case C-337/05 EC v. Italian Republic (Augusta Helicopters I) [2008] ECR I-2173 para 45,47,49; Case C-157/06 EC v. Italy (Augusta Helicopters II) [2009] ECR I 7313 para 26, 28 For a case note on the two cases see: Heuninckx (2008b:187-193); Trybus (2009:973-90).

[17] Article 258 TFEU (ex Article 226 TEC) reads:
1.If the Commission considers that a Member State has failed to fulfil an obligation under the Treaties, it shall deliver a reasoned opinion on the matter after giving the State concerned the opportunity to submit its observations.
2. If the State concerned does not comply with the opinion within the period laid down by the Commission, the latter may bring the matter before the Court of Justice of the European Union.

[18] At the time art 6 of the Public Supplies Directive 93/36/EC O.J 1993 L 199/1, replaced by Directive 2004/18/EC of the European Parliament and the Council on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts, O.J. 2004, L 134/114, replaced by Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC.

[19] Case C-70/94 Fritz WernerIndustrie-Ausrüstungen GmbH v Federal Republic of Germany [1995] E.C.R I-3189 para 11,12.

[20]Case C-83/94 Criminal Proceedings against Peter Leifer, Reinhold Otto Krauskopf, Otto Holzer [1995] E.C.R. I-3231 para 7, 12,13.

[21] According to 267 TFEU (ex art 234 EC) the CJEU has jurisdiction over preliminary rulings on the interpretation of the EC Treaty, and on the validity and interpretation of legal acts issued by the institutions of the Community and by the European Central Bank, as well as the interpretation of the statutes of bodies established by an act of the Council where those statutes so provide. On the other hand, it does not have jurisdiction to rule on the interpretation or validity of international law or national laws, or to give a binding ruling on facts that are put before a national court. In the two reported cases (C 70/94 Werner and C 83/94 Leifer) national courts were seeking clarifications from the CJEU on the interpretation of the Treaty.

[22] Art 207 TFEU (ex art 133 EC, ex 113 EEC) defines general principles in the field of common commercial and exports control policy.

provides for the legal accommodation of a top-sensitive item, which concerns the provision of the critical technical means for MSs' self-defence; for this reason its collocation and permanence in the EU Treaties architecture has to be interpreted as a major safeguarding measure which constitutional legislators, namely the MSs, decided to reserve for their discretional activation with a view to protecting their own national security interests. In this light, it is understood by lawyers that art 346 TFEU does not apply automatically, rather it should be reiterated by MSs any time they invoke its application, with the consequence that each derogation from the Treaty, being exceptional in nature, should require a justification based on the protection of an essential security interest of the State (Arrowsmith 1996:858-859; Georgopoulos 2004:110; Trybus 2005:150).

The same line of interpretation on art 346(1)(b) TFEU has been endorsed by the CJEU's jurisprudence in a set of decisions which recognized not only that its application must remain circumscribed to clearly defined and exceptional cases[23], but also that those exceptions have to be interpreted strictly [24] (Heuninckx and Arrowsmith 2018:160; Heuninckx 2018:64). In the landmark judgement *Commission v. Spain*[25] the Court interpretatively clarified that the exemption as of art. 346 TFEU (1)(b) does not operate automatically; on the contrary MSs opposing the derogation from the internal market rules are requested to provide a justification on national security grounds. In the reported case, the EC lamented that the Kingdom of Spain failed to fulfil the obligation to pay the Value Added Tax (VAT) under EU law[26] opposing instead the application of a national law[27] which under art 296 TEC (today art 346 TFEU) exempted the fiscal imposition from supplies of munitions and military equipment.

In reaffirming that there is no automatic national security derogation from the Treaty, the Court, in the case under consideration, denied that an essential security

[23] Case C-222/84 Johnson v. Chief Constable of the RUC [1986] ECR-1651 para 26; Case C-414/1997 EC v. Kingdom of Spain [1999] ECR- I-5585 para 2, 21; Case C-239/2006 EC v. Italian Republic EU: C 2009:784 [2009] ECR 1-11913 para 46; Case C-284/2005 EC v. Republic of Finland EU:C 2009:778 [2009] ECR. I-11705 para 45; Case C-249/2005 EC v. Kingdom of Sweden EU:C 2009:779 [2009] ECR I-11777 para 45 (reported in Heuninckx and Arrowsmith 2018:160).

[24] C-239/2006 EC v. Italian Republic cit. para 47; Case C-284/2005 EC v. Republic of Finland cit. para 46; Case C-294/2005 EC v. Kingdom of Sweden cit. para 46; Case C-615/2010 Isinooritoimisto Instimi Oy and Puolustusvoimat EU:C 2012:324 E.C.R I-324 para 35; Case C 246/2012 Ellinika Nafpigeia v. EC EU:C 2013:133 [2013] ECR I-133 para 17 (reported in Heuninckx and Arrowsmith 2018:160).

[25] Case 414/1997 EC v. Kingdom of Spain [1999] cit. para 22.

[26] Council Directive 77/388/ECC [1977] OJ 145 on the harmonization of laws of the MSs relating to turnover taxes – Common system of value added tax: uniform basis of assessment.

[27] Law n. 6/87 4/05/1987 concerning budgetary appropriations for investments and operating costs of the armed forces published on the Official Journal of Spain (BOE) on19/05/1987.

interest linked to the protection of the State could be identified in the fiscal obligation to pay VAT while procuring hard-defence materials. In addition, the Court shifted the burden of proof, no matter whether plaintiff or defendant, on the MS invoking the application of the exemption, furthermore affirming that the derogation should be assessed on a case by case basis, and that, on such assessment, the derogation should manifest as needed for the protection of an essential attribute of national security, rather than for purely economic considerations (Trybus 2000a: 664-668; 2000b:NA 99-100, 2014:108,110,119-120; Georgopoulos 2004:127-128 [28] 2005a:569-570; Heuninckx and Arrowsmith 2018:160-161,164).

The EC has subsequently specified conditions for the application of art 346 TFEU in the context of an ad hoc political Communication (EC 2006a). In recognizing the centrality of the CJEU 's interpretative and control functions over the uniform and correct application of European Union law, it clarified that, when balancing the compression of the internal market principles and rules in favour of art. 346 TFEU activation, MSs should perform a narrow and pragmatic assessment. Such assessment should include an evaluation of the essential security interest concerned; it should furthermore verify the existence of a reasonable connection and of a relation of proportionality between the protection of the security interest and the procurement decision at stake; finally, it should justify its reasons motivating the non-application of the EU Public Procurement Directive in the specific case (EC 2006a:7-8).

Provided that the definition of essential security interest remains a prerogative that lies with each MS (EC 2006a:6: Georgopoulos 2004:121; 2007b:NA47), national authorities determined to claim the protection of that interest ex art. 346 TFEU are requested to prove that the decision to invoke the exemption is necessary and proportionate to ensure national security, namely that there is no other way to attain that specific objective of highest importance for the essential security of the State, other than by resorting to national purchasing (Georgopoulos 2007b:NA45-46; Trybus 2014:112-114; Heuninckx 2018:65), and given that the measure does not adversely affect conditions of competition in the internal market regarding products which are not intended for specifically military purposes as per art. 346(1)(b). Most

[28] In his PhD thesis, Georgopoulos (2004:123-12) elaborates comparatively on the examination of 'manifested unsuitability' as opposed to a 'strict proportionality' test to reflect on criteria supporting an objective legal scutiny of the defence derogation.

recently, a blueprint[29] has been proposed building on orientations expressed in the CJEU's case law and the EC's official policy positions, to provide guidance[30] to MSs in safely invoking art 346 TFEU (Heuninckx 2018:61-70) in the context of a more general analysis on measures within the scope of defence procurement, and especially offsets and direct award of contracts to the national industry.

In concluding the reflection on this important scholarly subject in the European defence procurement law literature, it is possible to observe that the coordinated reflection over conditions of application of art 346 TFEU amongst CJEU's interpretative jurisprudence, EC's institutional political guidance, and the technical analysis provided by legal academics/procurement scholars has been of crucial importance in progressively compressing MSs' overly discretional prerogatives to exempt the application of EU law from their national procurement. It is argued, translating to the next section, that a restrictive legal interpretation of art 346 TFEU proved instrumental in strategically capitalizing political attention on the situation of defence equipment markets in Europe and reaffirming the institutional role of the EC[31] empowered under articles 258(2) or 348(2)[32] TFEU to open,

[29] The scholarly effort responds to the need for coordination of the defence exemption contained in art 346 TFEU primary law provision with the new EU defence procurement legal regime contained in Dir. 2009/81/EC, as it will be offered in the next section, in itself containing a regime of exclusions from its scope of application.

[30] More specifically, it is observed that although there is no CJEU ruling on the subject matter, the principles of transparency and proportionality enshrined in the EU Treaties would oblige MSs to define in clear terms their own notion of essential security interest(s) so to avoid the tailoring of a different notion for each and any specific contract placed; in second place, the MS' to-be-defined general notion of essential security interest is subjected to a constitutional and judicial limit that indicates amongst the accepted protectionist measures only those ones based on an essential national security-motive, with the inclusion of acquisition of critical materials for the security of national supplies, and the exclusion of commercial and export-related motives; thirdly, outside of specific cases where secrecy requirements are needed (e.g. critical cases), there should be a clear, public and formalized exemption procedure, better if enshrined in a published regulatory or administrative instrument. A number of criteria should be checked in an hypothetical public formalized procedure: first, the need for a competent body to issue an administrative decision on the exemption being invoked, subject to appeal in the domestic court system (e.g. principle of effective judicial control); second, the need for the exemption to be apply on a case by case, contract by contract or even measure by measure narrow basis, provided that hard-materials procured do not fall in the military list and that they serve a military scope only: third, the need for a limited material scope for the application of the exemption with respect to products contained in the 1958 Military List, and with a specific military purpose; fourth, the need for conditions of appropriateness, necessity and proportionality to be concretely met when invoking the exemption; fifth, the need for the measure being invoked under the exemption not to affect either civili markets, or civil and military ones transversally; finally, the need for clear requirements in the contract documents and procurement procedures to be formalized at the national level should the country make use of art 346 TFEU, tracing a differentiation in the case of awards completed on non-competitive grounds (see Heuninckx 2018 for a further elaboration on the criteria).

[31] In support to the argument which sees the legal debate over the applicability of art 346 TFEU politically framed to institutionalize a EC's competence into the armaments field, one might want to consider that the EC itself earlier formalized that the existence of art 346 TFEU did not represent per se the main reason for defence markets fragmentation, nor the main obstacle to their integration (EC 2003; also reported in Georgoloulos 2003:N89).

[32] Article 348 TFEU (ex Article 298 TEC) reads:

(1) If measures taken in the circumstances referred to in Articles 346 and 347 have the effect of distorting the conditions of competition in the internal market, the Commission shall, together with the State concerned, examine how these measures can be adjusted to the rules laid down in the Treaties.

(2) By way of derogation from the procedure laid down in Articles 258 and 259, the Commission or any Member State may bring the matter directly before the Court of Justice if it considers that another Member State is making

respectively on general or special grounds, infringement procedures against MSs abusing the derogation. Nevertheless, the impossibility of supporting the harmonization of this policy sector due to a lack of ex ante positive regulatory measures motivated the same institution to take a further step in the political project of Europeanization of defence equipment markets with the proposal for a tailor-made regulatory regime to adapt to the specificities of defence markets.

2.2.2 Towards a EU rule-based EDEM: mapping steps and scope of application

As evidenced in the previous section, the doctrinal and jurisprudential reflection on conditions for the invocation of art 346 TFEU contributed to the progressive elimination of uncertainties over the correct application of European Union law in the defence market field. Although a theoretical account of the role of the EC will be provided in the next chapter, it is advanced here that this institution, by capitalizing on the technical capacity of the CJEU and the doctrinal interpretative activity provided by legal academia, became an important EU public policy entrepreneur. In an early phase, analysed in legal terms in section 2.2.1, the EC, seizing a window of political opportunity in the legal debate over art 346 TFEU, advanced an EDEM '*by stealth*'. By clarifying conditions for the applicability of the defence exemption, EDEM emerged *a contrario* as the body of principles and rules governing public procurement activities in the EU internal market[33] covering 'all procurement' non-falling under art 346 TFEU.

From the mid 2000s onwards, the EC's institutional role has progressively expanded, and the objective of promoting the liberalization and effective functioning of defence equipment markets evolved into a structured policy definition/ regulatory activity in the defence market field. The status quo indeed removed the need to dwell

improper use of the powers provided for in Articles 346 and 347. The Court of Justice shall give its ruling in camera.

[33] Priory to the entry into force of the special regime contained in Directive 2009/81/EC, public procurement regulation applicable to defence markets subject to art.346 TFEU comprised the two 2004 Public Sector Procurement Directives, namely Dir. 18/2004 /EC (classic procurement) and Directive 17/2004/EC (utilities procurement). The EU public procurement regime has been most recently amended by a reform contained in the 2014 Public Procurement EC Package. For a legal analysis of the reform see: Arrowsmith S. (2014) The Law of Public and Utilities Procurement: Regulation in the EU and UK vol, 1 (3rd ed.) London: Sweet and Maxwell.

any longer on making the application of art 346 TEU 'as skinny as possible', while extending the regulation of classic and utilities procurement to non-exempted military markets. In this more mature phase of the EDEM construction process, the CJEU, guardian of the correct and uniform application of EU Treaties, played only an indirect/secondary role, since the EC purposely advanced its policy-making activity under the threat, levelled at MSs, of an uncontrolled judicial action on art. 346 TFEU, should they not agree to a tailor made regulatory regime for EDEM (Heuninckx[34] 2010:91; Blauberger and Weiss 2013:1122-1123).

The EU rule-based EDEM construction project advanced via a set of purposive and tailor made supranational initiatives. The 2004 EC's Green Paper (EC 2004) and the consultation process thereto (EC 2005a), whose outcomes were published in an official political Communication (EC 2005b), prepared the ground for a positive regulatory regime to be modelled at European level on the specificities of defence markets (EC 2005b:7; 2007a,b). Support for the EC's legislative initiative (EC 2007c) came with the creation of an ad hoc task force with the European Institute for Security Studies (EUISS)[35], as well as in a set of endorsing contributions by legal commentators (Georgopoulos 2005a:566-572 2005b:NA34; 2006a: NA 119-120; Heuninckx 2008c:16; Trybus 2013:4) and other parts of the EU defence decision-making environment (EDA 2005a)[36]. This strategic interaction significantly accelerated the debate on EDEM, including a targeted reflection on the opportunity for non-binding versus rule-based future regulatory options (EUISS/Schmitt 2005:17-18, 25ss)[37].

[34] Heuninckx (2010) refers to a 'carrot & stick' approach in defining the EC strategy towards EDEM, which is a similar concept to what Blauberger, and Weiss (2013) defined, employing a political science approach, as 'judicial politics' or 'judicial law-making'.

[35] The 2005 EUISS Task Force comprised Dr. Andrew James, Senior Lecturer in the Policy Research in Engineering, Science and Technology (PREST), University of Manchester (UK), Dr. Thierry Kirat, Head of Research in CNRS, IRIS-CREDEP, University of Paris Dauphine (FR), Dr. Martin Lundmark, Researcher at the Swedish Defence Research Agency (FOI), (SE), Michele Nones, Vice-President of the Istituto Affari Internazionali (IAI) (IT), and Joachim Rohde, Deputy Head of Research Unit, European and Atlantic Security, SWP (DE). Chairman and Rapporteur was Dr. Burkard Schmitt from EUISS.

[36] Besides official statements and press declarations, a risk, if not a real case, of institutional rivalry between European Defence Agency (EDA) and the European Commission (EC) has been identified by a number of authors in both the legal and the political science traditions. On the legal side see Trybus 2006b: 667; Heuninckx 2008c:17; Georgopoulous 2015:133; Koutrakos 2008:2. On the political science side, inter alia, see Batora 2009: 1075; Devore 2015a: 172; Fiott 2015:542-543. Of a different view is Oikonomou 2018: 263 who denies the existence of a rivalry and identifies synergies between the two institutions under an historical materialistic theoretical framework.

[37] The reflection on the need for a rule-based binding EU Defence Procurement Code to overcome the inefficiencies of the Western European Armaments Agency (WEAG) intergovernmental activities had been already envisaged back in time by Prof. Trybus (1999: 226ss). The insufficiency of intergovernmental non-rule based regimes was also lamented by Georgopoulos (2006b:57) while comparing the EDA Code of Conduct on Defence Procurement with the WEAG's Coherent Policy Document.

A point of departure in the construction of a EU-rule based EDEM was the acknowledgement, emerging as a core output of the EC's Green Paper Consultation (EC 2005b) and reiterated in the ex ante EC's regulatory impact assessment (EC 2007a), that the existing legislative framework for defence procurement in Europe, at the time consisting of the two reformed public procurement Directives 2004/17/EC and 2004/18/EC, was ill-suited to accommodate the specificities of defence markets and overcome the fragmentation and inefficiencies in their functioning (EC 2005b:5; 2007a:6, 15, 27; 2007b:2-3; Trybus 2004b:198; Georgopoulos 2004: 322ss; Georgopoulos 2005a:559; 2005b: NA34; 2006a:NA119; 2008:NA82; Heuninckx 2006:208). It is reported that the majority of stakeholders involved in the 2004 Green Paper Consultation identified a number of obstacles in the existing public procurement legislation down to the following components: a) the use of open tendering procedures based on publication in the OJEU not compatible with confidentiality requirements; b) the use of the negotiated procedure as preferred procedure on too restrictive and ill-defined grounds; c) the absence of criteria such as security of supply, confidentiality and urgency for the selection of tenderers; d) the inappropriateness of rules on technical specifications, time limits and follow up contracts (EC 2005a:5; Georgopoulos 2006a:NA119; Heuninckx 2011b:10 [38] ; Heuninckx and Arrowsmith 2018:152-153).

The reported criticalities in the existing EU public procurement legislation, in tandem with a lamentable lack of understanding concerning applicable rules, were elevated as an important cause of the abusive invocation of art 346 TFEU, also via the route of art. 14[39] Directive 2004/18/EC[40] (EC 2005a:7; 2007a:16-19). The direct consequence was indeed the systematic non-application of EC rules to the defence market sector governed instead by national rules and practices often incompatible with the EC Treaty principles (elaboration on EC 2007a:19-27). Building on the detected deficiencies in the application of EU law, the EC's policy option of

[38] Heuninckx reported two additional problems with the application of EU public procurement directives in the defence sector in: 1) the lack of specific clauses to ensure that competition is channelled down the supply chain in order to improve market access for Small and Medium Enterprises (SMEs); 2) the absence of special clauses harmonising offsets practices.

[39] Beyond the express reference to art 346 TFEU, art. 14 Dir. 2004/18/EC included specific exclusions for public contracts declared to be secret, when their performance must be accompanied by special security measures, or when the protection of the essential interests of the MS concerned so requires.

[40] At the time Dir. 2004/18/EC had just consolidated three previous public procurement directives, namely Dir. 93/36/CEE, Dir. 93/37/CEE and Dir. 92/36/CEE. A reform of Dir. 2004/18/EC, and of the utilities Dir. 2004/17/EC did not come until 2014 with the passing of a new EC Public Procurement Package comprising Dir 2014/24/EU on public procurement, Dir. 2014/2015/EU on utilities procurement, and Dir 2014/23/EU on the award of concession contracts.

deepening further integration via a rigorous interpretation on conditions for application of art. 346 TFEU was complemented by a parallel initiative to advance a tailor-made regime to coherently accommodate under a unique EU regulatory framework the special characteristics and sensitivities of defence equipment markets (EC 2005b: 2-3,6-7; 2006b: 15, 2007a: 7; 2007e:6).

The proposal for an ad hoc regulatory regime to be modelled on the special defence markets features emerged as a key and necessary step to be undertaken at the European institutional level, with a view to correcting the inefficient functioning of defence equipment markets in Europe via the harmonization of national procurement procedures (EC 2005b:6; 2006a:3; 2007a:28,40-41; 2007b:7; EUISS/Schmitt 2005c:11, anticipated by Trybus 1999[41]:217ss and by Georgopoulos 2004:301ss[42]). Such regulatory activity imposed on the EC policy entrepreneur and legislator the difficult task of balancing, in an evolving politico-economic context[43], the objective of integrating the defence component under the EC internal market programme and advancing the EU economic integration project[44] with the aim of safeguarding MSs' sensitive requirements linked to the protection of national essential security interests[45] (EC 2007b:44; Di Lenna 2009:46).

Furthermore, the drafting of a brand-new regulatory regime for defence equipment markets required weighting the application of EU internal market principles of transparency, non-discrimination and competition against flexibility requirements in the different phases of the sensitive and complex defence procurement process (EUISS/Schmitt 2005c:26; EC 2007c:6; Di Lenna 2009:48). The outcome of such highly sensitive technical activity is contained in the text of the EU

[41] In studying options for harmonization of defence procurement procedures in the European Union comparatively drawing on national experiences in 3 MSs (FR, DE, UK) Prof Trybus articulated in his PhD thesis a detailed set of technical proposals for a legally binding European Defence Procurement Code (Trybus 1999:217-301).

[42] In analysing prospects for future European integration in armaments, Georgopoulos theorized in his PhD thesis about the need to structure a three-stage approach/process from soft to hard law in advancing a EU regulatory framework for EDEM. The quick transition to a EU defence procurement mandatory legal regime partially confuted his theoretical anticipations.

[43] As it will be offered in the cases study analysis, the changing techno-economic conditions of defence markets and industries have shaped incentives for new politico-economic configurations and new regimes to progressively emerge in Europe. Lawyers instead tend to list techno-economic characteristics of the defence sector as something static and immutable over time. For an illustrative description of special features of defence equipment markets see Trybus (1999:7-13,21-27; 2014:22-58), Georgoloulos (2004:57-65;2007a:203-206), Heuninckx (2015b:320-337), Heuninckx and Arrowsmith (2018:138-143).

[44] Inter alia, by extending commercial opportunities for economic operators via access to economies of scale and the abatement of productive costs.

[45] Amongst them, most prominently the preservation of defence technical and industrial capacities, the security of equipment supplies and of information exchanged.

Directive 2009/81/EC [46] (EC 2007c; OJEU 2009a) providing for a set of administrative legal rules coordinating the substantive and procedural regime covering MSs' defence and security procurement activities in the European Union (Briggs 2009:NA129; Georgopoulos 2010:NA2; Trybus 2013:3). Dir. 2009/81/EC (EC 2007c; OJEU 2009a), from now on the Defence and Security Directive (DSD), is part of a broader EC's initiative, the so-called 2007 EC Defence Package, also consisting of Dir. 2009/43/EC[47] (EC 2007f; OJEU 2009b) designing an administrative legal regime for the intra-EU transfer of military and sensitive equipment, as well as an EC's official Communication proposing a Strategy for a more competitive defence industrial sector (EC 2007d;e;g; Georgopoulos 2008:NA 81; Trybus 2013:11).

Postponing until the empirical chapters the elaboration of politico-economic drivers beyond the 2007 Defence Package, the remainder of this section concentrates on the EU regulatory regime introduced by the DSD. The present review does not include a legal analysis of Dir. 2009/43/EC providing a regulation for intra-EU transfers of defence related equipment. The administrative regime sketched by Dir. 2009/43/EC presents a lower degree of strategic relevance for EDEM, whose regulatory core-piece is embodied by the DSD. The 2007 EC's Defence industrial strategy does not present legislative/regulatory aspects, and for this reason its contents will enlighten the political analysis contained in Chapter 6.

The new regulatory regime introduced by the DSD has been drafted by 'chiselling from the rock' (Trybus 2013:12; 2014:5) of the Public Sector Directive 2004/18/EC (OJEU 2004a) [48] and it entered into force on 21/08/2009 with a two-year deadline for MSs to transpose it into national laws. The EU rule-based regime for defence and security procurement articulates special provisions on: a) the scope of application of the new rules, and b) the protection of sensitive interests throughout the whole procurement process (EC 2007c: 5,7; Georgopoulos 2008:NA82; Kennedy-Loest and Pourbaix 2010:401ss; Trybus 2014:245ss). It has been furthermore accompanied by an EC-issued list of official Guidance Notes providing for interpretative clarification of a set of topics of central importance in the application of

[46] Directive 2009/81/EC of the EU Parliament and the Council of 13.07.2009 on the co-ordination of procedures for the award of certain works contracts, supply contracts and service contracts by contracting authorities or entities in the fields of defence and security, and amending Directives 2004/17 and 2004/18 [2009] OJ L216/76.
[47] Directive 2009/43/EC of the EU Parliament and the Council of the 06.05.2009 simplifying terms and conditions for transfer of defence related products within the Community [2009] OJ L 216/76.
[48] Dir. 2004/18/EC, today repealed by Dir. 2014/24/EU on public procurement as part of the 2014 EC's Public Procurement Package.

the new regime for defence and security procurement in the EU[49]. The present subsection will produce a synthetic account of item a) in the legal debate on the subject matter, namely the definition of the scope of application of the new regulatory regime for EDEM, namely the DSD. A structured analysis of item b) articulating special provisions in the procurement process adapted to the specificities of the defence and security markets will occupy Section 7.2 of Chapter 7, offering a detailed assessment of regulatory EDEM a decade after its entry into force. It will be suggested that reading the recalled provisions under an empirical light allows one to gain an understanding of the impact these norms concretely generate and will be likely to generate on the advancement of their primary objective, EDEM.

For the sake of the present legal review an analytical differentiation is drawn between the a-legal notion of boundaries and the legal notion of field/scope of application as referred to the DSD. In the present context, boundaries can be interpreted as lines of demarcation in the determination of the applicability versus non-applicability of law to a subject matter. The intellectual reference to boundaries can help to establish when the DSD applies out of classic EU public procurement rules, or, alternatively, when no EU procurement law applies at all to an economic significant defence and procurement activity in the European Union (Heuninckx 2010:92). The legal notion of field of application instead is crucial not only to define internal boundaries (e.g.. when the DSD applies), but it furthermore substantively helps to shape the quantitative and qualitative size of the new regulatory regime for EDEM. The substantive perimeters of the new EU regulatory regime for EDEM can be traced by following general provisions on applicability of law, and special provisions contained in the DSD defining the personal[50] and material[51] scope of the Directive. A deductive account shall be given of EU Treaties exemptions as well as of the list of exclusions contained in the text of the DSD from the application of the regulatory regime under comment.

[49] Guidance Notes issued in 2009 cover the following topics: 1) Field of application; 2) Exclusions; 3) Research and Development (R&D); 4) Security of Supply (SoS); 5) Security of Information (SoI); 6) Subcontracting; 7) Offsets. On 30.11.2016 the EC issued a new note providing guidance on Government-to-Government (GTG) contracts in defence. The document helps MSs' procurement authorities applying exclusions ex art. 13(f) DSD and it replaces section 3.6 'Contracts awarded between governments' (para 24-26) of the guidance note n. 2) on Exclusions.

[50] Namely to which contracting entities it applies to/who is covered.

[51] Namely to which type and value of contracts it applies to.

First of all, as the DSD is *lex specialis*[52] with respect to Directives 2014/24/EU[53] and 2014/25/EU[54], currently disciplining the public and utilities procurement (OJEU 2014a;b), it applies at the same conditions giving preference to the general legal principle according to which *lex specialis derogat generalis* (elaboration on Georgopoulos 2004:20ss; Trybus 2014:305). The reported general legal principle has been codified in the body[55] of the 2014 Public and Utilities Procurement Directives, which residually apply for the awarding of public contracts in the field of defence and security, with the exception of contracts falling within the scope of the DSD, as well as of contracts to which the DSD does not apply pursuant to articles 8[56], 12 and 13[57] of the same Directive. For this reason, for a specific procurement activity, the applicability of the DSD first has to be ascertained. If it applies, the Public/Utilities procurement Directive does not apply. If one of the three recalled exemptions applies under the DSD, then none of the EU Directives apply. Out of the referred options, if the DSD does not apply, the general EU 2014 public sector regime would apply, provided that none of its own specific exemptions would apply. The application of both Public Sector Directives remains subjected[58] to art. 346 TFEU (elaboration on Heuninckx 2010:95; 2017:62-63).

The DSD applies to contracts for pecuniary interests concluded in writing with the meaning of 'public contract' or 'contract[59]' provided in the 2014/24/EU and 2014/25/EU Procurement Directives. To ensure coherency amongst EU procurement regimes, the DSD applies to the same types of contracts as defined by the two public sector Directives[60] being awarded by public authorities and bodies governed by public law including central purchasing bodies[61] (EC 2009a:3;Trybus 2014:248ss) so that the

[52] On the philosophical categorization of defence procurement as notion *specialis* under the notion generalis of public procurement see: Georgopoulos (2004:20ss) and Trybus (2014:305).
[53] Directive 2014/24/EU of the European Parliament and the Council of 26.02.2014 on public procurement and repealing Dir. 2004/18/EC OJ L. 94/65.
[54] Directive 2014/25/EU of the European Parliament and the Council of 26.02.2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Dir. 2004/17/EC OJ L 94/65.
[55] Art. 15(1) (a) (b) Dir 2014/24/EU, Art. 24 (1) (a) (b) Dir. 2014/25/EU.
[56] Art. 8 DSD provides for thresholds above which the new regime applies. The value is calculated excluding VAT as no less than: 412.000 EUR for supplies and service contracts, 5.150.000 EUR for works contracts. Art 4 Dir. 2014/24/EU provides for different thresholds.
[57] As illustrated in the end of the present subsection arts. 12 and 13 Dir. 2009/81/EC provide for the regime of exclusions from the application of the Directive.
[58] Art 15(2) Dir 2014/24/EU and Art. 24(2) Dir 2014/25/EU.
[59] Art 1(2) DSD defines the notion of contract with reference to art 1(2) of the 2004/18/EC Dir, today 2(1)(5) of Dir. 2014/24/EU and art. 3-4 Dir. 2014/25/EU.
[60] Art 1(17) DSD defines these terms by reference to Art 1(9) of Dir. 2004/18/EC and art 2 2004/17/EC today repealed by the 2014 Public Sector Directives.
[61] The DSD does not have an Annex listing the entities covered by its personal scope and it merely refers to the Public Sector Directive.

applicability of law will depend on the subject matter of the contract, and not on the authority awarding it (Heuninckx 2010:97; 2017:68-69; Trybus 2014:266; Heuninckx and Arrowmisth 2018:185). Pursuant to art. 2 DSD, the regime covers the following categories of contracts above the thresholds set out in Art. 8: i) the supply of military equipment, including any part, components and/or subassemblies thereof[62]; ii) the supply of sensitive equipment, including any part, components and/or subassemblies thereof[63]; iii) works, supplies and services directly related to the equipment referred to in points i) and ii) for any of the elements of the life-cycle[64], or; iv) works and services for specifically military purposes or sensitive works and sensitive services.

Subject to articles 36, 45(3), 51, 52(1), 62, 65(1)(b), 72, 73 [65], and 346 TFEU, the DSD extends its scope of application to 'military' and 'sensitive' procurement (EC 2009a:3; Heuninckx 2011b:12; 2012:98; 2017:68; Trybus 2014:260-61). Military equipment is defined[66] as equipment specifically designed or adapted for military purposes and intended for the use of an arm, munitions or war material[67] (EC 2009a:5; Briggs 2009:NA131; Trybus 2014:261; Heuninckx 2010:98; Heuninckx and Arrowsmith 2018:187); sensitive equipment, works and services on the other hand, are defined[68] as equipment, works and services for security purposes, involving, requiring and/or containing classified information (EC 2009a:6; Trybus 2014:263; Heuninckx 2010:99; Heuninckx and Arrowsmith 2018:190). The decision to expand the material scope of application of the DSD to sensitive contracts with a security purpose responds to strategic reasons. As will be offered in the context of the case study analysis contained in Chapter 6 illuminating also the broader politico-economic context in which EDEM is placed, the emergence of the international terrorist threat with 9/11 attacks and the growing EU institutional framework in the

[62] Art 2(a) DSD.
[63] Art. 2(b) DSD.
[64] According to art. 1(26) DSD, the notion of life cycle entails all the possible successive stages of a product, namely R&D activities, industrial development, production, repair, modernization, modification, maintenance, logistics, training, testing, withdrawal, and disposal (see also Heuninckx 2015a:68; Heuninckx and Arrowmisth 2018:192).
[65] Articles 36,45(3),51,52(1),62,65(1)(b),72, 73 TFEU provide for exemptions from specific parts of the Treaties justified by public security considerations. This is an elaboration on art. 2 DSD, which lists only some of them. For a scrutiny of judicial decisions on these exemptions see: Trybus (2002b:1350-1353). For a comprehensive analysis of those exemptions in the context of the DSD see: Trybus (2014:72-85).
[66] Art. 1(6) DSD.
[67] Recital 10 DSD specifies that military equipment should be understood in particular as the product types included in the list of arms, munitions and war materials adopted by the Council in its Decision 255/58 of 15 April 1958 (Military List). However the same Recital 10 and the 2009 EC Official Guidance Note on the Field of Application of the DSD specifies that the Military List does not necessarily give an exhaustive description of the scope of the Directive with respect to the supply of military equipment, and for this reason new materials and technologies in the meantime emerged fit the notion of military equipment.
[68] Art. 1(7) DSD.

field of crisis management under CFSP and the nascent CSDP significantly narrowed the divide between the defence and security sectors (Di Lenna 2009:55; Darnis et al 2010:31). At the same time, the rapidly evolving techno-economic context and the process of consolidation in the arms industry modelled new intersections between civil and military R&D investments, security and defence technologies and new business opportunities (see more extensively Ch.s 5 and 6), creating incentives for MSs to uniform, under the EC's regulatory proposal, the legal regime for defence and security markets.

The expansion of the legislative instrument to dual-use products and security markets has not been accompanied in technical terms by legal clarity in the specification of essential notions such as the one of 'security' or of 'security purpose' which indeed are not defined in the text of the DSD. Recital 11 is generic in its wording, assuming that a security purpose exists when 'military and non- military forces cooperate to fulfil the same mission' or when 'the purpose of the procurement is to protect the security of the Union and/or of MSs on their own territory or beyond it, against serious threats from non military and/or non-governmental actors'. The generic reference in the same Recital 11 to activities such as border control, police activities and crisis management missions does not offer a comprehensive account of the security purpose to which sensitive contracts should respond (EC 2009a: 7; Trybus 2014:264).

To be covered by the DSD, the procurement for security purposes must also involve classified information[69]. This condition does not apply for military equipment so that the latter does not necessarily have to involve classified information. The classification or protection of the information must result from the application of national legislation/regulation and it should have been attributed before the contracting decision from the public authority in the interest of national security (EC 2009a:7; Arrowsmith and Heuninckx 2018:191). One could observe that the same requirement, namely the presence of classified information, has been elevated by the EU legislator as condition for the application of the DSD for security procurement, while it can also be used as a condition for rejecting the application of the same

[69] According to art. 1(8) DSD classified information is defined as any information or material, regardless the form, nature or mode of transmission thereof, to which a certain level of security classification or protection has been attributed, and which, in the interests of national security and in accordance with the laws, regulations or administrative provisions in force in the MS concerned, requires protection against any misappropriation, destruction, removal, disclosure, loss or access by any unauthorised individual, or any other type of compromise.

Directive under art. 346 TFEU (1)(a) [70] that recognizes MSs the right to derogate the EU Treaties against the supply of information whose disclosure is considered contrary to the essential interest of its security[71]. It is reasonable therefore to believe that MSs will apply the new regime for security procurement in limited cases, when/if the disclosure of those classified information does not expose their essential security interest.

Art 346 TFEU and the recalled special security exemptions contained in the TFEU are not the only provisions restricting the scope of application of the DSD. Additionally, and as anticipated when discussing the item of applicability of law, the legal regime presents per itself an exemption based on international rules and a specific list of important exclusions. Together considered, they encompass: i) contracts awarded under international rules (art. 12 and Recitals 26, 28); ii) contracts whose disclosure of information is contrary to the essential interest of its security (art. 13-a and Recital 27); iii) contracts awarded for the purpose of intelligent activities (art. 13-b and Recital 27); iv) contracts awarded in the framework of an R&D based cooperative programme[72] (art. 13-c and Recital 26); v) contracts awarded in third countries (art.13-d and Recital 29); vi) contracts awarded by Government to another Government (GTG) (art. 13-f and Recital 30) (Heuninckx 2010:109-113 2011:13; 2017:70-72; Trybus 2014: 272-301; Heuninckx and Arrowsmith 2018:205-219). An official EC Guidance Note has been issued to clarify their applicability (EC 2009a;b;c EC 2016a), but a risk persists that even in the remote case that MSs could not rely on either art. 346 TFEU or articles 12 and 13 DSD, they can surely refer to the list of exemptions contained in the 2014 Public Sector Directive, and most prominently on the special security exemption[73].

Indulging no longer on the doctrinal analysis of the (overly restricted) legal scope of application of the new EU rule-based regulatory regime for defence and security procurement activities and residual EU Public Sector regimes, the present review will shift towards the political science debate in an attempt to highlight major contributions made on the other side of the intellectual spectrum over the past decades

[70] According to Art. 346 TFEU (1) (a) no Member State shall be obliged to supply information the disclosure of which it considers contrary to the essential interests of its security.
[71] Further to Art. 346 (1)(a) TFEU, as it is going to be offered, art. 12 DSD provides for a special exclusion based on the security of information ex art 12 (a), as well as on intelligence activities ex. art.12 (b).
[72] It is interesting to observe that, although R&D cooperative contracts are excluded from the scope of the DSD, art. 1(c) requires MSs to inform the EC of the outcome of collaborative R&D programs.
[73] Art. 15(3) Dir. 2014/24/EC.

on the subject under investigation. A structured empirical analysis will be taken up in Chapter 7, Section 7.2, to assess the EDEM legal construct a decade on from its entry into force. In that context, a specific mention will be made to procedural provisions originally designed to flexibly accommodate the specificities of defence markets.

2.3 EDEM in the politics debate

2.3.1 EDEM under the lens of IR theories

When reviewing political science contributions on EDEM, there is an important element to take into consideration. Indeed, as observed in 2.2.1, not only has the strategic balance of the intellectual debate traditionally leaned more towards the legal/public procurement disciplinary terrain, but it was also only with the institutionalization of CFSP/CSDP that a more structured reflection on EDEM by political scientists emerged. Clearly, the state of under-development characterizing the European defence institutional architecture until the beginning of the Twenty-First Century, with the formalization of CSDP as an autonomous political segment of the CFSP, left a narrow space for intellectual efforts to blossom in the European Integration (EI) tradition, outside few pioneering contributions reviewed in the next section.

As a first body of literature reviewed, IR theory offers a number of intellectual references for the study of EDEM, which support a set of analytical elaborations. Specifically, the most prominent IR intellectual scholarships, namely structural realism, neoliberal institutionalism and social constructivism, will be reviewed for their theoretical contribution to the EDEM. According to structural realism, the international system is a multi-state political structure whose organizing principles are anarchy and hierarchy, a functional differentiation of capabilities, and their distribution amongst units (Waltz 1979:88-101; Buzan et al 1993:7ss; Donnelly 2000:93ss; Griego 2009:31; Elman 2007:13; Andreatta et al 2012:20,25,61). Under structural realism, States are independent and functionally-alike sovereign units of power, holding a monopoly of legitimate violence and centralized political systems (Waltz 1979:93-98; Kolodziej 2005:132,136; Dyson and Kostantinides 2013:137). Their action is a reflection and consequence of their relative power position within the

international system (Waltz 1959:159-187; Donnelly 2000:82ss; Andreatta 2012:32), which mirrors an uneven distribution of different capabilities (Waltz 1979:100-101; Buzan et al 1993:21-22) and it follows a two-fold balancing logic (Griego 2009; Andreatta et al 2012:55ss, 72ss).

Under the balance of power theory, States are functionally equal in a condition of anarchy and the balancing activity takes place amongst weak players, against the strong one(s)[74]; whereas balance of threat takes place in a situation characterized by a hierarchic organization marked by strong inequalities amongst States, with balancing activities operating against the most threatening actor via soft power strategies (Waltz 1979:126-127; Walt 1985:4; Buzan et al 1993:23ss; Andreatta et al 2012:54ss, 62-63, 68-69; 73). Under both theoretical accounts, structural pressures drive States to become perpetual security-seekers, never able to fully trust each other to ensure their own security (*internal balancing*), but at the same time incentivized to consider the option of cooperating when internal resources are insufficient or other type of constraints originate (*external balancing*) (Waltz 2002:199; Kolodziej 2005:138; Andreatta et al 2012:61,70).

As evident, cooperation is part of States' balancing activity under structural pressures exercised by the international system. However, while according to balance of power theory, cooperation is a response to the need to accumulate material resources in a system, as a primary expression of aggregated power (Waltz 1979, Donnelly 2000:6), in the second version of the balance theory, countries react to threats (Waltz 1979; Walt 1985:8-9). The notion of threat is more expanded, encompassing further elements namely military technology, geographical extension, proximity and intentions of the threatening power (Andreatta et al 2012:73; Walt 1985:10). Both versions of the theory confirm the strategic importance of the technological and economic dimension to the external balancing activities. Indeed, despite structural realism formally recognizing the prominence of high politics and military issues in the functioning of the international system, both the size of the economy and the state of advancement in military technology/capability are elevated to core substantive components in balance of power/ balance of threat theorizations.

[74] Balancing under balance of power theory means allying in opposition to the strongest as opposed to bandwagon, which means ally with the principal power. Under balance of threat theory balancing means allying against the country that is the principal source of danger, as opposed to bandwagon activities, namely allying with the country which poses the biggest threat.

For this reason, under structural realism, one could interpret EDEM as a manifestation of European States' external balancing activities performed by cooperating in armaments programmes with a view to: a) accessing economies of scale and increasing their commercial/strategic trade position versus stronger competitors, such as the United States of America (US), and today other emerging economic powers (*balance of power*); or alternatively, b) preserving their own security responding, via soft-balancing/ low politics action (e.g. cooperating in armaments programme) to external threats manifested by players outside the cooperation zone (*balance of threat*).

A similar line of thought, indeed, has interpreted EDEM, under structural realist premises and in the context of a fully-fledged CFSP/CSDP, as the cooperative product of important differences in the external vulnerability of European States seeking to maximize relative gains in soft-power activities with the threatening power of the US (Dyson and Kostantinides 2013:144). In partial correction of the reading provided by a recent American literature interpreting CSDP as an external soft-balancing exercise against the US dominant military power[75], the two authors proposed that EDEM can be understood in the light of the multifaceted layers composing the EU-US relation, resembling a form of '*reformed bandwagoning*' rather than a pure balancing of power/threat exercise (Dyson and Kostantinides 2013:147ss). But if European States were to side with the strongest, for opportunistic gains, the shift from a low strategic cooperative framework to a set of ambitious regulatory activities comprising a multibillionaire European Defence Fund remains unexplained under structural realist premises. Furthermore, the reading provided by Dyson and Kostantinides does not take into account the changing shape of EDEM, which is per se a reality conceptually separated from CSDP[76]. Indeed while in a pre-CSDP phase, EDEM could have potentially reflected an act of external balancing with the intergovernmental cooperative efforts amongst strongest European players via political structures such as the Letter of Intent (LoI); in post-CSDP phase the EDEM

[75] A large number of US-based scholars, including Art, Layne, Paul, Pape, Posen and Walt, have argued that Europe is engaging in a form of 'soft balancing' against the US. For an account of the literature on the subject see, inter alia: Art (2004:4), Layne (2006:7, 34-36), Posen (2004:5; 2006:149), Walt (2002;121ss; 2005:129), Dyson and Kostadinides (2013:145, footnote 73.

[76] Despite being functionally linked to CSDP, EDEM is a separate stand-alone reality, which deserves autonomous theoretical and empirical consideration from CSDP. There is instead a certain tendency amongst political scientists of IR tradition to conceptually assimilate EDEM with CSDP in their analyses. Examples of such assimilation are found in the structural realist analysis of Dyson and Kostantinides (2013:113ss) but also in the historical materialistic one by Oikonomou (2007a: 15ss, 40-41).

supranational regulatory construct legally binds all European States when purchasing defence and military equipment to a common project, further comprising an Agency, the European Defence Agency (EDA), to develop defence technological and industrial capabilities and strategically supporting the CSDP military segment. Lastly, the structural realist interpretation completely neglects the European Commission's (EC) purposive policy entrepreneurial role in passing EDEM, as well as in projecting long-term institutional goals over EDTIB. To some extent, core theoretical postulants of the structural realist thought in IR theory have been partially reflected in the Liberal Intergovernmentalist (LI) reflection within European Integration (EI) studies (see next subsection), which also runs short of explanations when it comes to give an account of the regulatory significance of the EC's supranational policy entrepreneurial activities in EDEM, as opposed to the low strategic importance of intergovernmental frames within EDA, such as for example the Code of Conduct on Defence Procurement, and previously the Western European Armaments Group (WEAG).

Within systemic explanations, as a counterbalance to the realist reading of cooperation as a second-best strategy to preserve States' national interests, Neoliberal Institutionalism (NI) offers new theoretical insights on the role of the international system in driving interstate cooperation. This body of literature rests on the assumption that the international system does not reflect a 'billiard model' aseptically accommodating the inter-State power struggle under conditions of anarchy and hierarchy (Krasner 1982b: 497-8[77]; Haggard and Simmons 1987:500). Instead, a non-hegemonic, multi-centred and interdependent system can promote the peaceful coexistence amongst States via the creation of international organizations supporting institutionalized forms of cooperation (Keohane and Nye 1977:7ss, 21ss, 228ss; Keohane 1984:50,85ss; Haggard and Simmons 1987:516).

According to rational neoliberal institutionalists[78], only partially reflecting neorealist rational theoretical premises, the international system is a dynamic and interconnected reality with a potential for common interests to emerge therein, and for collective action to support joint gains (Keohane 1984; Haggard and Simmons

[77] In the quoted contribution, Krasner discussed Realist models of first and second-generation. For Realists of 1st generation the international system can be conceived as a 'billiard model' under which the struggle for power is a zero-sum game where the increase in State's capabilities means decrease in the capabilities of others; the Realist model of 2nd generation resembles the metaphor of the 'tectonic plates' where the opportunity for mutual and relative gains arise from international exchange.

[78] Keohane (1988) alternatively refers to the title of 'reflective' institutionalists.

1987:513; Duffield 2009:55). While the realist principle of cooperation based on hegemonic stability and distribution of power is being contested (Keohane 1984:7; Andreatta et al 2012:159,173), international institutions come to play a primary role in promoting cooperation and convergence, by offering a coordination role, reducing information asymmetries and transaction costs, emphasizing their reputation, promoting stability and predictability by enforcing mandatory mechanisms (Keohane 1984, 1988, 1989 Duffield 2009:55-58; Andreatta et al 2012:165,255). Prominent manifestation of such activity, and expression of the neoliberal rationalist reflection, is the emergence/notion of international regimes as collective forms of politico-economic organization/configuration of power interests in the multi-centred and interdependent international system (Krasner 1982a:499;1982b:189).

The rational neoliberal institutionalist analysis has concentrated on multiple equilibrium conditions beyond international regimes, namely on the set of causal relations varying across periods of regime creation, persistence, and dissipation (e.g. regime change) (Krasner 1982b:499; Keohane 1986; Duffield 2009:56-57), with a lower degree of intellectual articulation on their consequences, with the exception of the two-level games explanation provided for by Putnam (1989)[79]. Although there is no academic work specifically employing a rational neo-institutionalist theoretical account in the study of EDEM, this intellectual scholarship has shaped the present analysis, which will draw directly in Chapter 3 (Subsection 3.2.1), on the sub-field of international regime literature to structure a multi-disciplinary conceptualization of EDEM. The analytical framework presented in Chapter 3 (Subsections 3.3.2 and 3.3.3) will go beyond traditional international regime explanations to account for the role of technological change and techno-economic paradigms in supporting socio-institutional adjustment in EDEM. Lastly, it must be pointed out that the contribution provided by rational neo-institutionalism falls in the same intellectual trajectory of the functionalist and new functionalist scholarships of European Integration (EI) derivation, further blossomed in the EU governance, institutionalist/organizational, and policy-making scholarship direction (to be reviewed in the following subsection). The EU policy-making literature, in specific, will integrate the multi-disciplinary analytical model contained in Chapter 3 (Subsection 3.3.3), connecting, for the first

[79] According to the logic of the two-level game proposed by Putnam (1989), national leaders have to negotiate simultaneously both with their internal constituencies and with States part of the international system, so that essentially the bargaining process takes place in parallel. For applications of the two-level game model at the EU level see: Saurugger (2014:64ss).

time, a body of evolutionary economics to EU policy entrepreneurship literature, to provide for a techno-motivated explanation of EDEM.

A second tale in the neoliberal institutionalist thought has a sociological orientation (Keohane 1988:379; Keohane 1989; Duffield 2001:58). Some authors place sociological neoliberal institutionalism into the constructivist intellectual tradition (Andreatta et al 2012:179; Krotz 2012:28) due to the prominent importance they both place on the inter-subjective aspects of international regimes, comprising formal and informal norms (Adler and Barnett 1998:10,42; Adler 2008a)[80]. Other authors (Hasenclever et al 1997:25; Caffarena 2009:77) instead observe that, while under both approaches actors' preferences contribute to explain international political interactions and norms, the opposite is true only for constructivists. This literature review reunites the two theoretical perspectives under the title of ideational explanations, inaugurated by Kratochwil (1989:23ss), Onuf (1989:33ss, 1998:58ss) and popularized by Wendt (1992,1999) as opposed to structural realist and rational neo-liberalist theoretical accounts, which provide instead for explanations based on the analysis of systemic material forces (Adler 1997:319;2008a:113; Hurd 2008:300,310).

An ideational approach assumes that ideas and informal norms, as opposed to material forces, are ontologically antecedent/ constituting the formal structure of precepts and rules shaping common political action (Wendt 1999:24-25,114-115; Adler 1997:324; 2008a:118; Krotz 2012:6,11). As a consequence of the above, reality is formed as the result of endogenous processes of social knowledge creation carrying an inter-subjective meaning for actors involved in its shaping (Kratochwil 1989:5-6; Wendt 1992:396-397, 1999:135; Fearon and Wendt 2002:63; Adler 2008a:126). Agents and entities, with their action, influence the formation and preservation of collective identities and shared ideational structures under new sets of norms, ideas and values which they will try to imprint via learning and socialization[81] processes and persuasion activities on the formation and functioning of formal regimes (Kratochwil 1989:61; Wendt 1995:73ss; 1999:227; Kurowska and Kratochwil

[80] Norms are intended as rules of legitimate and appropriate behaviour. Formal norms encompass material entities and forces, whereas informal rules include ideational structures and processes, namely ideas, beliefs, values, discourse and expectations.

[81] For constructivists, socialization comprises the activity of social consciousness, learning and interaction in which mutual perceptions and new ideas are communicated, shared, and assimilated via social influence or via communicative persuasion.

2012:96) as well as on regional integration dynamics (Checkel 1999:548-548; 2007:8ss).

A first strand of work (track 1) in the reviewed intellectual tradition has concentrated on the role of political institutions, as an expression of evolving cultural, learning and socialization models, and how they shape new ideas, preferences, perceptions and identities (e.g. constitutive norms) (Giegerich 2005; Meyer 2005, 2006[82]; Howorth 2007:187ss). A second investigative line (track 2) has deepened its focus on the incidence that domestic processes of construction of political identities/social constitutive norms play on dynamics of appropriateness[83], cognitive evolution, and institutionalized behaviours, including cooperative political decisions (Nye 1987; Adler 1992:106ss, 2005:142ss,178ss;2008b; Krotz 2012). Finally, a third area of exploration (track 3) has looked, inverting the perspective of track 2, at the evolution of international institutions and regimes (e.g. the structure) under the modelling activity of actors' identities, values, beliefs and perceptions (Howorth 2004:212; Mérand [84] 2008:5-17,22-24; 59-64,85-88, 143-144,149, 156; Faleg 2014:33ss, 280ss).

As opposed to the set of contributions which adopted a constructivist/sociological perspective to explain the emergence of security communities, and their intersection with international politics via institutional processes of communication, multilateral exchange, formation of mutual trust and collective identities (Deutsch 1957 reproduced in Eilstrup-Sangiovanni 2006:68ss; Adler 2008b:198ss; Adler and Barnett 1998:29ss,38,41) up to the inauguration of a tailored CFSP/CSDP centred intellectual debate in social constructivist key (Howorth 2004:229-231;Adler 2008a:118ss; Krotz and Maher 2011:565ss; Kurowska and Kratochwil 2012:86ss), no academic studies have expanded on the influence of international institutions and regimes in creating common political values, identities, perceptions and routines in EDEM (track 1), nor the opposite (track 3). The only available social constructivist contribution on EDEM has provided for a theoretically

[82] A tailored strand of research in social constructivist tradition has theoretically elaborated on the notion of European Strategic Culture, inaugurating an intellectual debate on the subject matter.

[83] Similarly to basic notions of International Law Theory, dynamics of appropriateness for constructivists encompass the repetition of behaviours over time (e.g. diuturnitas), and the general belief of their compulsoriness and necessity of those behaviours (e.g. opinio juris ac necessitatis).

[84]Formally proposing a sociological framework, in practice Mérand gets close to constructivist assumptions, at least as far as the analysis of ideational interests, social representation of national and the institutionalization of transnational fields is concerned. In suggesting further research trajectories for the future in the conclusions to his book Mérand (2009:156) explicitly mentions that: 'a coherent research programme can come out of a richer dialogue between political sociology and some versions of constructivism'.

articulated and empirically supported analysis of how domestic inputs and processes in the hypersensitive field of national defence policy, namely the production of advanced weapons, are shaped and affected by different forms of institutionalization under the intergovernmental (Franco-German) armaments cooperative programme Tiger (track 2) (Krotz 2012).

As in the case of previously reviewed contributions, EDEM overlaps with the notion of intergovernmental cooperation in armaments amongst European States. Nevertheless, there are substantive differences: while in the case of structural realists, EDEM figured as the economic reality residually emerging from the power politics ' zero sum' game under conditions of anarchy and hegemony, for rational neo-liberal institutionalists it substantiated the potential relative gain/output deriving from patterns of economic interdependence amongst States in a changing geopolitical environment. Under social-constructivist premises, instead, EDEM featured as the historically contingent, mutually constitutive and highly inter-subjective product of the ideational contamination between logics of institutionalization/ construction of inter-State relations, on the one hand, and the incidence of domestic factors and processes on the other, observed through the experience of the Franco-German Tiger programme (Krotz 2012:8; ch2).

The project-contingent perspective to tackle EDEM as an expression of interstate institutionalization of national interests and foreign policy preferences - analysed under the three intellectual categories of regularized inter-governmentalism, symbolic acts and practices and para-public underpinnings - linked to the specific armaments cooperative arrangements, despite being methodologically coherent with constructivist premises, represents ultimately the very Achilles's heel of such theorization. Indeed, over the past several decades, cooperation in armaments has involved the same two countries in several other institutionalized arms production and procurement efforts, well beyond the helicopter field. Furthermore, the perimeters of institutionalized armaments cooperation in Europe expanded beyond bilateral formats, comprising multilateral intergovernmental programs (inter alia: Panavia Tornado, Eurofighter and most recently the EuroMale UAV programme), cooperation under international MoM agreements (inter alia: Future Air Combat System, Eureka, LoI/ Farnborough Agreement), as well as cooperation under international organizations (inter alia: WEAG/WEO, OCCAR, EDA) or special institutional arrangements

contained in EU Treaties (for example the Permanent Structured Cooperation under the Lisbon Treaty). For this reason, it remains unclear what the elucidation of the institutionalization and construction of inter-state preferences and foreign policy options of the two countries (France and Germany) part to the Tiger programme (Krotz 2012:173) is supposed to bring, if translated to the multilateral reality of an 'EDEM at 27', namely composed of 27 Member States (MSs).

The next subsection will complete the literature review on political science scholarly approaches to the study of EDEM covering contributions which have blossomed in the mainstream European Integration (EI) studies and consequent evolutions up to the EU public policy tradition.

2.3.2 EDEM under the lens of EI mainstream literature and its derivations

After having mapped the size and limits of intellectual contributions having been provided in the different IR theoretical traditions, the present subsection will clarify core tenets of mainstream EI scholarship to expand on the review of contributions having specifically articulated, on these intellectual premises, on different aspects of the EDEM phenomenon. On one side of the analytical spectrum, we find Liberal Intergovernmentalism (LI) having blended components of rational neoliberal institutionalism and the rational version of new institutionalisms in delivering a core pillar of the EI scholarship. On the opposite side of the analytical spectrum we find theoretical perspectives having reflected, and in time outrun, the essence of New Functionalist (NF) intellectual elaboration. The verb 'outrun' well portrays the articulated and expansive evolution having characterized segments of EI-derived literature, which has come to populate a small emerging universe of theoretical approaches going beyond NF structuralist premises. By contrast, LI scholarship has preserved a fixed structure and monolithic organization over time of core tenets underlying its theoretical architecture. For this reason, unlike the reviewed IR literature, a clear-cut differentiation between rational and non-rational approaches is hard to draw initially, at least until the development, on the margins of NF scholarship, of a set of accounts inspired by structural versus ideational perspectives.

As anticipated, the first important theoretical reference which has shaped one half of the mainstream EI debate is Liberal Intergovernmentalism (LI), which in turn draws on realist or conventional intergovernmental tradition (Hoffman 1966 reproduced in Eilstrup-Sangiovanni 2006; 1982; Griego 1995, 1996). Under the reported intellectual scholarships, the State is the primary actor in advancing the process of European integration (Hoffman 1966:135; Rhodes and Mazey 1995:9-10; Rosamond 2000:130; Hix 2005:15); as a consequence of that, collective decisions are reached via international bargaining amongst rational and self-interested players who will try to maximize their economic gains and lower their costs of transaction under logics of diversity, rather than amalgamation (Hoffman 1966:144,155-156; Rhodes and Mazey 1995:11; Rosamond 2000:131; Saurugger 2014:58,67). Unlike realist intergovernmentalists though, LI formulates positive prospects for peace to be maintained in post Cold-War Europe as a consequence of the rise of democratic governments and of the growing interdependence amongst European countries (Caporaso and Keeler 1995:43; Pollack 2001: 225), eventually placing LI reflection close to rational neoliberal institutionalist positions (Moravcsik 1993a; Rosamond 2000:142) or what Keohane defined as a 'modified structural realist view' (Keohane 1984:61-64 in Moravcsik 1991:21).

According to LI theory, formalized and refined by Moravscik (1991,1993b, 1995, 1998), European integration is a multi-step process. The first step concerns the formation of MSs' national preferences, which are rational and changing, namely linked to a specific politico-economic environment, covering both security and economic interests. The second step pertains to inter-state negotiations, which assign to MSs a core entrepreneurial role in leading international bargaining activities, reducing distributional conflicts and capitalizing on economic gains from respective asymmetrical interdependencies. The third step covers MSs' choice to delegate authority to supranational institutions suitable to reflect and strengthen their own credible commitments (Moravcsik 1991:25,48-49; 1993b:482,496,507,517;1995:621; 1998: 26, 35-49, 473, 478; Rosamond 2000:136ss; Pollack 2001:225-226; Saurugger 2014:54-55,68ss). While the first two components translate the two-level game theoretical articulation elaborated by Putnam (1989) to the European integration field, the institutional choice component clearly reflects the influence of rational neoliberal institutionalist scholarhip by Keohane and Nye.

As opposed to federalist and technocratic theories stressing respectively the importance of ideology and technical competence, the credible commitment approach puts the emphasis on political coordination via delegation activities as an heuristic strategy to commit governments to decisions maximizing their own interests when options for unilateral control over policy outcomes are unavailable (Moravcsik 1993b:499ss, 1995:612; 1998:483). For this reason, MSs' decision to liberalize/Europeanize a policy field can occur in light of their relative power position under the pressure of (changing) structural economic conditions (Moravcsik 1993b:490-491, 495). In this context, the EU and its institutions are conceived as a deliberative arena, yet not empty like the 'billiard' or 'black box' structures of neo-Realists, designed to accommodate, in a reciprocal manner and more efficiently, MSs' interests whose underlying strategic calculations, mirrored in a set of regulatory and distributive preferences, ultimately shape the outcome of European collective actions (Moravcsik 1991:27; 1993b:481,508,517).

When translated to the defence market sector, the LI theoretical construct, blending neo-realist and neoliberal intergovernmental positions, lends itself to interpret EDEM as the product of inter-State cooperation in armaments. Moravcsik (1993c) applied LI lenses to explain European armaments collaboration amongst major arms-producing countries in Cold War times, through the case study analysis of the Franco-German fighter aircraft (1975-1985), tank (1977-1983), and helicopter (1985-1990) experiences (Moravcsik 1993c:137ss). In Moravcsik's reading, the formation of domestic preferences and the articulation of international decision-making over armaments collaboration takes place amongst three categories of actors across countries involved: Chief Executives (namely President, Prime Minister, or Chancellor), top MoD officials (namely the military or civil servants), and representatives of arms producers (namely the CEOs of defence companies). According to the proposed reconstruction, the political Chiefs of Executive would stand between two fires of competing interests: on the one hand, the military would push to capitalize on a superior operational performance on the battlefield, while on the other hand, defence firms would seek to maintain a position of economic competitive advantage on the expanding international markets (Moravcsik 1993c:131ss). In applying the first two stages of the LI model (e.g. national preferences and international bargaining), Moravcsik recognized the central role of the Chiefs of Executive, alias State politics, as the 'agenda-setter' with the policy

entrepreneurial ambitions as well as the 'Janus-face' responsible for balancing domestic and international concerns in advancing cooperation in armaments (Moravcsik 1993c:135, 155).

As it will be illustrated in Chapters 5 and 6, though, this has not been the case on several occasions, even before the arms industry consolidated globally. As military engineers in top-management positions with the defence sector will report, the industry has always had 'a nose in the wind', meaning that the industry often anticipated the politics and proactively prepared material conditions not only for cooperative programs to take shape, but also for processes of productive and organizational consolidation to accompany most significant changes in the technological and innovation environment. It is indicative to refer, as will be expanded on in the course of the empirical analysis, that in the creation of multinational defence industrial structures of the calibre of the European Aerospace and Defence Company (EADS), currently the Airbus Group, political actors were involved in the final stage of negotiations. In contrast to LI assumptions, the EADS consolidation experience was subsequently politically endorsed and inter-governmentally uploaded to promote a model of European integration leveraging on the potential concentration of the defence industry amongst the big players in Europe. As will be offered in Chapter 6, this solution has proved unviable due to the decreasing levels of intergovernmental investments in military R&D and procurement programs over the years, which are instead necessary to meet the objective -envisaged by the politics- to retain defence technological and industrial capabilities within the European continent.

The reality, which is even more evident today, is that defence companies resemble more and more multinational enterprises (MNEs) whose domestic defence markets are just a slice of the much bigger global market cake. It is indicative that Putnam's two-level game logic placed at the heart of Moravcsik's LI theory does not provide an accurate explanation of the practical evolution of the defence market sector, as early analysed by the same father of LI (Movavcsik 1990). The first step of formation of domestic preferences has evidenced a tendency in main arms-producing countries to support the internationalization and privatization of the defence industrial capital to catch economies and scale and face global competitive markets. A second step of inter-governmental bargaining activity to support the liberalization of defence

markets at the European level, hence European integration in the field, instead has not occurred however until the framing and negotiation of the EC's Defence Package, with a delay of over 20 years from the first step.

A LI account has most recently inspired further academic work, which has acknowledged the incidence of key institutional developments in Europe, and shifted the focus of the intellectual enquiry from cooperation in armaments as a low-politics expression of European integration (as opposed to the high politics bargaining over the Treaties) to EDTIB as a range of negotiated outcomes shaping the face of EDEM (Fiott 2018:13, 60ss). Placing his contribution in the frame of rational/structuralist explanations the author has tested the reported EDTIB-related outcomes against four independent variables, namely: a) structural factors comprising a number of economic and political sub-factors[85]; b) EU institutions; c) National Preferences; d) Relative Bargaining Power (Fiott 2018:13-16). That notwithstanding, Fiott's theorization tips the scales towards methodological criticisms: despite the fact that LI scholarship is supposed to inform and shape the proposed analytical framework, two of the four hypotheses formulated draw from a non-LI literature, one of them (e.g. hypothesis 3)[86] is even in contrast to LI assumptions as it tests the role of EU institutions and policy entrepreneurialism in advancing European defence cooperation in EDTIB.

In addition, and as a consequence of the above, the theoretical framework emerges simply as a further extension of a detailed literature review, stylistically included in the same chapter, without a clear demarcation between, on the one hand, hypotheses to be tested against the thesis' theoretical framework, and, on the other hand, hypotheses that, despite reflecting assumptions formulated elsewhere in the available literature, have no correspondence to the LI model. Last but not least, two of the three case studies selected to test the hypotheses - namely the making of two EU legal regimes, respectively for defence and sensitive procurement (e.g. the DSD) and for intra-EU transfers (Dir. 2009/43/EC)- encompass two pieces of EU administrative law towards EDEM, and not EDTIB. For this reason, while a case study on the creation of the European Defence Agency (EDA) can allow one to make inferences regarding defence industrial cooperation and industrial policy aspects thereto, the two recalled supranational regimes regulating administrative conducts, e.g. public

[85] namely, defence globalization, the rising costs of defence equipment, increased international competition, decreasing defence budgets, geopolitics and the global balance of power.
[86] Hypothesis 3 states that EU institutions such as the European Commission, the European Defence Agency and/or the European Parliament drive forward European Defence- Industrial Cooperation (Fiott 2018:16).

purchases and transfers of defence/sensitive items under licences, in the EU fall outside the notion of EDTIB. The conceptual ambiguity runs throughout the whole thesis, from the theoretical to the empirical part, as the notion of EDEM- spelled out in official documents since the establishment in 1976 of an Independent European Programme Group (IEPG) within NATO is never mentioned or clarified, as independently of EDTIB.

As opposed to LI, the other core tenet of EI literature, New Functionalism (NF), has offered a set of theoretical coordinates for scholarly explanations to blossom in the wake of historical, institutional and ideological factors. Developed by Ernst Haas and Leon Lindberg in the late 1950s/1960s, and reformulated from the early 1970s by Philippe Schmitter and others, a first core tenet of NF stresses the structural idea that increased levels of economic interdependence amongst Member States will incrementally lead to a deeper level of political integration at the regional level in Europe (Haas 1958a:13; Eilstrup-Sangiovanni 2006:90; Niemann and Schmitter 2009:48). In other words, the process of European political integration is interpreted as being driven by economic determinants, as integration in an area will impact on related functional fields due to a spill-over or expansive logic originating from increasing volumes of trade and economic transactions across-borders (Haas 1958a: 283, 291, 297, 383; 1961:372; Lindberg 1963:64; Rosamond 2000:52). As a consequence of the indicated, MSs will find themselves facing governance problems linked to the increasing size and complexity of transnational economic relations whose management will be assigned to supranational bureaucracies (Haas 1958a: 17, 301; Lindberg 1963:97,101, chapter 4, Eilstrup-Sangiovanni 2006:94; Niemann and Schmitter 2009:49). Indeed, EU international institutions are viewed as repositories of knowledge and effective solutions to collective action problems emanating from growing levels of economic interdependence in the expanded socio-economic context, and not as expression of cultural, ideological or political unity (Haas 1958a: 12,58-59, 290; 1958b: 448, 454; 1970:484-485).

In retaining a pluralistic interpretation of politics as an arena which represents multiple economic and political instances, NF shapes the notion of political spill-over, beyond the functional one, referring to the incremental effect arising from the formulation, articulation, intersection and potential convergence amongst different politico-economic preferences and interests across new public policy spaces (Haas 1958a:11;1958b:450; 1964:39; Lindberg 1963:107-108; Rosamond 2000:56). Indeed,

once EU institutions are created as a consequence of the spill-over effect, political actors are persuaded to shift their loyalties, expectations and activities towards new centres of power, while socio-economic and industrial groups will be incentivized to upload their representation structures at the European level and organize transnationally, to influence the public policy action (Haas 1958a:14,16; 1961:368; 1964:101; Lindberg 1963:6,293; Schmitter 1969:162-163,166; Eilstrup-Sangiovanni 2006:91ss). Clearly, since EU supranational institutions are elevated to essential components in the advancement of the EI process, political spill-over will acquire a 'cultivated' nature once the mere institutional coordination role will evolve into more articulated and autonomous policy initiatives addressing impartial compromise to integration problems and upgrading common interests into new institutional settings (Haas 1961:377-378; Lindberg 1963:71, 210,278; Schmitter 1969:164; Rosamond 2000:61; Niemann and Schmitter 2009:50).

One of the major criticisms of neo-functionalist scholarship questioned the feature of automaticity[87] characterizing the political integration process under the pressure of functional spill-overs and unintended consequences (Hoffman 1966; 1982; Hansen 1969:253; Rosamond 2000:78; Eistrup-Sangiovanni 2006:97; Fiott 2018:54). Secondly, the pluralist image of the European policy process as a complex network comprising a multitude of national, transnational and supranational actors, was regarded as unsuitable for guaranteeing an effective and harmonious convergence of interests for political integration to take place, as opposed to an inter-governmental organization of the process (Hoffman 1982:33; Eistrup-Sangiovanni 2006:98). Thirdly, the automatism of functional integration and the 'cultivated' effect of political spill-overs can only explain integration in certain economic policy areas (e.g. low politics) whereas, according to intergovernmentalists, the core engine of European integration is to be found in the 'self-controlled' inter-state bargaining activity over vital interests of national diplomacy and gran-strategy (e.g. high politics) (Hoffman 1963:530-531; 1966:882; Hansen 1969:247-248; Rosamond 2000:77,87; Eistrup Sangiovanni 2006:90, 97-99).

[87] Although this feature was revisited in a later version of the NF theory elaborated by Haas and Schmitter (1964), which stressed the gradual politicization of actors' purposes under the influence of a set of observable variables. Politicization implies that actors, in response to the initial purposes, agree to widen the spectrum of technical means considered appropriate to attain them, including the potential delegation of authority to a new centre for the upload of the common interest (Hansen 1969:243-244; Pentland 1982 in Trevor 1982:122).

Applied to the EDEM subject matter, one could observe that NF assumptions remained largely untested throughout the six decades that preceded the enforcement of the regulatory regime contained in the 2007 Defence Package. Indeed, since the failure of the European Defence Community (EDC) in 1954, MSs have traditionally displayed a tendency to oppose political resistance to the liberalization of defence equipment markets, in light of their strategic importance for national security and economic performance. If that was the case, as it was, the NF theoretical account could not explain why loyalties or expectations in the defence sector did not shift, under the thrust of spill-over mechanisms, from MSs to European Institutions in charge of uploading the common interest and directing the future course of EU public policy. Under these referred premises, one of the most sophisticated correctives to the application of NFs theory to the subject matter of the present investigation elaborated on the differentiation between high and low politics proposed by Hoffman (1966) in an attempt to provide for a 'middle ground' theoretically-structured reading of entities and activities governing integration in an area at the very intersection between power politics and economic interests, namely the defence industrial policy field (Guay 1996:404, 416; 1998:7,9,11,15, 167).

To this purpose, Guay emphasizes the influential role played by EU institutions and non-state actors in the changing international environment elucidating less developed segments of the NF reflection; in specific the author, adopting a structural explanation, points at the notion of reactive spill-over (Guay 1996:411ss; 1997b:404-405; Guay 1998a:11,15,173,179) which suggests that interest groups/ the defence industry, States and EU institutions 'react' to changes in international political and economic environment. According to the reading offered, such changes incentivize, in the first place, the arms industry to internationalize and develop transnational corporate ties (Guay 1997a:3-14; Guay 1998a:Ch2, 161, 174-175, 177, 182); secondly, they drive Governments of arms-producing countries initially to try and retain control over the defence sector, both by supporting the creation of national industrial champions and by intensifying participation in intergovernmental forms of defence R&D and procurement cooperation (Guay 1997b;1998a:Ch 5, 170-171); thirdly, they create opportunities for the EU to progressively seek a more pro-active political role and regulatory responsibilities in preserving the global competitiveness of European defence markets (Guay 1996:409; 1997b:411-414; 1998:Ch 3, 173, 176,

180, 187); lastly, the shift in the political centres of decision-making in turn pushes the industry to organize interests representation structures and lobbying activities at the European level to co-influence the new course of EU public policy action (Guay 1997a; 1998a:Ch 6, 161ss, 174, 188).

While Guay's contribution restore the NF's pluralistic interpretation of the political integration process translated to the European defence industry sector, the theoretical construct produced, including the same notion of reactive spill-over, does not ultimately address the main interrogative the whole intellectual enquiry is meant to respond to, namely why MSs have ceded sovereignty to the EU in the most sensitive policy area for the protection of their own national security and economic performance (Guay 1998a:12, 167, 184). The explanation provided hides behind theoretically under-developed economic arguments of neo-functionalist derivation, and it furthermore reproduces elements of structuralist literature flavour, which empirically point at the incidence of 'external stimuli'- namely rising defence equipment costs and international competition pressures- in triggering the so-called reactive spill-over effects (Guay 1996:408,413-414;1997b).

It is observed that, in ultimate terms, a theoretical elaboration of the underlying causes of the change in strategic roles, and the new configurations of regulatory competences in an emerging EU defence policy-making arena, never really occurred in the contributions reviewed. The same Supranationalist scholarship inaugurated with the work of Sandholtz and Zysman (1989) having projected onto the NF legacy, proposed a theoretical framework which stresses the political impact of changes in global and regional 'economic structures', in tandem with the multi-actor bargaining activity and the catalysing role played by the EC policy entrepreneurialism. As observed sharply (Oikonomou 2007a:24, 27-28), although the concept of European integration is progressively enlightened by the notions of reactive spill-over (Guay 1996,1997b;1998a) and later of EU Supranational Governance (Sandholtz and Stone Sweet 1997,1998), there is no intellectual deepening on the socio-economic causes of institutional change. Such activity indeed would require contributors in the political science discipline to articulate, which they did not do, a further theoretical dimension where to place socio-economic drivers, listed instead only in empirical terms by NFs and structuralist explanations, and

elevated to the blurred component of transnationalism in contributions employing a Supranationalist approach.

The same deficiency characterizes theoretical evolutions which have departed from EI mainstream scholarship under NF premises and have landed respectively in institutionalist, organizational/ideational and EU public policy directions to provide for a tailored scholarly explanation of the EDEM phenomenon. In blending a realist and historical institutionalist account, Mawdsley (2000) reconstructs institutionalization patterns in the dominant discourse and joint practices linked to defence production and procurement within the three main arms-producing countries, namely France, Germany and the UK, in the decade following the end of the Cold-war. The same theoretical lenses have been applied more recently to explain how the involvement of European Institutions, and primarily the EC, in the EU security research area can be interpreted as the outcome of the institutionalization, and not Europeanization, of internal State defence-related dynamics in the context of an evolving CSDP segment (Mawdsley 2004:9-12,16). Such a theoretical approach, which has been reflected most recently in other intellectual efforts (Pannier 2013; Pannier and Schmitt 2014) delivers a weak notion of EDEM as the reality emerging from patterns of convergence in the institutionalization of policies and practices linked to cooperation in arms production and procurement, in turn evolving under different intergovernmental frameworks (e.g. WEAG, OCCAR, CSDP, EDA) with a clear divide between options reserved for big and small players in influencing the course of European armaments policy making (Mawdsley 2008: 373-385).

A similar theoretical interpretation has proposed an historical institutionalist reading of EDEM integrated with a structuralist component inspired by International Political Economy (IPE) theory. DeVore (2012; 2013a, 2014) considers the long time horizon of Europe's international armaments organization design, where a set of policy choices and dependencies have accumulated into forming a polycentric governance architecture composed of different types of organizations, dominating distinct segments of the cooperative process. In other words, it is offered that previous choices, path dependencies and layering effects have played a critical role in shaping the course of European defence armaments cooperation into multiple and sometimes competing trajectories (DeVore 2012:433,447; 2013a:3-27). It is interesting to note that while investigating actors' preferences, patterns of continuity and change in

organizational designs (DeVore 2012, 2013a, 2014) channelling the course of armaments cooperation in transatlantic vs. European direction, the author further digs into the IPE scholarship of IR derivation, which allows concentrating the attention on broader structural causes, such as the rise in equipment costs, advances in technology, internationalization of supplies and the incidence of global economic pressures (DeVore 2013b:533, 2015a:571-572).

Although IPE lenses help to expand the theoretical perspective and partially overcome Historical institutionalism (HI) explanatory shortages in elaborating over determinants of critical junctures, the proposed reading of EDEM, as the path-dependent resultant of the impact of globalizing forces on a set of institutional configurations integrating a multi-centred governance structure, falls into the same conceptual trap as NF and general structuralist explanations, namely the incapacity to theorize any further on socio-economic drivers of change and deep reasons beyond the (successful) EC's policy entrepreneurialism in the defence sector. It is relevant to recall that previsions elaborated on by DeVore on EDEM, specifically concerning limited options for supranational institutional involvement in European defence industrial cooperation (DeVore 2012:434,450-451) have been ruinously disregarded, not only with the entry into force in 2009 of the EC regulatory regimes for defence/security procurement and intra-EU trade but most importantly with the adoption in 2017/8 of a multibillion European Defence Fund (EDF) to shape the face of armaments cooperation in the years to come.

Another set of theoretical elaborations on the EDEM subject matter have attempted to provide for a degree of intellectual prominence/representation of the role of the EC's policy entrepreneurialism in the defence market policy field, and of the increasing complexity characterizing the EU defence policy-making system of governance. Pioneering empirical work in this area has been produced since the early 2000s under a theoretical framework inspired by sociological institutionalism and organizational studies. Mörth (1999,2000,2003) and Britz (2004) have inaugurated a new intellectual tradition, elaborating on the existence of two interlocking organizational fields, namely the security and market-related ones, within the defence policy sector (Mörth 1999:10,15; 2000:175-177, 179-183; 2003:31ss, 59ss, 104, 145; Mörth and Britz 2004:959). It is advanced that the analysis/interpretation of processes and activities which present a 'multi-perspectival' or 'network-centric' ideational component, is more important than fixed preferences (Mörth 1999:4-5,14; 2000:176;

Mörth and Britz 2004:961-963, 970-971). Sense making at the European level takes place via framing and organizing actions under the thrust of international organizations *in primis* the EC, not reflecting a mere rational aggregation of national preferences (Mörth 2000:184ss; 2003:139-140, 151; Mörth and Britz 2004:958). On the contrary, institutions shape a new public policy space, which will integrate a set of ideational categories/ interpretations and organizing objectives (Mörth 1999, 2003; Mörth and Britz 2004:960-961) with direct consequences for the top down/bottom up injection of new ideas and preferences as Mörth and Britz (2004:965,968) evidence, illustrating the progressive Europeanization of the Swedish defence policy. In a set of contributions Britz (2001,2008) has bridged organizational and European integration theory to elaborate on the notion of Europeanization, conceived as the activity of uploading and downloading of policies and preferences respectively between domestic and European policy processes, contextualizing the analysis of the Defence Industrial Policy sector. As to be evidenced, the Europeanization approach has most recently integrated a small segment of EDEM-related literature in European public policy tradition.

Remaining for the moment on the side of the organizational approach to the study of the European armaments policy, Mörth (2000; 2003) digs into the very sensitive political environment which followed the end of the Cold War and analysed in depth the EC's first attempt to create a European organizational field on the armaments subject with the framing of the two 1996-1997 EC's policy initiatives (Mörth 2003:28;93ss;145ss). In accomplishing such an intellectual objective, Mörth (1999,2000,2003) points, as anticipated, at the existence of competing internal frames, namely ideational structures, characterizing the different EC Directorates General (DGs) involved in the armaments policy-making activity. While a comprehensive account of this unique empirical and theoretical contribution to the understanding of EDEM will be offered in the context of the case study analysis contained in Chapter 5, it will suffice here to observe that the organizational analysis is insensitive to the politico-economic context in which the analysed institution operates, de facto relegating the whole explanation to the internal universe of the institution 'framing activities and making sense', without questioning why, what and how that policy actor is placed in that specific position of power as opposed to before. Indeed, while it contributes to the existing literature by giving prominence to the role of ideational

components and informal practices, the organizational elaboration falls into the same theoretical trap of previously reviewed elaborations which failed to clarify the underlying causes leading to the formation of those specific ideational motives, framing practices and policy entrepreneurial activities.

In this direction, and again on the shoulders of new functionalist basic assumptions, a small set of contributions has emerged in the frame of EU public policy-making literature, which in turn stresses different aspects of that intellectual scholarship. In trying to enrich the theoretical understanding of drivers beyond the process of Institutionalization of Defence Equipment Markets, Muravska (2014) elaborates on a pluralistic theoretical framework inspired by the multi-stage EU public policy process as an heuristic device which intellectually accommodates and analyses the co-influencing role played by the defence industry/lobbyist groups and the EC in delivering the supranational regime for EDEM. Muravska's model has the merit of having analytically applied the theory of EU public policy-making cycle, in its different steps, to disentangle processes and activities beyond the institutional change in EDEM. At the same time, since the analysis only covers a specific outcome (e.g. EDEM) case-studied from the perspective of individual actors involved, in methodological terms it is essentially impossible to appreciate a variation in the independent (e.g. entrepreneurialism of the EC and defence industry) and in the dependent (e.g. EDEM) variables, while, as it will be offered in the present research, all these variables have been subjected to change over time. As a matter of fact, their change is direct a manifestation of shifting conditions in the macro-structure hosting each techno-economic paradigm.

In the context of emerging EU public policy making literature on EDEM, we also find scattered empirical contributions which have stressed the 'judicialized' nature of the EC law-making and opportunistic enforcement action towards defence equipment markets (Blauberger and Weiss 2013; Weiss 2014; Strikwerda 2017). Using a functionalistic logic of demand and supply in case-studying the making of the 2007 Defence Package, Weiss (2014:33ss) postulates that on the demand side, transformations in defence economics and technology, on which the author does not really elaborate though, have led competitive defence firms to promote gradual market integration with Governments following this trend in the hope of realizing economies of scale face to the shrinking procurement budgets; on the supply side, it is

indicated that the EC converted this increasing demand into political action. Expanding further on this point, this author (Weiss 2014:32-33) observed that the EC, initially appearing as '*non-majoritarian*[88]' actor in the EU defence policy-making arena, has responded to indicated structural/demand pressures playing an increasingly important policy entrepreneurial role.

As anticipated in the review of the legal literature on EDEM, this role consisted, in a first phase, of promoting a process of integration of defence markets in Europe by referring to the CJEU's legal interpretative activity and clarifying conditions for application of the general public procurement regime to the defence sector; in a second phase, the EC became a '*majoritarian*' player and supported integration by threatening MSs with a CJEU-driven application of law in the absence of a political agreement over a tailor-made EU defence procurement regulatory regime for EDEM (Weiss 2014: 40-41), that Blauberger and Weiss (2013:1122ss) defined as the joint-decision trap. An eminent legal commentator has referred in other terms to the logic of the 'carrot and the stick' employed by the EC to persuade MSs to adopt a EU regulatory regime as the solution to providing legal certainty against the discretional feature of CJEU case-law and infringement procedures (Heuninckx 2009:91; see earlier subsection 2.2.2). It is to be noted that, according to these interpretations, both in law and political science, the main structural dynamics underlying the supply for regulation do not receive any degree of theorization, making it impossible for inferences regarding the types of techno-economic variation determining institutional change, as well as on the suitability of a regulatory regime, rather than another one, to address changes in the socio-economic context.

Lastly, in the wake of a growing CFSP/CSDP-related literature which has assigned intellectual prominence to the role of ideas, discourses, values, and socialization activities in shaping collective identities, structures and processes (Howorth 2004, 2007, 2011a; 2011b; Kurowska and Kratochwil 2012: 86-110; Faleg 2014; Violakis 2016) an emerging piece of literature is progressively taking shape on the side of defence markets and industry fields. An earlier contribution has applied *tout court* cognitive lenses to interpret patterns of armaments cooperation in Europe in the years following the end of the Cold War (Teichler 2007a:57ss;247ss;, 2007b)

[88] The wording 'non-majoritarian/majoritarian' is employed by Weiss (2014:40-41) in the contribution titled '*Integrating the Acquisition of Leviathan's Sword. The Emerging Regulation of Defence Procurement in the EU'* to refer to the changing influence of the EC in the EU defence policy making arena.

coming to very similar conclusions to the reviewed social constructivist elaborations on EDEM. A cluster of contributions is investigating on the importance of discourse, networks, learning and knowledge-sharing activities in shaping the practice of European institutions operating in the defence market and industrial policy field (Batora 2009; Barrinha 2010; Calcara 2016,2017a,2017b).

Finally, another small body of research is advancing an ideational reading, under an Europeanization framework, of European defence industrial policy-making (Britz 2010, Hoeffler 2012; Castellacci et al 2014). These last contributions, which have employed the Europeanization framework, have insisted on the centrality of cognitive structures in hosting the incubation of new ideas and rules, as in the case of Britz's (2010) analysis of the role of marketization in the Europeanization of Swedish Defence industrial policy; at the same time, Hoeffler (2012) and Castellacci (et al 2014) have come to evidence the limited impact that these defence market rules have exercised on MSs' capacity to autonomously formulate and implement defence industrial strategies and policies thereto. As was the case with ideational explanations, the focus remains strictly on the process and the potential effects, rather than on the causes of institutional change in EDEM.

2.4 Conclusion

The chapter has provided for an attentive reconstruction of the scholarly debate on the intellectual topic of EDEM from the two-fold disciplinary perspective of law and political science, which were for the first time integrated within the present literature review. As illustrated in the course of the chapter, the intellectual debate on EDEM has essentially remained since the early 90s, and in the absence of a developed EU gran-institutional framework of reference (e.g. no CFSP/CSDP), under the intellectual monopoly of a small niche of legal scholars in the public procurement law tradition. This literature has had the merit of extending for the first time the perimeters of the legal analysis over a subject, which has traditionally remained under the control of national Governments and out of the regulatory reach of international institutions, such as the European Union. Nevertheless, a purely doctrinal legal approach has also manifested its own limits regarding the incapability of empirically

accounting for the changing configuration of politico and economic drivers in the evolution of EU-ruled vs. non-ruled based regulatory constructs. The legal analysis of the CJEU case law on art 346 TFEU and of the invalidating list of exemptions and exclusions from the application of the Defence and Security Directive (DSD) are just examples in this respect.

The second part of the chapter has shifted towards the political science disciplinary field to trace and analyse relevant scholarly contributions on the subject matter of investigation. The offered review has reconstructed the contribution of International Relations Theories (IR), on the one hand, and of European Integration (EI) up to EU public policy/Europeanization literature, on the other, in developing a scholarly reflection on EDEM. Specifically, while the common denominator in all IR theoretical contributions is a characterization of EDEM as an intergovernmental reality of cooperation in armaments amongst European States, there are substantive differences amongst approaches. Indeed, as illustrated, structural realism and rational neoliberal institutionalism have provided for systemic explanations, namely accounting for EDEM as the residual/ potential reality deriving from patterns of economic collaboration/interdependence amongst States in a changing geopolitical context primarily constellated by inter-state high-politics relations of power. A sociological version of neoliberal institutionalism, in line with social constructivist views, delivered instead an ideational image of EDEM as an a-causal, inter-subjective, and historically contingent product of the constructed relation between, on the one hand, inter-state institutionalized national and foreign policy preferences, and on the other, the evolution of domestic factors.

The review of scholarly contributions in EI studies tradition has evidenced a less marked divide between rationalist/structuralist and historical/ideational approaches, and a growing degree of intellectual autonomy from the CFSP/CSDP gran debate. The analysis has departed from the two main EI-schools to project into their derivations and specific applications to the defence market domain. While LI has kept a pretty monolithic organization of its theoretical scholarship, NF reflection has generated a number of tailored revisions under the reactive spill-over reading and the supranationalist scholarship. Further evolutions have departed into institutionalist, organizational/ideational and EU policy-making theoretical directions, with combinations of the cited perspectives. Despite the incidence of organizational studies specifically developed in the early 2000s to explain EDEM, the application of

ideational frameworks, including the Europeanization framework, remains still limited.

In conclusion, the review of the literature in the political science disciplinary field on the subject matter of EDEM provided evidence of a growing intellectual scholarship which has come to complement the legal reflection, by means of enlarging the theoretical visualization - covering an account of mechanisms, activities, outcomes- over the subject of defence equipment markets. That notwithstanding, there is an element missing in all reviewed contributions, and that is an elaboration on the role that technological development and innovation dynamics played in determining patterns of socio-institutional adaptation. The next chapter will elaborate on causes of change, proposing a technologically guided interpretation of EC's policy entrepreneurialism in EDEM.

CHAPTER 3

A theoretical framework to study EDEM

From conceptualization to analysis

3.1 Introduction

The previous chapter provided for a literary review of most relevant scholarly contributions from legal and political science academic traditions to the study of European Defence Equipment Markets. The fragmentation characterizing the academic debate on EDEM directly motivated the intellectual effort contained into Chapter 2 to map and reconnect the legal and political science universe of disciplinary contributions on the subject of intellectual enquiry. The several and sensitive layers characterizing the functioning of defence equipment markets have furthermore unveiled a deficit of scholarly attention by legal commentators towards the politico-economic determinants of EDEM, which instead should be highly considered when discussing future harmonization policies and regulatory regimes prospects for defence equipment markets in Europe. On the side of political science approaches however, apart from specific attention reserved for the study of mechanisms, processes and activities beyond cooperation in armaments as a form of EDEM, no theoretical elaboration has characterized the analysis of causes and drivers beyond the emergence of a supranational regulatory regime in EDEM.

Building on the illustrated premises, the present chapter argues for the importance of integrating politico-economic considerations in the study of EDEM, and in specific to theoretically expand on its socio-economic determinants. Such effort is translated into a structured interdisciplinary reflection over the notion of EDEM, whose conceptualization (articulated into section 3.2) clarifies its notion and economic rationale. The proposed theoretical conceptualization furthermore fills a gap in the articulation of the policy construct advanced via the acronym ‘EDEM’ by

European institutions, and most recently the European Commission (EC), over the past 30 years.

Section 3.3 evidences limitations in alternative explanations, and it advances an interdisciplinary analytical framework to provide for a theoretically structured explanation of EDEM. More specifically, the explanation of EDEM politico-economic determinants is generated under a (two-layer) integrated framework bridging changes in techno-economic paradigms (TEPs) to adjustments in socio-institutional structures (layer n. 1), and specifying conditions connecting different socio-institutional adjustments (SIAs) to changing policy entrepreneurial strategies (layer n. 2) under the main/underlying condition of a shift in TEP. A technologically driven explanation of EDEM represents an element of absolute novelty in the panorama of scholarly contributions on the subject of European defence equipment markets.

The chapter concludes by recapitulating the two-layer structure of the proposed theoretical framework and how it will find verification across the 4 cases study analyses. While the first (Ch.4) and the last (Ch.7) cases study provide for empirical verification to the theory assembled against EDEM, Chapters 4 and 7 serve respectively as entry and exit doors of an overall mechanism which, under the same theoretical premises that host and test EDEM, allow to explain a broader socio-institutional adjustment in EDTIB.

3.2 Conceptualizing EDEM

3.2.1 Policy regime

Conceptualizing EDEM means replying to the question: what is EDEM? While as observed in Chapter 1, and as it will be further expanded in the articulation of the case study analyses, the acronym EDEM has been employed by European Institutions even before a Common Security and Defence Policy (CSDP) was even formalized at the European level, a structured theoretical reflection over its notion and rationale has been lacking.

The notion of EDEM rests on a three-dimensional conceptualization. The first dimension, reflected in the concept of policy regime, is reconstructed by digging into

the theoretical domain of international regime literature. This literature[89] has concentrated on providing for a definition of international regimes, as well as in analysing causes and consequences of their existence (Levi et al 1995:270; Hasenclever et al 1997:8). Three perspectives have influenced the structure and development of a scholarly reflection on the subject of international regimes, *de facto* mirroring, and to some extent blending and integrating, conceptual traits of reviewed IRs approaches (Hasenclever at al 1996:178; 1997; 2000; Joyner 2000:212) (see Chapter 2 section 2.3.1).

The first approach displays a focus on power as a central attribute potentially determining, in the frame of hegemonic stability theory[90], relative gain options in the international system deriving from inter-state cooperation. A power-based conceptualization has delivered a notion of regime as of continued patterns of convergent behaviours and stable agreements amongst States destined to last over extended timeframes (Krasner 1982a:187; Jervis 1982:357; Haggard and Simmons 1987:495). Power theorists of regimes assume indeed that prospects of relative gain under regime-based inter-State cooperation ascribe causal significance to international organizations in setting a puzzle beyond traditional external balancing activities (Hasenclever at al 1997:3).

Going beyond intellectual perimeters of new realist tradition, the widely cited conceptualization offered by Krasner (1982a:185-186) extends the reading of regimes as to *constructs presenting a set of explicit and implicit principles, norms, rules and decision-making procedures around which actors expectations converge in a given area of international relations*. Projecting an intellectual ambition to forge a unified consensus definition (See Preface to the 1982 International Organization Special issue; Gale 1998:12; for a criticism see Strange 1982; and for a revival of such attempt Hasenclever at al 2000), Krasner's notion of regimes stretches over four dimensions, comprising: a) principles categorized as beliefs of facts, causation and rectitude; b) norms as standards of behaviour defined in terms of rights and obligations; c) technical rules conceived as prescriptions or proscription for action; d) decision making procedures, namely prevailing practices for making and implementing collective choices.

[89] Inaugurated by the 1975 and 1982 special issues from the International Organization Journal.
[90] According to the theory, the more concentrated power is in an international system, the greater the supply for international regimes at any level of demand. Keohane (1982) has come to integrate this theory by reflecting on the conditions for demand of regimes, which in turn are likely to affect its supply.

Reproduced in the empirical analysis by Smith (1987) and Müller (1993)[91], the definition by Krasner has been criticized for being too generalist, inelastic and contradictory, as well as for its unsuitability to analytically size effectiveness and resilience/robustnesss of regimes (Young 1986:105-106; Haggard and Simmons 1987:493-494; Hasenclever et al 1996: 179: Levi et al 1996:270ss). Indeed, the notion advanced differentiates, on the one hand, rules and norms without articulating on those concepts, while on the other hand, it blends together rational (e.g. explicit principles) and ideational elements (e.g. implicit norms and beliefs) under the same conceptual framework while the two theoretical attributes belong to opposed intellectual traditions.

In an attempt to simplify the conceptualization shifting the focus on informal components of regimes, Young (1980:332ss; 1986:107) has provided a definition referring to regimes as to 'social institutions and practices consisting of recognized roles linked by clusters of rules, rights, or conventions governing relations among the occupants of these roles'. In accordance to Young's behavioural reading, other authors share the premise under which regimes would contain only rules shaping the conduct of their addressees (Nollkaembper 1992:49), and that their governing practices do not necessarily have to be formally stated in explicit commitments and injunctions (Zacher 1987:174; Hasenclever et al 1997:15).

Behavioural readings carrying informal components in the study of international regimes traced a projecting line towards cognitive interpretations. A cognitive or knowledge-based approach, also referred to as interpretive (Kratochwil and Ruggie 1986: 775) or reflective (Keohane 1988:382), embodies indeed the second perspective being reviewed as inaugurated by academic works by Ruggie (1975), Haas (1975, 1982), Puchala and Hopkins (1982), Kratochwil (1994) and Ruggie (1986; 1997) stressing the significance, of human subjectivity and the embeddedness of contemporary international institutions into social practices (see also: Chapter 2 subsection 2.3.1 review of sociological institutionalist and social constructivist scholarships[92]). According to a cognitive reading, regimes are defined as social institutions or governing arrangements constructed by States around which expectations converge on various issues (Haas 1975:827;1980:358,370; Kratochwil

[91] studying, respectively, the rise of non-proliferation regimes and the internationalization of security regimes.
[92] In reviewing knowledge-based approaches Hansenclever et al (1997) categorized contributions into weak and strong cognitivists, which resemble the differentiation existing between sociological institutionalists and social constructivists.

and Ruggie 1986:764; 1997:32). The emphasis is placed on convergent expectations, rather than on formal and enforceable behaviours of States, which are analysed under a cognitive framework as constitutive foundations of regimes and highly inter-subjective phenomena via the lenses of shared principles and the understanding of desirable and acceptable forms of social behaviour (Kratochwil and Ruggie 1986:764; 1997:34).

There is a growing set of definitions and elaborations, which have stressed the constitutive significance of ideational, communicative, and informal components in shaping the reality of international organizations and their policy action. Amongst them, Vogel (1996:20-21) provides a weak-cognitivist/mixed reading and suggests that regulatory regimes are a constellation of ideas and institutions; while ideas would provide for *regime orientation*, namely the method, scope and goal of Government intervention reflecting actors' adherence to broad economic doctrines, institutions would provide instead for the so called *regime organization*, namely the planning and administration of those activities presupposing an interaction between the public and the private sector. Eisner (1993:xv-xvi; 18-22) further stresses the interactive nature of regimes formation and proposes that a policy regime is *an historically specific configuration of policies and institutions which structures the relationships between social interests, the state and economic actors in multiple sectors of the economy [..] so that whenever there is change of regime, it is possible to identify a unique synthesis of interests, values, political-economic ideas and administrative reforms* (Eisner 2000:2).

A tailored contribution in the hard cognitivist tradition has concentrated in analysing the EDEM regime as a constructed incarnation of political actors' expectations in the specific international issue area of cooperation in armaments (Teichler 2007a:50ss). The weakness of such interpretation, and of strong cognitivist elaborations of international regimes in general, lies with the intellectual ambition to explain material realities, such as hard-law regulatory constructs, moving from an individualistic and inter-subjective interpretation of actors' human consciousness, knowledge and expectations transfused into the so called *problematique*. The *problematique* is a socially constructed motive/puzzle of sense shaping meanings as forms of productive power articulating across different regime configurations (Teichler 2007a:57ss,247ss), and potentially conferring to the regime even an implicit or tacit nature (Ruggie 1982; Kratochwil 1993).

As will be offered in the second part of this chapter, as well as in the case study analyses presented, material forces, such as changes in techno-economic conditions, reflect for themselves a constitutive account of incentives and interests of politico-economic actors involved in regime-making activities. Incentives, interests and activities forged an explicit material reality, the EDEM regime, composed of a set of formal and mandatory rules of administrative law (e.g. the Directives) disciplining the acquisition and transfer of defence and sensitive products and services in the European Union (EU). Despite the most recent spread of ideational contributions in the analysis of CFSP/CSDP (see Chapter 2 subsection 2.3.2), the cognitivist approach proves unequipped to unveil and explain underlying causes for a certain pattern of reference, the *problematique*, to emerge and affect the specific articulation of a regime in explicit or implicit direction. Since each *problematique* is historically constructed and contingent, cognitive indicators elaborated are of limited analytical significance as they cannot place the understanding of regimes in a longitudinal perspective, leaving unattended the possibility to infer on dynamics of institutional change.

In contrast, weak-cognitivist readings reviewed (Eisner 1993; Vortel 1996) which stress the mixed (ideas and institutions) and interactive quality of international politics allow projecting into the third stance in the study of international regimes, which offers a middle-ground solution between rationalist and constructivist claims. Inaugurated by the intellectual work of Keohane[93] (1982) appeared in the 1982 Special Edition of the International Organization Journal, the interest-based or formal approach stands on neoliberal institutionalist premises (Hasenclever et al 1997:4,23) in analysing regimes as phenomena the creation, maintenance, and demise of which is accounted for from the perspective of rational and interconnected actors with preferences changing over time (Hasenclever et al 1997:26). Rejecting the complexity of a general consensus definition (Krasner 1982a), as well as both the power-maximizing perspective of hard behavioural accounts and the hyper-subjective component of strong cognitivist readings, Keohane (1982:325;1989:3-4; 1993:26-9) advanced a lean definition, under which regimes are '*formal institutions with explicit rules, agreed upon by governments, that pertain to particular sets of issues in international relations*' and institutions are '*persistent and connected sets of formal*

[93] Although his work is most closely associated with neoliberalism he has also made notable contributions to the power (Keohane 1988) and knowledge-based research agendas (Goldstein and Keohane 1993; Keohane 2000).

and informal rules that prescribe behavioral roles, constrain activity and shape expectations'.

Further conceptualizations having adopted an interest-based approach to the study of regimes have stressed the multi-causal, dynamic and interactive nature of regime formation and change. Amongst them, Francis (1993:43) postulates that policy regimes define the '*reasonable enduring purposive arrangement embracing both formal and informal organizations, and incorporating the relationship between private interests and public bodies that make governing decisions*'. More specifically, Francis shapes a notion of regulatory regime that accounts for two crucial features, which are, on the one hand, a multi-level location of regulatory decision making (e.g. national, intergovernmental, and supranational), and, on the other hand, a temporary/shifting competence, or allocation of regulatory responsibility amongst policy actors. The reported conceptualization stresses two important aspects of regulatory regimes omitted in previous definitions and in line with an interest-based characterization of the EDEM policy regime: in first, place there is space for supranational institutions to contribute with the articulation of autonomous interests to the making of new regimes; secondly, regulatory regimes are the temporary product of a compromise amongst different forces at play in an interconnected system characterized by primary needs and limited economic resources. As a consequence of the interdependence of political and economic relations, policy makers flexibly adjust their positions and bargaining options in new arenas of power. Under this reading, formal regimes such as EDEM reflect not only a shift in the allocation of power competences to new actors and at a new level of governance, but also the significance that altered socio-economic conditions play in the institutionalization of new power configurations and new regulatory solutions.

Wilson (2000) has proposed a categorization of policy regime to study regime change also drawing on the interest-based tenet of international regime literature. In doing so he (Wilson 2000:257ss) advances a four-dimensional model structured on the notion of power arrangements, policy paradigms, policy organization and the policy itself. First, power arrangements concern the accommodation of interest relations amongst a group of economic and political actors; second, policy paradigms entail the dominant design/ rule of thumb in the framing and resolution of policy problems; third, a policy organization covers the practical articulation of ad hoc policy structures; finally, the fourth dimension encompasses the policy itself, its rules,

routines, goals of the implementing agency. Wilson's conceptualization is exposed to similar biases as those having originally affected Krasner's general consensus definition, namely thickness, over-complexity, repetitiveness, and inconsistency/lack of clarity.

Muravska (2014:9) has most recently resumed Wilson's conceptualization polishing the notion of policy regime as comprising the following attributes: 1) a set of power arrangements amongst policy actors, 2) a policy paradigm supporting issues framing and problems resolution, 3) a set of policy making procedures, and 4) a policy goal. According to the proposed reconstruction, which is further depurated and retained here for conceptualization purposes, EDEM emerges as a supranational rule-based policy regime regime advanced by the European Commission (EC), negotiated by a variety of policy-economic actors responding to incentives and shifting interests over the issue area of defence and security procurement, and agreed upon with the specific goal to overcome economic fragmentation of European defence markets.

In an attempt to limit imprecisions in the political science international regime literature vocabulary, which refers to terms such as principles, norms, rules and regulation inconsistently, the next sub-section will provide for a more precise (legally-wise) account of those notions to complete the conceptualization of EDEM.

3.2.2 Regulation

This sub-section looks at EDEM as a regulatory regime by investigating the notion of regulation through the lenses of public policy/public administration, philosophy of law, and more generally socio-legal studies literature. In the classic American literature on public administration, regulation has been regarded as a form of governmental control over a set of economic decisions taken by the private sector (Friedman 1985: 111-112; Noll 1985:9) in order to promote public interest, or at least align private activities to collective ones (Stone 1982:7; Selznick 1985: 363-364; Chang 1997:704)[94]. Crucial to the notion of regulation in the public administration

[94] Theories of regulation are normally divided into public interest theory, private interest theory (with sub-differentiations into capture theories and interest-group theory), and institutional theory. Public interest theory has become the cornerstone of modern public economics as well as an important reference for theories of governmental intervention in American public administration tradition. For a comprehensive overview on theories of regulation see Morgan and Yeung (2007); Baldwin, Cave, and Lodge (2010); in the political science tradition

scholarship is the idea that the regulatory activity must be imposed via normativity, e.g. through the ex ante legalization of prescriptive rules as well as via the monitoring and enforcement of these rules by social business and political institutional actors (Noll 1985; Picciotto 2002:2; Levi Faur 2011:22). It was indeed suggested by one of the most reputed contributors in this intellectual tradition that '*a divorce of policy from all the other aspects of politics requires the language of law and the technique of control*' (Lowi 1985:69).

A further consideration is that rule-based public control via regulation represents an optional form of government intervention. Drawing on the differentiation introduced by Hart between primary and secondary rules[95] (Hart 2012:91; Brennan et al 2013:41) a first public-policy categorization of forms of public intervention in the economy is presented where regulatory policies integrate a macro-structure comprising also constitutive, distributive and redistributive forms of public intervention[96] (Lowi 1964:713;1972:300;1985:73). The differentiation amongst the four policy areas is not merely descriptive as each area of policy or government activity constitute a system of its own; each regulatory space tends to develop its own characteristic political structure, political process, and configuration of relations amongst economic and political actors (Lowi 1964:689). As anticipated when discussing the notion of regulatory regime, American public policy literature helps not only to categorize EDEM as a regulatory form of public policy activity impacting on and shaping the socio-economic reality, but also to substantiate EDEM as an arena of power reflecting a specific power configuration of politico-economic interests converging towards a purposive scope.

The American public policy administration scholarship cannot, nevertheless, go any further in disentangling EDEM regulatory regime, hence it is necessary to turn to other disciplines. As the notion of rules is key to understand regulation and regulatory reform, it is also essential to grasp the essence of EDEM. The nature of

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see Levi-Faur (2011); on the economics side with comments on the Chicago critique of the public interest theory Shleifer (2005). For a combined historical overview of regulatory evolution in the light of economic and political world developments see: Chang (1997). For an overview of empirical and theoretical studies on Regulation see Noll and Joskow (1981).

[95] Primary rules enjoin citizens to perform or refrain from performing an action imposing obligations and sanctions; secondary rules specify the ways in which the primary rules may be conclusively ascertained, introduced, eliminated or changed also by recognizing powers and rights of individuals.

[96] Where regulatory policies are primary rules imposing obligations and sanctions over an individual conduct with questions of compliance and non-compliance are involved, redistributive policies are also primary in nature but they work on the environment of conduct imposing a categorizing activity on the private sphere. Distributive policies are secondary rules impacting on individuals without imposing a conduct and conferring powers or privileges, and finally constituent polices are also secondary rules conferring powers about rules and authority.

rules, their justification, their technical aspects, and their interpretation has been investigated within the philosophy of law and, most recently, enriched by socio-legal studies. In these disciplines, rules are defined as 'general norms, or norms suitable for generalization, mandating or guiding conduct or action in a given type of situation' (Baldwin 1995:125; Black 1997:7; Twining and Miers 2010: 80) with the overall objective to ensure a social management and control function (Summers and Howard 1972:37; Morison 1990:33; Black 1997:5).

Traditional type-classifications in philosophy of law differentiate between formal and informal rules. While informal rules or social norms reflect a spontaneous ordering of society and of the socio-economic relations within it, formal rules would encompass precise formulations defining the terms of normative attitudes (Baldwin 1995; Twining and Miers 2010: 94; Brennan et al 2013:5-6, 40,51). Within the realm of formal rules, prescriptive rules are normative mandatory provisions characterized by the legal form, or 'the mode of promulgation of the rule', and by legal effects, or 'the consequences associated to prescriptions' via enforcement mechanisms (Baldwin 1995, 1998:14; Black 1997). Prescriptive mandatory rules normally present a 'command and control' structure which ensure that the substance of the policy is achieved via a formal model of bureaucratic rationality where the regulatory control function is guaranteed by the existence of a legitimated source of authority and by the existence of a formal procedure (Black 1997: 214-215; .246; Twining and Miers 2010: 114).

Such a viewpoint complements the interdisciplinary conceptualization of EDEM. It emerges indeed as a formal, prescriptive, rule-based construct of secondary norms reflecting the administrative regulatory function of law (Summers 1971:737); it furthermore mirrors a notion of regulation in the first theoretical dimension conceptualized by Baldwin (1998:24) as a formal activity entailing a set of commands though an administrative legal procedure promulgated by a public authority and backed by sanctions to ensure compliance[97]. It is to be acknowledged that, most recently, the intellectual debate over the subject of regulation has received a new impulse under the discipline of socio-legal studies, which has proposed new conceptualizations as alternatives to the traditional formal command and control rule-

[97] As Baldwin further indicates 'Such a notion implies that the act of regulation is exercised by a public authority or agency that has been previously delegated via formal attribution of a defined set of competences and that the source of legitimacy and power should lie in a primary (Constitutional) or subordinately in secondary or administrative legislation'.

based regulatory paradigm. These advancements propose to extend the notion of regulation to include broader forms of public intervention, namely the use of economic incentives such as subsidies and aids, government organizing via contracting or deployment of recourses and supply of information as well as self-regulatory processes and mechanisms of collective control.

Notions such as those of 'decentralized', 'smart' 'responsive' and 'principle-based' regulation have been forged in the socio-legal and global governance debate in an attempt to shape flexible tools of socio-economic governance, as opposed to command and control, suitable to serve a more dynamic and purposive role in addressing the complexity, intricacy, and fluidity characterizing socio-economic relations within the globalized international order. Instruments supporting the advancement of new models and varieties of regulatory types are principles and standards other than formal procedural rules. Standards are non-categorical precepts, being generated as clusters of context-specific, principle-based and goal-oriented determinations. It is key to highlight that EDEM is a traditional and formal legal construct whose theoretical premises and practical articulation proves incompatible with most recent conceptualizing advancements of the notion of regulatory activity.

3.2.3 Competition

In order to provide for a fully rounded multidisciplinary conceptualization of EDEM, it is necessary to explore also its economic rationale. It has been evidenced in the previous sub-sections how EDEM can be conceived as a formal rule-based procedural regulatory regime. EDEM comprises a supranational policy regime composed of two pieces of EU administrative law disciplining respectively the economic activities of procurement and transfer of defence and sensitive goods and services within the territory of the European Union.

The empirical economic reality into which state regulation normally intervenes has been traditionally illustrated in the public economics literature as a situation where a failure characterizes the functioning of public markets (Bailey 1995:7; Hartley 1995a: 466; Mankiw 2003:7; 2011:12). The economic notion of 'market failure' indicates the incapacity of an economic unit to survive on the market

in conditions of perfect competition (Bailey 1995:26; Stiglitz 1997:153; 2000:77; Mankiw 2003:11). Pure public goods, such as national defence, represent the classic example of market failure (Bailey 1995:29-30; Stiglitz 1989:14; 2000:128; Gruber 2013:183) as their provision requires intense R&D investments that the free-market would not otherwise allocate under perfect competitive conditions.

While Chapter 4 will analyse state intervention in defence public markets to safeguard the provision of strategic goods for the protection and competitiveness of national defence economies, the present section is elaborating on the economic rationale inspiring the EU institutional regulatory activity via EDEM. Defence markets are characterized by a high degree of economic fragmentation as a consequence of the political sensitivity characterizing defence technological development, production and acquisition activities. The existence of thick economic, informational and political/regulatory barriers in the functioning of defence markets has been analysed by contributors in the disciplinary field of defence economics[98] as an economically profitable choice by major arms-producing countries to capture monopoly rents via national champions which exploit economies of scale, while minimizing interferences and dependence from foreign competitors and protecting strategic technological and industrial assets (Dunne 1995:409,423; Hartley 1995a: 470, 483; Hartley 1995b: 1149). Nevertheless, if observed from the perspective of an emerging European defence equipment market, the same phenomenon has been read by defence economists in the same scholarly tradition as an important cause for the inefficient allocation and duplication Europe-wide of productive resources amongst a limited number of countries presenting an advanced technological and military industrial capacity across few economic monopolies (Hartley 1995b: 1166; Hartley 2011: 133, 145).

In this light, the predisposition of a supranational regulatory regime via EDEM is to respont to a deviation in the functioning of defence markets from a Pareto-like efficient situation by promoting the harmonization of administrative rules and procedures, governing the terms of the economic exchange between demand and

[98] Defence economics, a key disciplinary pillar of scholarly research in public economics which emerged in the early 1960s under the influence of the pioneering works by Hitch and McKean, Richardson and Shelling, has most recently addressed a number of intellectual enquires on a wide number of defence industrial and market-oriented topics, including theoretic and empirical contributions to the study of multiple equilibrium in military alliances, the economics of defence/R&D expenditure, military enterprises and economic growth, incentives in procurement processes and industrial policies thereto. Works cited include Hitch and McKean (1960); Richardson (1960); Schelling (1960).

supply forces across an enlarged market comprising the sum of national defence markets. Given that the economic model envisaged as favouring the progressive opening of national defence markets in Europe reproduces an ideal competitive equilibrium situation amongst economic players, one could easily deduce that essential to the understanding of EDEM's true rationale is the notion of competition in economic theory.

Competition is a basic principle of economics. It has entered economics as a common sense concept with empirical relevance and an operational function having been traditionally regarded as a social and political desideratum of any economic system (McNulty 1968:639-640; Mankiw 2003:51; 2011:66). A conceptual divide in the evolution of the notion of competition has characterized different intellectual scholarships reflected within main schools of economic thought. As opposed to classical and evolutionary thinking, neoclassical economics has conceived competition in the terms just illustrated as an organizing principle of economic society which contains the negative economic effects of excessive concentration of market power and restores an optimal equilibrium amongst demand and supply functions in the marketplace (Change 1997:706; Mankiw: 2003:62; Monti 2007:86, 124).

Under this theoretical account and in line with the exposed, monopoly, as a market structure in the form of a sole-seller who is 'price maker', it has been regarded as an anathema to competition (Mankiw 2003:258; Jones and Sufrin 2011:9; Dunne 2015:14); in contrast, competition would depict a structural, not behavioural, property of the market, supporting the functioning of the so-called '*Polypolium*'. The neoclassical '*Polypolium*' proposes a structure involving a myriad of buyers and sellers whose interaction on the marketplace determines a (quantitative and qualitative) equilibrium combination of productive factors that minimizes total costs and maximizes net revenues (McNulty 1968:641; Ellig and Lin 2001:32; Mankiw 2003:66, 236; 2011:77).

Central to the neoclassical macro-economic intellectual articulation of the '*Polypolistic'* model is the notion of pure or perfect competition (Chamberlin 1962:6[99]; Robinson 1942:18). Considered together, pure and perfect competition

[99] According to Chamberlin pure and perfect competition should not be considered as the same thing. Pure competition entails a simpler and less inclusive concept than perfect competition Pure competition identifies a state of economic affairs where no one has any degree of control over price-making on the market while perfect

inspiring the functioning of EDEM as an economic *Polypolium* define an ideal equilibrium situation deriving from a continuous and fluid price-driven exchange of homogenous/standardized products amongst a constellation of identical, indefinite and unchanging economic units, under the fictional assumption that no quantitative limitations, informational asymmetries, or entry/exit barriers exist (Hayek 1948:95; Stigler 1957:5; Chamberlin 1962:7; McNulty 1967:397; Begg et al 2014:310).

Pure or perfect competive markets hold that prices, and not other variables such as advancements in the state of technology or product performance, are key parameters determining the rules of the interplay amongst economic forces, indeed 'price-takers' and not 'price-makers' (Mankiw 2003:66; Jones and Sufrin 2011:8; Dunne 2015: 8-9); additionally, the perfect competitive model promotes a static conception of economic efficiency (Hayek 1948:94) as the 'sought' perfect equilibrium reflects a projective hypothetical *status ad quem* where market price equals marginal costs (allocative efficiency) to the lowest possible costs (productive efficiency) (Robinson 1942:85, 121; Mankiw 2011:234; Jones and Sufrin 2011:8-9; Begg at al 2014:76-77).

The proposed notion, which portrays EDEM in neoclassical terms, clashes both with previous classical and with subsequent evolutionary contributions in economic theory. Classical readings conceived competition as as a dynamic behavioural process (McNulty 1968:643), as opposed to the neoclassical static vacuum driving instead market prices to a 'natural' level (Clark 1961:25; Smith 1977:84-85;). The existence of an inherent rivalry or disequilibrium condition (Stigler 1957; Clark 1961:13) presupposes that the market *per se* is not perfect (Robinson 1942: 90) and that competitive performance derives from such imperfection (Clark 1961:63).

A behavioural essence has also shaped the dynamic reading of imperfect competition advanced in the framework of the evolutionary economics thinking, which builds on the work initiated by Joseph Schumpeter, and further expanded in the past fourty years under the trajectory of neo-Schumpeterian studies (Ellig and Lin 2001:6-7, 21). The referred intellectual scholarhips, have rested on a dynamic notion of competition read as a vigorous process whose productive equilibria are multiple in

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competition would also entail a full ideal fluidity or mobility of factors, allowing instantaneous change, and perfect knowledge as absence of uncertainty.

imperfect markets evolving over time (Ellig and Lin 2001:40). The peculiarity of the evolutionary reading is the one of having recognized to the state of technological advancement, innovation and product differentiation/performance dynamics a central importance, other than to price-dependent considerations, in determining the organization and evolution of the economic system (Ellig and Lin 2001:16-17; Dornbusch et al 2008:52, 77; Williamson 2018:231), as well as in paving the way to socio-institutional change (Coriat and Dosi 1998:6, 9, 17; Furubotn and Richer 2000: 29-30,32; Pyka, Saviotti and Nelson 2018:160).

The described notion supporting the proposed analytical model structure clearly departs from a neoclassical construct portraying EDEM's architecture as a static setting artificially reuniting politically fragmented economic units (e.g. national defence markets in the European Union). For this reason, the emergence of a neoclassical regime (EDEM) within an evolutionary context, as the one to be theoretically articulated, could seem at first sight an open contraddition in terms. The analytical framework to be illustrated is making sense of the contraddition by developing a peculiar explanation of EDEM as a purposive output fitting a broader EU socio-institutional adjustment under a major shift in the techno-economic paradigm governing military production and organization.

3.2.3 Integrating the three dimensions

The previous three sub-sections have shaped a multi-disciplinary conceptualization of EDEM around a political, legal and economic dimension (Fig. 1). A first component articulating the political dimension originates from the interest-based tenet of international regime literature, a substream in the field of international relations, placing the notion of policy regime at the heart of a conceptualization which revisits Wilson (2000) and Muravska's (2014) ones. A second component articulating the legal dimension draws on a variety of legal scholarships, namely US public administration literature, philosophy of law, and socio-legal studies, to deliver a notion of regulation shaped on Baldwin's (1998) conceptualization. A third component integrating the economic dimension digs into the neoclassical economic literature (Robinson 1942; Chamberlin 1962) to articulate over EDEM's economic

rationale from the notion of pure or perfect competition as mirrored in the functioning of the neoclassical *Polypolium*.

	Underlying Notion	Conceptualization
Political Dimension	Policy regime	Wilson (2000) and Muravska (2014) revisited
Legal Dimention	Regulation	Baldwin (1998) revisited
Economic Dimention	Pure or Perfect Competition	Neoclassical Polypolium

Fig 1: Author's own elaboration on EDEM for conceptualizing purposes

As a result of the integration exercise EDEM emerges as:

- POLITICAL DIMENSION: A supranational rule-based policy regime advanced by the EC, negotiated by a variety of policy-economic actors responding to incentives and shifting interests over the issue area of defence and security procurement, and agreed upon with the specific goal to overcome economic fragmentation and promote the opening of European defence equipment markets. (e.g. policy regime);

- LEGAL DIMENSION: Two formal and prescriptive pieces of EU regulation/secondary law entailing a set of commands promulgated by a public authority and backed by sanctions to ensure compliance disciplining via an administrative legal procedure the activities of procurement and intra-EU

transfer of defence and security products, works and services in the European Union (e.g. EU regulation/ public administrative law);

- ECONOMIC DIMENSION: An ideal economic structure involving a myriad of buyers and sellers whose perfectly competitive interaction on the market-place determines the ideal *ad quem* equilibrium condition where the market price equals marginal costs to the lowest possible cost (e.g. *Polypolium* under perfect or pure competition).

The second part of the chapter will briefly outline limitations in existing explanations of EDEM and will advance a brand new analytical framework based on a techno-economic driven account of institutional change in EDEM.

3.3 A framework for analysis to study EDEM

3.3.1 Limits of existing explanations

As anticipated in discussing the dynamic notion of economic competition, the technological component has played a role of primary importance in the advancement of the modern evolutionary economics scholarship via the intermediate steps of the intellectual incarnations provided for by classical and Schumpeterian contributions in the history of economic thought (Freeman 1994a: 310; 2007:133; Malerba 2014:83; Nelson 1995:63; 2018:8).

In contrast, as illustrated in the literature review, the technological variable has been almost neglected in available scholarly explanations of EDEM. As observed, while lawyers have provided for a descriptive account of EDEM's high-technology nature in listing special features of defence equipment markets, and justifying an ad hoc regulatory regime, political scientists have identified origins of EDEM into alternative explanations. Further projecting on considerations contained in Chapter 2, structural realists have identified the end of Cold war as the main factor having influenced the evolution of the EU-US strategic relationship, which should have led, under a widely quoted analysis (Mearshemeir 1990:19; 2001:391), to the end of bipolar stability and of a peaceful world order for Europeans within a multipolar

context; most recently, the structural realist reading has interpreted EDEM as a form of cooperation in armaments as an act of reformed bandwagoning on US power (Dyson T. and Kostantinides 2013). Despite a lack of direct contributions on EDEM, rational neoliberal institutionalists have read the end of Cold War as a (further) driver to the emergence of a transnational political system, which responds to dynamics of complex or thick interdependence (Keohane 2000:13; 2002:10-11,17; Keohane and Nye 2000:198, 208) rather than to hegemonic stability considerations.

This first block of explanations is exposed to a set of biases: on the structural realist side, provided that Mearshemeir's prediction on Europe failed to materialize, it is not explained, in presence of a pattern of European integrative tendencies leading to CSDP, why a regime for EDEM emerged with almost a two-decade delay from the end of a bipolar world order (temporal bias) and with a peculiar supranational regulatory structure (structural bias). If the rationale for EDEM resided in projecting a EU bandwagoning power strategy face to an ambiguous US posture, as Dyson and Kostantinides (2013) claim, then an intergovernmental regime, which existed in different forms even before the formalization of CSDP, would in principle suffice without the need to involve a supranational institution, namely the EC, in a sensitive policy area for MSs such as arms production and procurement. On the neoliberal institutionalist side, the liberalist argument connecting increased levels of interdependence to the emergence of new forms of subnational and supranational governance (Keohane and Nye 1977, 2000:194,2002) in a post Cold war phase less oriented in Europe towards hard-military topics (Rees 1993:4,8,158-159; Andreatta et al 2012:35) clashed with the recent and fast progressing EU militarization plans of which EDEM represents only the very first step (see Ch. 7 for a full account of EDTIB).

A second block of explanations recognizes the constitutive role of ideas, discourse, informal practices and ideational processes in changing the material reality. Under such scholarship, one could in principle group the earliest transnationalist and new functionalist reflection, as well as sociological institutionalist, organizational studies and social constructivist intellectual traditions, and most recently a segment of the EI-related/EU public-policy literature. As reviewed in Chapter 2, these explanations maintain in broad terms that ideas, channelled via narratives and socialization processes, open new avenues and construct new realities determining incentives for States' to align their policy preferences (See Ch. 2 and Howorth

2004:229; 2007:23,28ss). In reaching alignment amongst policy preferences, the activity of sense-making must be shared by elites (via coordinating discourse) and properly communicated to the public (via communicating discourse) (Schmidt 2000;2002:232-250; Howorth 2004:212).

The ideational account of EDEM reviewed from the perspective of IR, EI studies, and the cognitivist regime literature also lends sides to criticisms: in the first place, these intellectual perspectives are insensitive to the contextual and historical element of the EDEM-creation process. Concentrated only in reconstructing and making sense of the inter-subjective micro-interaction considered, these contributions lose sight of the macro-context in which institutions operate and the policy-making activity evolve with the two-fold effect that they cannot infer nor on the causes of the *problematique* at stake or on the long term consequences of institutional change, as they lack a multi-causal longitudinal perspective. As it has been offered in the ad hoc analyses provided by strong cognitivists (Teichler 2007a;b; Krotz 2012), organizational scholars (Mörth 2000,2003; Mörth and Britz 2004) and most recently ideational readings of EU institutionalization processes in the defence industrial and market-related field (Batora 2009; Calcara 2016), EDEM emerges as the reality potentially originating from the ideational contamination between logics of construction of inter-state relations and the incidence of domestic factors through intergovernmental and institutionalizing cooperation experiences (see: WEAG, OCCAR, LoI and most recently EDA).

As a second bias, this time of a methodological nature, cognitivists automatically assimilate ideational to material change, as agents and structure are mutually constituted via inter-subjective sense-making processes. Such assumption does not seem to mirror the reality of the history of armaments policy-making where there has always been a considerable gap between the discourse and the practice of European defence integration. Reports from the Independent European Armaments Group (IEPG) created in 1976 within the North Atlantic Treaty Organization (NATO), later replaced by the Western European Armaments Group (WEAG) within the reactivated Western European Union (WEU) were filled with references to the notion of European Security and Defence Identity (ESDI); as it will be shown in the first two cases study analyses, ESDI remained no more than a dead-letter concept whereas the formal intentions of WEAG's rapporteurs were to promote further integration amongst European national industrial and armaments policies. While the

creation of an institution might reflect the political uptake of new ideas and ideologies, as it will be offered in the case of EDA (see Ch.7) this does not automatically mean that a certain institution will have an impact on the material reality, and, even if it had, they prove methodologically unequipped to assess it outside the State-centric cognitive perspective. Last but not least, the latest ideational literature in the frame of EI tradition, which has analysed the profusion of intergovernmental agencies and their heuristic effects on the advancement of CSDP, proves unequipped to provide for a theoretical explanation to the emergence of an ad hoc EC supranational regulatory regime in EDEM, outside the logic of agencies-based intergovernmental cooperation (Howorth 2000:36,84; 2007:30; 2011:7)

Lastly, a third block of contributions has identified structural factors, namely globalization, technological dependencies and trade-related aspects, as multi-causal drivers for closer defence markets and industrial integration (Fiott 2018:50-51). This block is divided into two micro-blocks. A first one, inaugurated in the early 1990s, in the wake of the end of Cold war, counted on a number of empirical economic analyses having assessed the impact of a set of negative trends (e.g. decrease in military spending, companies profitability and levels of employment) on the rationalization of the defence industrial sector. This first sub-strand, analysed in Chapter 5 (p.135ss), has originated and remained inherently anchored to the Peace dividend/conversion debate, and it has only tangentially touched the topic of the evolution of a potential European market integration framework (Bauer 1992; Allebeck 1993; Silva 1994; Gummet 1996; Gummet and Stein 1997; Taylor 1997). A second sub-strand, analysed in Chapter 6 (p.175ss), has supported in a post-1999 phase, the reflection around the global consolidation of the defence industrial sector, remaining intellectually detached from the theoretical contribution on the evolution of the EU defence institutional framework. Both structuralist accounts remain highly empirical as important structural causes, such as globalization/internationalization and technological change, are elevated to economic indicators rather than to autonomous theoretical variables potentially supporting a model of analysis to study institutional change in defence markets. For this reason, this literature has been employed to integrate the empirical analyses contained in the case studies. Finally, it is to point out that a very isolated effort has been paid very recently (see DeVore in Ch.2 Sub-section 2.3.2) to merge an International Political Economy (IPE) argument into an Historical Institutionalist HI) framework and provide for a theoretically structured

explanation of EDEM as integrating changing patterns in defence armaments cooperation.

3.3.2 Technological change, techno-economic paradigms and long waves

The present study has chosen to theoretically explore the technological variable to provide for a structured explanation to socio-institutional regulatory change in EDEM. This will be done in the course of the sub-section by reviewing a number of intellectual contributions from the fields of economics, sociology and history of technological change, which contributed to the shaping of the notion of *techno-economic paradigm* (TEP) supporting the present analytical framework. A TEP can be defined as the techno-economic model, comprising a set of principles, working methods and practices, governing the politico-economic organization of a society in a determinate historical period. Each paradigm is characterised by a cluster of interrelated technical and organizational innovations, which determine its evolution.

When it comes to recognizing intellectual prominence of technology, first, came classical thinkers[100] who conceived this variable as a dynamic force determining change in social and economic structures (Parayil 2002:72; Malerba 2014:22-23). The classical tradition, which proposed a historically contingent reading of technological change as a collective and evolutionary process moving social evolution forward (Rosenberg 1983:35; Parayil 2002:22,48; Basalla 1989), received a revised intellectual impulse in neoclassical economic studies. Despite having elevated technology as the main factor explaining economic growth, formal exogenous growth models elaborated in the neoclassical economics tradition (Solow 1956:66; 1957: 312; 1970:35)[101] and proliferated more recently into endogenous models (Lucas 1988, Romer 1990, Grossman and Helpman 1991)[102] totally ignored the temporal, cumulative and evolutionary/path-dependent nature of the technological phenomenon (Freeman 1994b: 465; Malerba 2014:98; Dosi and Nelson 2018:38), which historians

[100] Inter alia : Adam Ferguson, Adam Smith, David Hume, David Ricardo.
[101] In the mid-1950s Robert Solow using an aggregate production function to study economic growth in the American society discovered the influence of a 'residual' factor in his model of analysis, namely technological change. The Solowian model assumed that the economy was perfectly competitive, the production function homogeneous and the change in technology exogenous and neutral. Further studies from Abramovitz (1959), Faricant (1959), Schmookler (1952), inter alia, projected in the trajectory of the Solowian contribution.
[102] For a literary overview of endogenous growth models see Grossmann and Steger (2007).

of technological change instead recognized in a conspicuous number of empirical studies[103] . It was indeed in the course of the 1970s, that Nelson (1973) and Nelson and Winter (1974) first called into question the basic tenets[104] of neoclassical (growth) theory and presented a brand new body of technological and innovation research (Nelson and Winter 1973, 1977, 1982). By extending in the line of the Schumpeterian intellectual trajectory, these postulations spelled out the need, quoting Rosenberg (1983; 1994), to '*open and explore the black box*'of technological change, to account for the incidence of qualitative and long term factors in the generation of micro, meso and macro economic explanations (Nelson 1973:888; Nelson and Winter 1982:10; Nelson 1995:48).

A first body of modern evolutionary theory has met this intellectual ambition by revitalizing concepts earlier elaborated in the historical literature of technological change. Drawing on the contributions of historians, Nelson and Winter (1977) in their '*Search for a Useful Theory of Innovation*' had early theorized around the existence of *natural trajectories* of technological change. By '*following an inner logic of their own*' there trajectories would spontaneously determine the speed of technological advancement in different industries. According to their theoretical reading, the evolving mode of each trajectory would be dependent on the particular type of technology or clusters of technologies populating a certain *technological regime* (Winter and Nelson 1977:56-57).

The reflection on technological regimes has continued in the evolutionary sub-field of microeconomics of technological change inaugurated by the pioneering works by Giovanni Dosi (Dosi 1982, 1984; Dosi et al 1988; Dosi et al 1992)[105]. In articulating a critique of traditional demand-pull and technology-push theories of innovation[106], interpreted as non-suitable to grasp the complexity of the technological development phenomenon, Dosi (1982; 1984a:13-14; 1984b:80-82) advanced the notion of *technological paradigms* or *technological research programs*, expressly referring to Thomas Kuhn's notion of scientific paradigm.

[103] On the historical side see, inter alia, works from Singer et al (1958); Landes (1969); Rosenberg (1976, 1992); Constant (1980); Mowery and Rosenberg (1983); Basalla (1988); Hughes (1983,1992); Mokyr (2010).
[104] Namely: quantitative aggregation of input factors with a minor and standardized role for technological change amongst other input factors, maximization of economic objectives, complete homogeneity amongst economic units, rationality of economic actors, optimal static equilibrium conditions in the functioning of the *Polypolium*.
[105] Building on his PhD in Economics at the University of Sussex in UK on technical change in the UK and European semiconductor industry (Dosi 1981).
[106] For an overview of traditional demand-pull and technology-push theories of innovation see Coombs et al. (1987).

Under such reading, it is understood that the concept of technological paradigm encompasses both the definition of a '*certain relevant problem as well as the specific knowledge and the set of procedures linked to its solution [..] in a way that progress derives from continuous technological and economic trade-offs'* (Dosi 1982:148; Dosi 1984b:83). *Technological* or *research paradigms* are linked to the emergence of *dominant designs* conceived in the space of artefacts by a set of design concepts embodied in components that correspond to the major functions performed by the product and by product architecture that defines ways in which components are integrated (Abernathy and Utterback 1975; Coombs et al 1987:116-117; Dosi 2007:322; 2010:66-67). According to such conceptualization which also spams in the innovation management literature[107], a change in the technological paradigm would occur when discontinuities or radical changes manifest in the form of *industrial revolutions* out of a context where continuities or incremental changes normally mark evolutionary progress on the same technological trajectory (Dosi 1982:147; 1984b:90 2010:70).

It has been indicated that the notions of *natural trajectories* (Nelson and Winter 1977; 1982), *technological imperatives* (Rosenberg 1976), *technological regimes* (Dosi 1982,1984b; 2007:333; 2010:68) and *technological guideposts* (Sahal 1985), despite proving useful to highlight micro-economic patterns of industrial transformations, cannot *per se* explain the complexity of long term economic and structural developments (Dosi 1984b:78; 1988:29; Dosi and Labini 2010:338) to which EDEM belongs via a multi-decade process of socio-institutional adaptation. For this reason, it is suggested that in order to upload the reflection at the macro-economic level, one needs to stretch intellectual categories, not by adding further and further and further technical layers/specifications to existing technological categories, but simply by digging into qualitative components and their intersections determining the evolution of technological systems (Dosi 1984b:79; 1988:29; Saviotti 1986:774).

To achieve this purpose, within the wide universe of modern evolutionary economic contributions having blossomed over the past half a century in many theoretical and empirical directions[108], the present analysis picks on a core piece of

[107] For important contributions in the management innovation literature on the topic of dominant design, types of innovation and industrial evolution see: Abernathy and Utterback (1978); Abernathy and Clark (1985); Henderson and Clark (1990); Rosenbloom and Cusumano (1987); Suarez and Utterback (1995); Utterback and Suarez (1993a), (1993b); Christensen et al.(1998); Murmann and Frenken (2006).

[108] For an overview of Evolutionary Economic Theory (main theoretical tenets and empirical avenues) see: Nelson and Winter (1982); Dosi et al.(1989) (eds); Saviotti and Metcalfe (1991) (eds); Mangusson (1993) (ed); Hanush

qualitative macro-economic literature inaugurated in the early 1980s with pioneering works by Carlota Perez (1983,1985) and Christopher Freeman (1988,1991) to build an analytical model supporting an explanation of regulatory change in EDEM on techno-economic premises/grounds. The two economists have forged a macro-economic model, which acknowledges the techno-economic nature and significance of engines pushing the evolution/transformation of socio-institutional structures (e.g co-evolution) within dynamics of long-term economic development. The building block of such architecture is the notion of *techno-economic paradigm (*TEP*)*. Perez (1983, 1985, 1986), Freeman (1982a, 1982b, 1984, 1991), and Freeman and Perez (1988) have forged the notion of TEPs as a milestone in the elaboration of the present behavioural theory of long-term socio-economic and institutional change. The concept of *paradigm*[109], as opposed to trajectories or guideposts, allows emptying the notion of technological change from a coefficient of technological individualism linked to micro-economic conceptualizations (Freeman 1991:222-223; 1994b:474-475; Dosi et al 2007:338) in a perspective to forge instead a systemic characterization which places the historical interaction amongst politico and economic forces at the heart of the intellectual explanation (Rosenberg 1992:81; Dosi and Nelson 1994:156; Farenberg 2010:12-13)[110].

Initially referred to by Perez as *technological styles*, TEPs would comprise the ideal type or meta-paradigm of technological and productive organization reflecting the common sense, guidelines or rules of thumbs which develop as a response for a given period to dynamics of the capitalist system (1983:361; 1985:6-7; 1986:32-33). In a similar fashion, Freeman (1982b, 1984) had advanced the notion of *new technological systems* to refer to clusters of interrelated product, process and organizational innovations to explain patterns of structural change in the economic system in long-term perspective. They finally refined their notion in a joint reflection (Freeman and Perez 1988:47-48) which qualified TEPs as clusters of interrelated

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and Pyka (eds); Malerba (2014); Nelson et al.(2018) (eds). For an overview of Theories of Technological Change and Innovation more broadly see: Mansfield (1969); Coombs et al.(1987); Hall (1994); Stoneman (1995) (ed); Swann (2009); Hall and Rosenberg (2010) (eds) For a useful glossary of main concepts in Evolutionary Economics see Hodgson et al.(1994) (eds).

[109] The legacy of theoretical constructs of the calibre of Kuhn's scientific paradigms has been instrumental in bringing about the idea that traditional governing modes of socio-economic organization are cyclically overthrown by revolutionary advancements and discoveries in the state of scientific and technological knowledge (Kuhn 1970:160ss).

[110] A systemic approach to the study of technological paradigms has evolved in the literature on national innovation systems within the disciplinary field of economics of innovation, previously indicated as economics of technological change. See Farenberg (2010) in the introduction to the Oxford Handbook on Innovation.

technical, organizational, and managerial innovations comprising a set of new technologies, best practises, and principles for organizational and institutional design whose technical and economic advantages are to be found in a set of new inputs or key factors[111] (Freeman 1984:491;Freeman and Perez 1988:48-49; Perez 2004:21; 2010:194-195).

In their theoretical reading, changes in TEPs, also defined as *technological revolutions* or *great surges of development* by Perez (2002:18; 2010:196), occur under a major discontinuity in the rules of thumb governing the functioning of the techno-economic relations within the technological system, in line with the evolution of long waves (Freeman 1991; Freeman and Perez 1988:47; Perez 2004:12; 2010:199). The long waves hypothesis is central to the Modern Evolutionary debate over long-term economic development, in the context of which Perez and Freeman's model originates. Specifically, it was Schumpeter, father of the evolutionary economic theory, who first analysed the innovation phenomenon as the key determinant of long-term economic development and social change. In confuting neoclassical orthodoxy, he conceived economic life as a historically sensitive dynamic where innovation-led entrepreneurial activities support a continuous regeneration of the *status quo* via an evolutionary process of creative destruction (Schumpeter 1939:84, 88; 100; 213-214; Canter and Hanush 1994:275; Hanush and Pyka 2007:12-13).

In *Business Cycles,* Schumpeter (1939:205-207) also attributed a cyclical character to the nature of economic development, and identified three cycles, from 1870, each of which consisting of at least an upswing and a depression phase, eventually extended by a recession and a recovery inter-phase under complex cyclical movements. In this light, the understanding of long-term evolution of the capitalist system has been conceptually and operationally linked to the appreciation of repetitive time series and recurrent movements throughout history across long waves described as 'successive industrial revolutions' (Schumpeter 1939:219; Rosenberg and Frischtak 1983:146; Freeman 1994:310). Initially studied and theorized by the Russian economist Kondratieff [112] long waves would depend directly from an

[111] These new inputs or key factors include the falling of relative costs, the improvement in technical characteristics and availability of supplies, the potential of within-product incorporation and its pervasive effects on the economic system.

[112] According to Kondratieff and Stolper, long waves would last an average length of 40/50 years in the capitalist economy, with upswings and downswings of respectively 20/25 years and 20/25 years for each cycle calculated from the late 1780s until the 1960s. They proposed that three great cycles characterized the movement of the

economically induced process of advancements in science and techniques as a function to respond to real life collective necessities changing over time (Kondratieff and Stolper 1935:112).

The intellectual category of long waves is retained[113] here for theory-building purposes as a powerful conceptual and analytical devise, which permits to place the understanding of a socio-economic phenomenon such EDEM in a broader perspective. Since, as it has been pointed out in Chapter 2, studying EDEM outside of its political and economic context exposes the analysis to bias of asepticism and artificiality, the present theoretical construct recognized the importance to set a temporal reference in an analytical horizon which spams across a multi-decade spectrum, with three decades anticipating and three decades following the entry into force of the regulatory regime (1980-2040). In addition, filling a gap in the evolutionary theoretical perspective on techno-driven long run economic development, the present theoretical articulation places the military as the centre of the post World War II (WWII) techno-scientific paradigm, which since the 4th Kondratieff wave (1940s-1980) perpetrated a military R&D-dependent model of social-innovation and economic development (Fig. 2).

Long Waves	Theoretical hypothesis
3rd Wave (1900-1940) 1900-1920 1920-1940	 Upswing phase Downswing phase
4th Wave (1940-1980) 1940-1960 1960-1980	 Upswing phase Downswing phase

economy from 1789 until 1940s. A forth wave would register its period of rise from the 1940s through the mid 1960s, and downswing until the end of the 1980s.

[113] Within the evolutionary tradition, a scholarly fringe, represented by Nathan Rosenberg and Carl Frischtak, raised a dissenting voice and exposed a critique of the potential suitability of a theory of long waves to actually demonstrate how technological and economic variables interact in the determination of Kondratieff and Schumpeter's hypotheses over the cycles timing, requirements, outputs and outcomes. For an articulation of the critique see: Rosenberg and Frischtak (1983,1986).

5th Wave (1980-2020) 1980-2000 2000-2020	 Upswing phase Downswing phase
6th Wave (2020-2060) 2020-2040 2040-2060	 Upswing phase Downswing phase

Fig. 2: Kondratieff's Long Waves hypothesis (1935)

The present model of analysis suggests an element of theoretical novelty in the study of long-term economic and institutional dynamics; in partial correction of Kondratieff, Freeman and Perez's assumptions, it is advanced that an overarching shift in paradigm took place in the upswing phase of the 5th wave (1980s-2000) which marked towards the end of the 1990s the crisis of a monolithic model of economic development that has traditionally rested over the decades on the primacy of military R&D investments and operations, in determining and controlling the pace and direction of innovation activities in the commercial world; it is suggested that, as a consequence of the rupture in the linearity (e.g. military towards civil) characterizing the innovation model, the 5th wave presents a peculiar structure, namely a halving of traditional time-cycles with two shifts in TEPs over the 40 years of the full cycle. In other terms, the theoretical argument proposed, building backwards on inductive grounds, points at the shortening of TEPs cycles and long waves under a (progressively) commercially driven organization of the global innovation machine, so that under a non-militarily controlled economy TEPs change and expire faster (Fig. 3).

TECHNO-ECONOMIC PARADIGMS IN DEFENCE

New TEP *Shift n. 1* *Shift n. 2*

TEP 1 (5^{th} Wave) 1980s-2000	TEP 2 (5^{th} Wave) 2000s-2020	TEP 3 (6^{h} Wave) 2020s-2040
Characteristics of technological development: • Conspicuous investments in military R&D and the military economy • Linearity R&D military to civil (spin out model) • Product dependent development • Modular, long lead or iterative development • Predominantly evolutionary over few radical innovations	Characteristics of technological development: • Less investments in military R&D and the military economy • Innovation going both sides/ civil innovation becoming relevant for the military as a consequence of the spin out of military inventions to the commercial world (Spin in/back effect) • Product plus non-product dependent development • Equal share between evolutionary and radical disruptive innovations	Characteristics of technological development: • Linearity completely broken by globalization dynamics/civil innovation more significant for the economy • Prevalence of non-product dependent development/ service innovation • Disruptive innovation as ordinary business model/Long-lead development becomes secondary

Strategic nature of military R&D and production: • Military aeronautics • Cross-fertilizations with civil aeronautics • Advancements in physical components/ Materials innovation • Tendency towards miniaturization and integration amongst physical and electronic components / birth of defence electronics systems • First prototypes for modelling and simulation	Strategic nature of military R&D and production: • Military aerospace including Drones • Cross fertilization with civil aerospace • Advancements in materials/components innovation • Tendency towards miniaturization and integration amongst physical and micro-electronic components/Systems and platforms integration via defence electronics • Integration between telecommunications and IT (telematics) • Electronic warfare, modelling and simulation via augmented reality	Strategic nature of military R&D and production: • Drones • Nuclear weapons • Cyber technologies, including crypto and de-crypto technologies • Artificial intelligence and reality anticipation/augmentation • Data transfer and processing technologies

Model of industrial consolidation: • Vertical and Horizontal M&As/ National champions • Intergovernmental armaments cooperation	Model of industrial consolidation: • Transnational M&As/Global Multinational Enterprises (MNEs) • Descending phase for intergovernmental cooperation in armaments programs	Model of industrial consolidation: • Public and private innovation accelerators and incubators • Civil-military R&D clusters within MNEs • R&D collaborative consortia gathering primes, SMEs, and start ups • Public-private partnerships
Relations between governments and industries: • State-owned or State-participated • Symbiotic relation/at arm's length	Relations amongst governments and industries: • Privatization of capital and ownership structures • Strategic corporate independency • Internationalization of production and processes	Relations amongst governments and industries: • Return to forms of State participated or controlled ownership • Network centric and project-centred • Public economic

	• Symbiotic relation broken/ rising global geometry	incentives to consortia
Industrial Representation Groups: • National level • Weak and fragmented EU presence	Industrial Representation Groups: • National uploading to the EU • Rising presence in EU policy-making	Industrial Representation Groups: • EU defence and aerospace companies expanding in security direction • Strong presence in EU policy-making

Fig. 3 Source: Author's own adaptation and elaboration on Freeman and Perez's TEPs categories (1988:50-55)

The next section covers the theoretical specification of the second milestone in Freeman and Perez's conceptualization, also permeating the proposed analytical model, providing for a techno-driven theory of institutional change, namely the notion of socio-institutional adjustment (SIA). Its understanding is enlightened by a theoretical articulation of the role of public entrepreneurship in EU policy-making interpreted according to a systemic reading of technological dynamics within the political and economic context hosting a change in TEP. Under an evolutionary

reading, new emerging forms of economic and productive organization normally unveil limitations and shortages in existing institutional structures, in turn channelling new opportunities and incentives for political and corporate actors to agree on new interests configurations and display policy entrepreneurial inputs to accompany socio-institutional change.

3.3.3 Policy entrepreneurship and socio-institutional adjustments

In line with the model elaborated by Freeman and Perez (1988:58-59) and refined by Perez (2004,2009,2010), the adjustment in the socio-institutional structure is what follows a shift in techno-economic paradigm (TEP). It is postulated that, in light of the radical modification in the qualitative attributes governing the forms and organization of the military productive and organizational paradigm under the 5th wave, a rapid process of socio-institutional adjustment is also taking place under a changing power/interests configuration amongst policy entrepreneurial forces in an evolving defence policy making arena. Since shifts in TEPs are accelerating in a non-militarily controlled globalized economy, socio-institutional adjustments (SIAs) also follow a quicker pace with the consequence that socio-institutional change loses its purely reactive connotation, to integrate also purposive components.

In an attempt to correct Freeman and Perez's theoretical model according to which structural adjustments would take place with a certain delay in the downswing phase of each wave, it is interpreted here that EDEM does not characterize simply as a passive *mismatch* or *decoupling* turning in time into a *good match* or *coupling* (Freeman and Perez 1988:58-59; Perez 2004:15-16; 2009:20; 2010:198-199) in the accommodative response of the socio-institutional structure to the emergence of new techno-economic pressures. More subtly, it is argued that EDEM embodies the 'best possible output' the system could generate under the new policy entrepreneurial input provided for by the European Commission (EC) in the aftermath of a major shift in the techno-economic organization of military production (*Shift 1* Fig.3) intersecting the emergence, under an anomalous 5th wave, of a new TEP (*Shift 2* Fig.3). There is indeed a shorter timeframe, namely 20 instead of 40 years, separating the first shift in TEP and the adjustment in EDEM, while only 10 years outrun the entry into force of

the EDEM regime and the emergence of a new TEP (e.g. TEP 3) inaugurating the rise of a new 6th wave (*TEP-3* Fig.3).

In light of the shortages in the available evolutionary sub-literature on national innovation systems to elaborate over mechanisms of institutional adaptation (Freeman 1987; Lundvall 1988; Nelson 1992; Farenberg 2010: Edquist 2010), it is proposed to correct the understanding of socio-institutional adjustments, read by Perez and Freeman as merely passive reactions in the politico economic system, digging from public entrepreneurship scholarship translated from the American to the European intellectual tradition. On the footsteps of a revival in institutionalism in the early 1980s, the American public administration literature has first forged a notion of policy entrepreneurs conceived as classes of political actors who identify opportunities, promote new ideas and viewpoints, mobilize interests and public engagement, create venues to debate policy problems and frame solutions, practise team and credibility-building activities, allocate and invest resources, just as any other private entrepreneur, in the hope of gaining back from investments made (Kingdon 1984;122; Roberts 1992:56; Mintrom 1997:739-740; Campbell and Mitchell 2012:193-194).

The same literature has also deepened on the nexus of causality in the relation between the activity of public entrepreneurs as agents of change and the change itself, which takes place throughout and within its natural environment, namely the public policy process (Schneider et al. 1995:3-17,81ss; Mintrom and Norman 2009:651,654ss). Such scholarly effort has marked the evolution of models of entrepreneurship in the public policy literature whose most reputed incarnations are the multi-stream model[114] (Kingdon 1984), the punctuated equilibrium framework[115] (Baumgartner and Jones 1991,1993; True, Jones and Baumgartner 2007; Jones and Baumgartner 2012) and the advocacy coalition framework[116] (Sabatier and Jenkins-Smith 1988,1993; Sabatier and Weible 2007).

In seeking to retain a number of core intellectual references from the American tradition, the European public entrepreneurship scholarship has evolved

[114] According to Kingdon's multi-stream model, policy entrepreneurs play a role in linking the three streams of policy problems, policy solutions and political processes, bringing about institutional change. A window of opportunity for policy change would arise when these three streams are open, namely when a certain problem is framed, a solution is formulated, and the politics picks it up favourably.

[115] Unlike incrementalist accounts, the punctuated equilibrium framework reads policy changes as dramatic ruptures with the past. Under this framework, in periods of equilibrium an issue is captured in stasis into a subsystem, whereas in periods of disequilibrium an issue is forced on the macro-political agenda.

[116] The third model focuses on the role of advocacy coalitions, portrayed as institutional actors covering a variety of positions who share a set of beliefs in a policy subsystem- and their interplays and learning processes in bringing about change in the public policy.

trying to adapt the understanding of the policy entrepreneurial phenomenon to the specificities characterizing the EU public policy-making process. Within an emerging body of EU public policy literature having elaborated on important processes such as the *Europeanization* or *Europeification* of policy styles and procedures (Andersen and Eliassen 1993:257; Muller [117] 1995a:12-13; 1997:5-7: Mazey and Richardson 1995:338) and the formation of a EU polity expanding regulatory competences and functions (Majone [118] 1994:88-89,1996:56; 1997:143; McGowan and Wallace 1996:565), the role played by a rising EU regulatory authority (e.g. the EC) in framing and shaping policy items and initiatives into the EU public policy machine has acquired a prominent intellectual consideration (Majone[119] 1996:74; Hix 1999: 235-237; Wallace and Wallace 2010:344-345).

In conceptual adherence with a multi-stage understanding of the EU policy process or cycle, a body of scholarly research has elaborated over components and mechanisms characterizing the very expression of the EC's policy entrepreneurialism, namely a set of purposive and strategically targeted actions, under the attribution of exclusive competences, towards 'setting the agenda' for future policy and regulatory initiatives to be developed in the EU (Peters 1994; Princen and Rhinard 2006; Cohen 2006; Princen 2007, 2009; 2011; Zahariadis 2008; 2016). Of theoretical significance for the proposed model is a conceptualization of EC agenda-setting activities offered by Princen (2011:931), which builds an interpretative matrix based on the notions of *attention* (for the issue) and *credibility* (for the action) to articulate a reading of the two main components of EC's agenda-setting strategy, namely venue and substance/problem setting.

Considering the element of novelty characterizing the proposed analytical model, which, for the first time, advances a theoretically structured techno-economic explanation of socio-economic change in EDEM, it is proposed to complement the understanding of the EC's policy entrepreneurialism in EDEM with a

[117] According to Pierre Muller, this process of progressive convergence can be seen at three levels: a) the creation of a European agenda b) the development of forms of representation of private interests 2) the affirmation of new modes in the public policy-making in the political arena.

[118] Majone developed the so-called EU regulatory State hypothesis, which suggests that regulatory functions of the State, such as the correction of market failures and the protection of consumers' rights, have been translated at EU level. The exercise of a distinct regulatory function is made all the more possible by the fact that, in contrast to constitutive and redistributive policies, it does not encounter budgetary limitations: while the extension of non-regulatory direct expenditure programmes is constrained by budgetary allocations and by the size of Government tax revenues, supranational regulatory reform does not have a direct cost on the institutions but an indirect one on firms and individuals who have to comply with the law.

[119] In developing a model of demand and supply for EU regulation, Majone also connected the rise of the EU regulatory State hypothesis to the strengthening of the EC' s policy entrepreneurial role.

conceptualization recently elaborated by Edler and James (2015) building on Princen (2011) agenda-setting matrix, and further expanded by James (2018) to provide for an analysis of supranational entrepreneurialism, respectively, in the EU security and defence research sectors. By adopting an inductive strategy, the two authors propose a notion of EC policy entrepreneurship that, unifying agenda-setting (e.g. the step 1 of the EC policy cycle) to policy shaping activities (e.g. step 2 of EC policy cycle)[120], comprises a set of constitutive conditions for the two EU security (2006) and defence (2018) research programmes. These conditions are: a) the setting of a policy arena/venue with contextual framing of a new policy problem in convergence with the formation of a political window of opportunity; b) the purposeful activism in searching and exploiting new opportunities and building credibility; c) the formulation of a solution to a problem based on instrumental ambiguities; d) a bottom-up approach in developing the entrepreneurial strategy with consensus building and subsequent link to high politics; e) real-time reshaping of agenda and policy options based on instrumental ambiguities, multiple mobilizations and institutional coalitions (Edler and James 2015: 1252-1256; James 2018:15-43).

Applying Edler and James'conceptualization to the present model of analysis, and in the broader context of Freeman and Perez's macro-framework, one could observe that the EC's policy entrepreneurial style towards EDEM only covers the attributes characterizing agenda-setting activities followed by the framing of a solution (e.g. points a, b, c), not even based on significant instrumental ambiguities, given the lack of strategic importance characterizing defence procurement not falling under art. 346TFEU and/or excluded from the scope of application of the DSD (*SIA in EDEM* Fig. 4). By contrast, a much wider and complex level of elaboration in the policy entrepreneurial strategy was needed in correspondence to policy items reflecting a top level strategic importance for EU MSs, namely security and defence R&D activities, as evidenced in Edler and James (2015: 1259-1262) and in James' (2018:28-38) analyses, which highlighted the need for the EC to play harder on institutional and normative ambiguities, adopt a forward-looking perspective linking policy engagement to high politics, and orchestrate re-framing activities building wide

[120] Such theoretical choice is explainable on practical grounds: indeed, if the EC is to invest energies and credibility into placing an item on the EU agenda displaying its exclusive agenda-setting powers, it is logical to predict that the same institution will also elaborate a policy entrepreneurial strategy to make sure that previous investments in attention and credibility will generate returns via an institutional outcome. In the practice of EU policy-making the two steps occur basically simultaneously.

institutional coalitions and promoting wide public mobilizations (*SIA in EDTIB* Fig. 4).

SOCIO-INSTITUTIONAL ADJUSTMENTS (SIAs)		
No SIA	*SIA in EDEM*	*SIA in EDTIB*
Under TEP 1 (5th Wave) 1980s-2000	Under TEP 2 (5th Wave) 2000s-2020	TEP 3 (6th Wave) 2020s-2040
Political configuration: • Marked inter-governmentalism • Low European institutional presence via WEU/WEAG • High NATO institutional involvement under art. 5 Collective Defence	Political configuration: • Marked inter-governmentalism • High European institutional presence via CEU Committees and EDA • Partnership NATO under Berlin Plus • Window of opportunity for the EC strategizing with EUISS Task Force and CJEU plus legal academia	Political configuration: • Weak inter-governmentalism • Descending phase for EDA • Cooperation in CEU with PESCO • Partnership NATO under the EUGS • Complex entrepreneurialism in EDTIB under a EU policy entrepreneurial coalition comprising (EC, EP, EEAS, ASD)
EC Policy entrepreneurial strategy: • a) setting of a policy arena/venue with contextual	EC Policy entrepreneurial strategy: • a) setting of a policy arena/venue with contextual	EC Policy entrepreneurial strategy: • a) setting of a policy arena/venue with contextual

framing of a new policy problem in convergence with the formation of a political window of opportunity; • b) purposeful activism in searching and exploiting new opportunities and building credibility; • c) formulation of a solution to a problem based on instrumental ambiguities	framing of a new policy problem in convergence with the formation of a political window of opportunity; • b) purposeful activism in searching and exploiting new opportunities and building credibility; • c) formulation of a solution to a problem based on instrumental ambiguities	framing of a new policy problem in convergence with the formation of a political window of opportunity; • b) purposeful activism in searching and exploiting new opportunities and building credibility; • c) formulation of a solution to a problem based on instrumental ambiguities • d) a bottom-up approach in developing the entrepreneurial strategy with consensus building and link to high politics; • e) real time reshaping of agenda and policy options based on instrumental ambiguities and multiple

		mobilizations and institutional coalitions
Outcome • Non-military outcome/ attempted EDTIB with the EU civil aeronautical research programme (Ch.4) • Non-outcome/ failed EC attempt to pass EDEM (Ch.5)	Outcome • Positive outcome/ First socio-institutional adjustment in EDEM with the 2007 Defence Package (Ch.6)	Outcome • Positive outcome anticipated under closing TEP-2/ Second socio-institutional adjustment in EDTIB with the 2016-2018 Defence Packages, followed in post-2020 by the EDRP (Ch.7). Partial overlap between SIA in EDEM and SIA in EDTIB on EDAP and EDF.

Fig. 4 Author's own elaboration on socio-institutional adjustment conceptualizations in Freeman and Perez (1988) and categorizations on EC's policy entrepreneurship by Edler and James (2015)

The provided interpretation is compatible with the theoretical macro-premises of the model (layer 1), which subordinates the incidence of policy entrepreneurialism to changes in the techno-economic context, in turn shaping politico-economic incentives for further policy entrepreneurial opportunities to arise. It is suggested that changing politico-economic incentives within shifting TEPs directly shape opportunities for new policy entrepreneurial attempts to manifest and play a strategic

role in the advancement of policy outcomes. Depending on the degree of political opportunity manifested under each change in TEP, policy entrepreneurs can purposely decide to either lower risks and play safely when the politico-economic contingency provides for fewer options, or take higher risks and elaborate more ambitious political initiatives when bigger opportunities arise.

Indeed, although the EC targeted the defence industrial policy field since the early 1980s, it was only shortly after the first important shift in TEP in the mid 2000s (*Shift n.1* Fig. 3) that an adjustment in the socio-institutional structure materialized (*SIA in EDEM* Fig.4). Under TEP-1 characterized by a linearly organized military economy (*TEP-1* Fig.3) the window of opportunity reserved to a supranational entity to play a policy entrepreneurial role of sort was essentially nil, as enterprises were kept at arm's length by Governments, and defence political relations relied on a strong core of inter-governmentalism under NATO (*No-SIA* Fig.4). It will be argued that in the early 1980s, the EC supranational policy entrepreneur generated a non-military policy outcome playing on the complementarities existing between civil and military aeronautical technologies (e.g. dual use technologies) by framing a EU (formally) civil aeronautical research programme, indirectly intersecting the military aeronautical industry (Ch. 4).

A decade later in post-Cold war period, yet under the same TEP-1, the EC policy entrepreneur still operating in a system of policy brokers with no autonomous agenda-setting power (e.g. Western European Union- WEU/Western European Armaments Organization- WEAO/Western European Armaments Group-WEAG) frantically articulated an attempt to frame a supranational EDEM which, although trying to maximize the political opportunity provided by the end of Cold war, did not succeed *(No-SIA* Fig. 4). As it will be argued in the second case study analysis, in lack of a change in TEP, governments of main arms-producing countries were still busy directing a process of internal industrial consolidation to build their own national champions under the illusion to be able to control the effects of a progressively no-more militarily controlled and globalized economy (Ch.5).

Finally, a major shift in TEP (*Shift 1* Fig.3) occurred at the beginning of the new century with the rupture of the traditional schemes governing forms of military production and organization created the politico-economic conditions for a supranational policy actor, the EC, to size its window of opportunity and articulate a coherent and proportionate entrepreneurial strategy. For this reason, it is supported

that the entry into force of the EDEM supranational regulatory regime, included in the 2007 Defence Package, does not reflect an indefinite 'any' passive form of adjustment in the socio-institutional structure, but it essentially carries the special sign-mark of the EC entrepreneurial strategy which, in that specific timeframe and exploiting a changing power configuration dynamic, played its own strategic cards maximising converging politico-economic incentives along the safe and consolidated low risk EU internal market route, pushing forward a toolkit of administrative regulatory instruments (*SIA in EDEM* Fig.3) (Ch.6). Although a new classical economic construct (see previously section 3.2.3) proves unfit to respond to the governmental challenge to contain the effects of commercial capitalism and uncontrolled globalization forces on the future competitiveness of the EDTIB, it represents the only and best policy output the EC could generate as wrapped in-between two TEPs of a reduced length and of equally disruptive nature.

In further support of the proposed theoretical argument which foresees shorter TEPs and quicker socio-institutional adaptations overlapping one another under a globalized and no-more militarily controlled innovation economy, it is advanced that the building blocks of EDTIB were already set in the 5th wave closing phase (2010s) (*SIA in EDEM* Fig.4), while its coherent implementation will take place in the post 2020s phase under a new TEP (*SIA in EDTIB* Fig.4). As it has been offered in empirical terms by James (2018) and to be confirmed in the last case study analysis (Ch.7), the accelerated process of socio-institutional adaptation in EDTIB, at the intersection between two shifts in TEPs, will add elements of further complexity and hybridity in the EC's policy entrepreneurial strategy progressively seeking for broader supportive institutional coalitions. In terms of outcomes, the EDTIB construct, whose foundations swipe off the sense of a static regulatory regime such as EDEM, will comprise the creation of a supranational European Defence Fund (EDF) to promote via the selection of R&D consortia formed on EU basis, the financing of collaborative activities amongst existing global multinational enterprises (e.g. the primes) and SMEs/starts up, eventually leading to the creation of new supranational research or procurement structures (*SIA in EDTIB* Fig. 4).

Last but not least, a clarification on the choice to employ TEPs as an underlying notion for the illustrated theoretical framework is due, in light of its proximity with the theorizing of a specialized military literature. More specifically, the theoretical engagement linked to the elaboration of this analytical framework,

revised, yet not retained for theory building purposes, the contribution of a circumscribed US-based literature of strategic studies derivation, which elaborated the notion of *military-techno revolution* (MTR) in the sidelines of the debate, initiated in the early 1990s, on the rise of a '*Revolution in Military Affairs*' (RMA). For RMA's theorists, this concept substantiates an unprecedented upgrade/transformation in the state of the military-techno organizational environment, with implications for the future US strategic posture, bureaucratic and industrial organization. In their reading, a RMA would occur when the application of new technologies into military systems combines with innovative operational concepts and organizational adaptation to fundamentally change the character and conduct of conflicts and warfare by producing a dramatic increase in the combat potential and military effectiveness of armed forces (Lesser 1994:2; Krepinevich 1993:3; Cooper 1994:5; RAND 1999:xiii, 9ss; Guay and Callum 2002: 764-765; Dombrowski and Ross 2009:155).

Contributing to this reflection, Krepinevich (1992) first forged the notion of *military-techno revolution* (MTR) to refer to a new organizing principle governing the internal transformation of the US military organization. In his view, a MTR would comprise four components, which are: technological change, military systems, operational innovations, and organization innovation. MTR's conceptualization was refined within a small circle of US military analysts close to the US defence administration. In Cooper's (1994:19) analysis, its components are operational innovation, organizational adaptation, evolving military systems and emerging technologies. Hundley (RAND 1999:xv) identified a new military reality or paradigm composed of a new technology, a new device, a new system, a new operational concept, and a new doctrine or force structure. They all attached a reading of MTRs as evolving and spamming across long-waves culminating thus far in the ICT or Information age (Lesser 1994:3-5: Cooper 1994:16-17; Murray 1997:3; Raska 2011:4).

Despite the impressive adherence to the paradigm-like structure of the theoretical framework presented in the course of this Chapter, and in particular to the evolutionary notion of long-waves of economic development swiping off dominant paradigms under revolutionary changes, the concept of MTR, which redundantly accumulates techno-organizational components, is unable to provide for an articulation of mechanisms/processes determining the emergence of a specific politico-economic interests/power configuration, including a specific

productive/organizational model for the industry, under each defence dominant paradigm. Furthermore, since MTRs remain conceptually detached from the politico-economic environment grounding their evolution, the notion cannot also articulate a theoretically structured explanation, as the model elaborated in this Chapter instead does, of different forms of institutional policy entrepreneurship accompanying changes in the strategic and regulatory/bureaucratic environment. In light of the commented, the present theoretical framework has not relied on the intellectual category of MTRs, and has retained the one of TEPs instead.

3.4 Conclusion

In bridging a gap in the literature, the chapter has provided for an interdisciplinary notion of EDEM by enlightening and integrating inputs from different disciplines, namely international regime literature, American public administration scholarship, philosophy of law, socio-legal studies, and finally economic theory. The result is an integrated conceptualization, which, on the one hand, offers an extended theoretical visualization on the phenomenon under enquiry, while, on the other hand, brings buried shortages in the articulation of the regulatory construct.

Reflecting on the limitations of existing theoretical explanations analysed in Chapter 2, the chapter has built a multidisciplinary analytical framework, having offered a theoretically structured explanation of EDEM. For the first time, socio-economic drivers beyond EDEM only empirically accounted under structuralist explanations and ignored by the rest of political science literature have received a degree of theoretical elaboration. Specifically, a body of scholarly work in the field of modern evolutionary economics has been linked to a sub-field of EU public policy literature to provide for a techno-economic dependent explanation of a EU regulatory regime under the input of the EC's policy entrepreneurial action. The model presents two layers: a first layer connects shifts in techno-economic paradigms to adaptations in the socio-institutional structure; a second layer, dependent on the first one, specifies necessary, but not sufficient, conditions under which the EC's entrepreneurialism determines policy outcomes; in this framework, the EDEM

supranational regime has been read as the best possible outcome deriving from a purposive low risk EC's entrepreneurial policy strategy under a first shift in TEP (*Shift 1* Fig.2).

The following chapters will provide empirical verification against the proposed theoretical model. As explained, a first layer broadly connects changes in techno-economic paradigms (TEPs) to socio-institutional adjustments (SIAs), while a second layer, which is dependent on the first one, specifies conditions for the EC's institutional entrepreneurialism to accompany socio-institutional change under shifts in TEPs. The first two cases study contained in Chapters 4 and 5 tests the theory via the experience of two non-outcomes (e.g. non-accomplished SIAs) while the second two cases comprised in Chapters 6 and 7 tests the theory via the experience of two accomplished policy outcomes (e.g. accomplished SIAs).

This chapter is dedicated to the memory of Dr. Hywel Davies (1929-2017).

CHAPTER 4

Attempting EDTIB:

The Curious Antecedent of the European Aeronautics Research Programme

4.1 Introduction

Chapter 3 contained the elaboration of the theoretical framework, now this first case study tests the coherency of the overall theoretical model which connects changes in techno-economic paradigms (TEPs) to socio-institutional adjustments (SIAs) (layer n. 1), and attaches to that primary condition the significance of the EC's policy entrepreneurial activity in the EU defence industrial and market field (layer n. 2). Specifically, the analysis makes a unique observation on the (under-researched) European Aeronautics Research Programme (EARP), strategically envisioned already in the mid-1970s and negotiated in the early 1980s under the EC's intent to forge a supranational defence industrial cooperative mechanism leveraging the, at the time existing, complementarities between civil and military aeronautical technologies/investments.

The first subsection (4.2) traces the origins of the EU involvement in R&D processes, evidencing how the military component has traditionally remained outside the EU institutional field of competence. Sub-section (4.3) clarifies important notions concerning the peculiar and sensitive functioning of aeronautical industries, their military significance, and their intense R&D requirements. The referred R&D

processes have traditionally placed, and still place under an evolving product development trajectory, governments of major arms-producing countries at the heart of an articulated politico-economic mechanism, part of the referred 'techno-economic paradigm' (TEP), which has progressively marked higher levels of intersections and cross-fertilizations between military and commercial investments, as the fortunate case of the Airbus consortium testifies.

The following subsection (4.4) further elaborates on the peculiarity of converging (military-civil) aeronautical technologies to analyse in closer terms underlying features of the first TEP governing military production (see: TEP 1 – Fig. 3 in Ch. 3), which will expand its features and working logics until the end of the 21st century. A set of techno-driven developments mentioned here will be analysed in depth in the course of Chapter 5, which will evidence, in the context of the same TEP, the formation of national industrial champions in the aerospace field. The shift to a new TEP will be analysed in Chapter 6 with the emergence of brand new logics governing the organization and functioning of the defence business around multinational enterprises (see: TEP 2- Fig. 3 in Ch.3).

Subsection 4.5 develops a unique analysis of the sophisticated policy entrepreneurial strategy elaborated by the EC setting for the very first time, an in-house forum for discussion with a three-State representative (UK, France and Germany) coalition of personalities, and, at the same time, gaining consensus amongst the defence industries of Europe made more and more dependent on incomes deriving from expanding commercial markets. Despite the level of formal elaboration in the EC's policy entrepreneurial strategy analysed, which wisely insisted on the element of competitiveness between Americans and Europeans in developing advanced aeronautical technologies on competing markets, the EC had de facto to accept a low-strategic result with a non-military outcome embodied in the political agreement to finance a EU supranational civil aeronautical research programme. It will be evidenced that despite the institutional success and long-term projection of the European Aeronautical Research Programme (EARP), the ambition which characterized the early group of personalities to activate a supranational defence R&D cooperative mechanism, never took place in the following decades having marked the successful evolution of the programme, as the EARP evolved in civil direction only,

with the progressive de-coupling or phasing out of the military trajectory from the civil one.

The chapter concludes by offering that the case study analysis has tested both layers of the theory. The first layer has been tested: in lack of a shift in TEP governing the military organisation, there will be no defence sensitive institutional adjustment of sort. The second layer has been tested too, as regardless to the level of elaboration in the EC's entrepreneurial strategy, no relevant adjustment will follow up in the defence socio-institutional structure governed by the same TEP. As expected and proved, the EARP has marked a non-military outcome.

4.2 Origins of the EU involvement in R&D and the military component

The topic of research has been a central item in the agendas of the former European Communities and remains one of the European Union (EU) nowadays. By EU research, we mean the process of research and technological development activities undertaken under the control and financial support of the EU (Stajano 2006:289). They include a series of R&D activities comprising only a part of the EU budget and the total R&D investment of EU Member States (MSs) (Peterson and Sharp 1998: 9-11). Between 2004 and 2014, EU R&D expenditure per MS' GDP – also defined as R&D intensity- increased from 1.76% to 2.03% (Eurostat 2015). In 1989, it amounted only to 1% of the 12 European countries' R&D spending (Commission of the European Communities 1989: 50). R&D covers three types of activities: basic research, applied research and experimental development[121].

The involvement of EU institutions in research policy has a long-standing tradition. Back in the 1970s, the Commission of the European Communities (CEC) proposed a Memorandum (CEC 1970a) to the Council of the European Communities, endorsing a political vision condensed in a set of principles and guidelines for the

[121] According to the Frascati Manual (OECD 2002 quoted in Tiwari 2008: box 2; OECD 2015:45) basic research includes research work undertaken primarily to acquire new scientific and technical knowledge with no aim of practical applicability (Hirshel et al. 2004: 4; Swamn 2009: 26). Applied research encompasses original investigation undertaken in order to acquire new knowledge directed towards a practical aim or objective (OECD 2002 quoted in Tiwari 2008: box 2; OECD 2015: 45). Experimental development entails systematic work, drawing on existing knowledge gained from theoretical research and/or other experimental practical activities, which is directed at producing new materials, products or devices, at installing new processes, systems and services, or at substantially improving those already produced or installed, after a successful 'technology' demonstration and verification (Hirschel et al. 2004: 4; OECD 2002; 2015).

construction of a European industrial policy. The importance of scientific and technological development in the European Communities was identified as a key condition accompanying structural change, promoting industrial growth and nurturing economic and social progress (CEC 1970a: 11, 34). In line with the vision expressed in the Memorandum, while remaining cognizant of the wide technology gaps existing amongst European countries (OECD 1968: 9-27), the EC acknowledged the failure to rationalize research efforts undertaken in previous initiatives, and pushed MSs to consider concretizing reasonable scales of R&D efforts via the progressive coordination of national research programmes and the pooling of common resources (CEC 1970b: 7-17).

As a milestone in the process of European integration, a common research policy in Europe has been pursued through the preparation, negotiation and implementation of dedicated research programmes. In 1974, the Council of Ministers decided on a research programme expanding from the areas of coal and steel, nuclear energy, and agriculture towards the fields of security of supply of resources (energy food and raw materials), promotion of internationally competitive industries, improvement of living and working conditions, and protection of the environment (CEC 1980: 7-13). At the time, the European Communities had no formal legal competence in the area of science and technology. Art 235[122] of the Treaty of Rome offered a weak legal ground to sustain the European Communities' involvement in research policy. With the negotiation around the setting of the 1st Framework Programme (FP), the Commission of the European Communities came to formally play a crucial role in the definition of the overall Communities' research strategy – including identification of R&D areas and objectives - as well as in the choice of the coordination, implementation and evaluation methods (CEC 1985: 5-27; Peterson et al. 1998: 56). European institutions have acquired a formal and more substantiated legal competence in the R&D field since the introduction of the 1987 Single European Act (SEA)[123]. After the Lisbon Treaty, EU R&D and technology policy is placed under article 173 of the Treaty of the European Union (TEU)[124] and under articles 179

[122] Art 235 of the Treaty of Rome stated: 'If action by the Community should prove necessary to attain, in the course of the operation of the common market, one of the objectives of the Community and this Treaty has not provided the necessary powers, the Council shall, acting unanimously on a proposal from the Commission and after consulting the European Parliament, take the appropriate measures'.
[123] Art 24 of the SEA added a new title (title VI Art. 130f-130q) to Part III of the Rome Treaty containing primary law provisions ruling in the field of research and technological development.
[124] Title XVII (generically titled: Industry).

to 190 of the Treaty of the Functioning of the European Union (TFEU)[125]. The Treaty of Lisbon is clear in recognizing a shared competence between the EU and MSs in the area of research, technological development and space[126].

Despite the over-expanding nature of research topics and areas having been progressively covered in the last over thirty years of supranational involvement in the research and technological policy field, defence has traditionally remained outside the European reach. A reputed strand of academic literature from different disciplines has categorized defence industries as 'non-traditional' economic units in light of the special characteristics of their markets and productive structures (Hitch and McKean 1960: 1-7; Gansler 1980:29-92; Intriligator 1990; Dunne, 1995; Hartley and Sandler, 1995; Hartley, 2003; Heidenkamp et al 2013a: 3-15, Markowski et al 2010: 82-91). The political dimension permeating defence industrial production reflects the width of roles governments contemporarily play in this field. The security and economic significance of the defence technological and industrial base makes that governments are not only consumers and regulators of these markets (Heidenkamp et al 2013b,d) but also direct sponsors of the defence industry (Heidenkamp et al 2013c). A crucial component of the so-called 'defence industrial sponsorship' is the Governmental support towards research and development activities (Heidenkamp et al 2013c:64). In the United States (US), as well as in a number of countries in Europe presenting a core of military and technological capacity, governments have traditionally provided for the whole of support to the research and development aspects of military production (Hitch and McKean,1960:243-266; Gansler 1980: 97-107; GAO 1994; Mowery 2010: 1221-1228).

Since the research and innovative capacity of the defence industries directly depends on the injection of capital from national governments controlling the R&D process and retaining its security and economic returns, there would exist in principle no incentive for governments to delegate authority in such field to the European Union (EU). Nevertheless, most recently the EC has successfully advanced a number of initiatives having culminated in the adoption of a European Defence Action Plan (EDAP) (EC 2016b). The EDAP (see Ch.7) presents a two-fold architecture comprising a European Defence Fund supporting multinational collaborative research projects (research window) and the development of joint defence capabilities

[125] Title XIX (titled Research and Technological Development and Space).
[126] Art 4.3 TEU.

(capability window) (EC 2016b: 5-11). Research and capability windows stand on politically substantiated governance frameworks foreseeing the development of an EU industrial policy in defence matters.

On the one hand, the research window paves the way to a European Defence Research Programme (EDRP) to be initiated in the next multiannual financial framework (post-2020) with a provisional budget of 500 million euros (EUR) a year. The mean to that end is as of 2017 a three-year Preparatory Action on Defence Research (PADR) that allocated a (total) budget of 90 million EUR to fund pre-competitive research projects run by multinational consortia selected for the purpose according to criteria and rules commonly agreed by MSs (EC 2017a:4,6). On the other hand, the capability window is aimed at pooling and synchronizing national contributions to dedicated capability oriented projects (EC 2016b:10). It has been coherently attached to the development of a European Defence Industrial Development Programme (EDIDP) comprising a provisional EU budget of 500 million EUR for the period 2018-2020 (EC 2017a:4, 9) to be cumulated to expected financial contributions from MSs on the capability development segment.

If the depicted is the present state of development in the nascent EU defence research and industrial programmes, under the auspices of a post-2020 European Defence Fund (EDF), the present case study reflects on the curious antecedent of the European Aeronautics Research case in the attempt to provide, in line with theoretical assumptions formulated in Chapter 3, for a technology-guided explanation of the delayed emergence of an EU military research programme. The following section is reflecting on the political economy of R&D in aeronautical industries.

4.3 The political economy of R&D in aeronautical industries

Aeronautics has been defined as the science of study, design, construction and operation of an aircraft (Gunston 2009:21). Hartley (2014:1) expands the notion to the industrial sector comprising the manufacture of aircraft, related machineries and major assemblies. The aeronautics industry comprises three major parts: airframes (for aircrafts, helicopters, gliders and missiles), engines and general equipment (CEC 1989: 15-12; GAO 1994: 1). A broad classification would include: a) civil

manufacture of airplanes, helicopters, gliders and their accessory parts for the transport of goods and passengers; b) the military manufacture of aircrafts, helicopters, and their accessories for defensive, offensive, trainer, transport/commuter and other special roles; c) aircraft armaments such as guns, bombs and missiles; d) advanced avionics systems integrated with the mechanical and hydraulic part, including electronic and digital components and systems for telecommunication, navigation, sensor, surveillance and flight control purposes (elaborated on Moir and Seabridge 2001; Collinson 2011; Hartley 2014; Kahusik and Hanmaiahgari 2017).

The sector has been regarded as a leading-edge strategic driver globally in a number of countries on the international scene (CEC 1989:section 15-10; Hartley 2006). Its strategic value is attached to the crucial role its industries have come to serve (Libicki 1989: 34, 39). Since World War One (WWI), but most extensively during World War Two (WWII), armed air manned vehicles have traditionally represented a central component of national defence; after WWII, aircraft progressively emerged as competitive forms of transport revolutionizing commercial air travels with jet airlines (Hartley 2014: 16-22). In that timeframe up until the end of the 21st century (e.g. 5th Wave TEP 1-Fig. 3 in Ch. 3), the strategic nature of the aeronautical industry came to progressively reside in both its security and economic dimensions (CEC 1989:section 15-13; Muller 1995b: 159-160; Hartley 2014: 29-32).[127] European aeronautical civil and military production has been mainly shared amongst three countries: France, Germany and the United Kingdom (UK) (GAO 1991; 1994; Hartley 2006: 13). The three European governments have traditionally nurtured capillary ties with the sector with different levels of proprietary engagement in research and productive structures. Despite differences in the models chosen to structure the relation with the aeronautical industry, funding R&D activities, with strong cross-fertilizations between civil and military, has represented a central element of their national industrial policies (Muller 1995b:164).

In light of the strategic potential of the aeronautical industries, governments have intervened in both segments of the sector to support firms to scale up the research and product development phases and 'get to' the commercialization stage (Hayward 1986:26-51,157-193; 1987:16, Hartley 2006:27, 2014:29-43). Governments have allocated consistent national budgetary resources and have taken

[127] The space component has added a further dimension to the air-strategic domain whose research and productive units have been progressively referred to as 'aerospace industries'.

up the risk of R&D investments until the latest product development phases. The amount of public investments needed to sustain R&D activities is something transversal to the two segments of the industry. In both civil and military aeronautics, the average R&D investment needed to translate a concept from design to the prototyping/demonstrator phase is tremendously high because of the complexity[128] of aeronautical technological systems and the development activities comprising an incredible number of validation loops to test technology, and requiring intense investments also in terms of testing infrastructures, such as aerodynamic test establishments, high-speed wind tunnels, pilot testing simulations etc. (Rosenberg 1992:72-75; Hartley 2014; Interviews 1,2)

Investment for the development of a civil aircraft has been estimated at approximately 10 to 15 billion EUR (Hayward 1986: 52; Interview 2). This can reach 20-25 billion EUR for the technological performance of a military aircraft such as the Eurofighter Typhoon (Interview 3). When referring to the total costs of military equipment, one has to consider not only the already vertiginous R&D and production costs but also the total life-cycle costs from operative disposal until maintenance of the aircraft over an average 30-year operation life of the product. Within the life-cycle, there is a tendency for costs to grow by a 15-18% throughout the R&D phases at any given programme in absolute terms. Furthermore, from a long-term perspective, costs also increase in an exponential direction at any given generation of technological systems (Hayward 1986; Hartley 2014). For example, an increase in 5 billion EUR has been calculated between the first Airbus (A300) - which had cost 10 billion EUR - and the 4th generation (A380) - which totalled a 15-billion EUR product development investment (Interview n. 2). For a tactical military aircraft, the ratio is of four out of ten increase in unit costs a year (Hartley 2014: 44). The unit production costs of a tactical military aircraft have been estimated to be rising at about 5% a year in 1980 and at 10% a year just three decades later (Gansler 1980:83; Hartley 2014:45).

Governments have chosen different modalities to support aeronautical champions (Hayward 1986:157; Hartley 2014: 174; OECD 2011: 17-19). Public

[128] The demanding conditions (atmospheric pressure, temperature, structural and aerodynamic aspects) applied to the construction of an aeronautical product resulted in numerous engineering disciplines, from mechanical to materials and hydraulic, from electronics to telecommunications and digital, contributing to the achievement of the technological performance of the aircraft. The interaction amongst these disciplines has forged a new engineering field, namely the aeronautical one that counts on a number of important sector-specific engineering disciplines, namely aerodynamics, propulsion, avionics, materials science, and their combinations.

economic measures such as subsidies, loans, grants, and reimbursement options are examples of such modalities. While economists have usually referred to the economic concept of subsidy, European lawyers prefer to employ the term 'state aid' to embrace its legal notion (OECD 2011: 17). States aid / subsidies comprise a volume of public resources that is potentially channelled towards R&D,[129] to support either a specific programme (direct)[130] or an industrial segment of the economy (indirect)[131] (Hartley 2006:22).

In the civil aeronautical sector, governments have traditionally supported the industry with launch aids in the form of loans subjected to repayment conditions. In essence, governments, in a non-competitive environment, provide the aircraft developer and constructor an advance – the launch aid- which is reimbursed should the aircraft be a commercial success (Muller 1995b:179; Hartley 2014:86, Interview 2). The product development activities of the first Airbus A300 wide body, for example, were subsidised by four governments[132] under a multibillionaire launch aid operation for the pre-financing of its R&D costs. Airbus Industries was created under the French legal structure of the *Groupement d'Intérêt Economique* (GIE) as the international holding company in charge of coordinating the development, production and sale of the designated national contractors (at the time), namely Hawker Siddley Aviation (HAS) for Britain, Sud Aviation (later Aerospatiale) for France and a German domestic consortium (Deutsch Airbus GMbH) for Germany (Economist Intelligence Unit- EIU- 1986b: 46-47; Hayward 1986:53-54; 1987:13). Each participating country generated a bank guarantee with the respective national financial institution to cover through a repayable loan R&D costs according to percentages reproducing the existing corporate shares division of the Airbus Industries consortium (Interview 2)[133].

[129] Other forms include fiscal incentives for the construction of infrastructures, preferential contractual conditions, preferential buying options, public ownership or other forms of proprietary control, favourable privatization conditions, employment incentives, financial support towards exports, sub-contracting limitations, other administrative preferential treatments.

[130] Direct subsidies include public loans and capital grants for the launching of a programme.

[131] Indirect measures may include the financing of non-product-related research activities, especially support for basic research activities into new materials, aerodynamics, and propulsion systems.

[132] Originally, France, Germany and United Kingdom. The participation of the Spanish Government in the programme through the national contractor *Construcciones Aeronáuticas Sociedad Anónima* (CASA) became institutionalized with a separate intergovernmental agreement with the three aforementioned countries ,while the UK Government and British Aerospace exited the consortium at a later stage.

[133] At the time of the development of the first Airbus A300 the shares were: 37.9% Germany, 37.9% France, 20% United Kingdom, 4.2 % Spain.

Compared to capital grants formally legitimating the State as a corporate shareholder, public loans are financing operations falling in a grey interpretative area with respect to the scope of application of State aids (e.g subsidies) restrictions provided for by art 87 and 88 EC Treaty (today TEU) and the EU State Aid regulation. The legal anchor is found in art 87(3) TEU which allows a derogation to State Aid rules if the 'compatible' aid addresses a market failure[134]. According to lawyers, the existence of a market failure though is not itself a sufficient justification for the aid to be considered as legal. State aid should result in the most appropriate response according to an economically refined approach to State aids control, which entails an effects based analysis performed through a case by case balancing test[135] (EC 2005c:18; Hartley 2006:36; Bacon 2009:15,19).

Public aid generated to sustain the development of large civil aircrafts have been since the early 2000s fuelling a notorious international legal diatribe between Boeing and Airbus over the legality of subsidies received respectively by the US government (Boeing) and the governments of Germany, France, UK and Spain (Airbus) for a period of over 30 years. The 1992 bilateral agreement[136] under the General Agreement on Tariffs and Trade (GATT) multilateral agreement set out a commonly agreed limit to 33% of total R&D costs to be sustained by governments *via* launch aid loans, and including indirect support through military contracts and tax incentives (Hayward 1994:58-64). In 2004, the US government unilaterally withdrew from the agreement and filed a case[137] with the World Trade Organization (WTO) complaining over the legality of subsidies corresponded to the Airbus group (WTO 2010:4-8, 762-833; A 2-4, B 2-5). Counter allegations from Europeans, rejected by Americans (WTO 2011:7-9), were included in a new legal case[138], which pointed at the US government's indirect subsidization of Boeing via military R&D contracts for

[134] The economic notion of 'market failure' indicates the incapacity of an economic unit to survive on the market in a condition of perfect competition (Stiglitz:1997:153; Bacon 2009:6-7, 20). Amongst the classic examples of market or public failure one can list States' provision of pure public goods (Stiglitz 1989:38, 45 Stiglitz 2000:77-80) such as national defence; impure public goods or publicly provided private goods (Stiglitz 1989:14, Gruber 2013:183) are also incline to generate market failures. Aeronautical markets remain at the intersection between public (military aeronautics) and impure public (civil aeronautics) goods.

[135] An effects-based analysis of whether or not an aid is compatible with the EU Treaty is structured on a cost benefit analysis of the probable effects of particular classes of aids on welfare and economic efficiency. The EC's effects-based approach towards State aided control has registered a number of shortages with respect to the analysis of aids for R&D.

[136] Agreement between the European Economic Community and the Government of the United States of America concerning the application of the GATT Agreement on Trade in Civil Aircraft on trade in large civil aircraft.

[137] The Airbus Case DS 316: The US Challenge of EU support for Airbus available at https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds316_e.htm accessed on 30/04/2017.

[138] The Boeing Case DS 353: The EU challenge of US support to Boeing available at https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds353_e.htm accessed on 30/04/2017.

over 5 billion dollars (USD) for the development of the aircraft B737 and for over 13 billion USD for the development of B747[139] (WTO 2011:4-39, 76-101, 781ss; B 3-15). The dispute (still open as of today) led to the verification of cross-evidences of the illegality of subsidies received by both parts in the development of various versions of Airbus and Boeing aircrafts.

Governmental support towards defence aeronautical R&D activities in Europe has traditionally remained outside the legal competence of the European institutions in light of the non-civilian nature of the operation. Governments have traditionally placed the military R&D contract in a limited/single source environment on a non-fixed costs reimbursement basis with few companies bidding and in many cases being awarded the full procurement and maintenance contract, comprising R&D activities, across the whole product life-cycle. This practice left the defence industry, and the military aeronautical industry as part of it, in a very privileged position as non-fixed cost reimbursement clauses eliminate any risk for the contractor to have to return loans or sustain expanding development costs (Gansler 1980: 97; Interviews 2, 3). Defence aeronautical industries had indeed low incentives to abandon the business not only because of the low risks connected to R&D activities, but also because of the high prices of the technological performance and the prospect to get extra gains from further technological requirements added to the initial technical specifications over the long life of R&D operations (Gansler 1980: 75-79, 92-93; Interviews 2, 3).

Furthermore, the comfort of operating in a monopolistic market presenting high barriers to entry and the concentrated nature of the R&D environment with consistent investments allocated, at least until the end of Cold war, to the military segment of the aeronautical industry, represented an additional aspect incentivising companies to remain linked to the military market (Interviews 3,4). Last but not least, as a peculiarity of the first TEP further analysed in the next section and in the course of Chapter 5, military R&D investments in aeronautics, most prominently concentrated in Europe within major intergovernmental cooperative armaments programs (see: cases of the 1982 Panavia Tornado, and the 1998 Eurofighter Typhoon), have progressively 'spun out' to the civil sector, responding to a governmental strategy, initiated in the US and followed up in Europe, to support a

[139] Europeans alleged that the US Government was providing indirect subsidies of 23.7 billion dollars (USD) through 8 National Aeronautics Space Administration (NASA) programmes and 23 Department of Defence (DOD) Research, Development, Test and Evaluation (RTD&D) project elements (WTO 2011:10).

strong internationalization of aeronautical markets with the aim of gaining economic returns from commercial economies of scale, and feeding back, in turn, the military machine (Interviews n. 1, 2, 4, 9, 27, see Ch. 5 for an analysis of the creation of national defence champions).

The referred 'market failure' of civil aeronautical markets, if compared to the military sector, covers only the early phase of new project development activities due to the difficulty to collect such an amount of money in the capital markets. Once commercialized, the civil aircraft should in principle reach a position of economic profitability, generating economic returns due to the larger commercial spaces of the civil airlines markets. In the aforementioned Airbus A300 case, for example, although one of the four contractors, Deutsch Airbus GMbH, did not initially reach the agreed payback level, and thus the German Government had to sustain 650 out of 700 million US dollars loan to be returned to Deutsche Bank, the product and its variants (A 300-B1, B4, B10, 300-600), passed from a market of 4 deliveries in 1974, to a market of 46 deliveries in 1982, and a total of 561 deliveries between 1974 and 2007 (its full life cycle) (Interview 2). The launch of a more advanced technologically performing aircraft (A310) in 1978 was oriented at positioning Airbus as a major player in the aircraft market; the aircraft had over 400 orders before it first flew, compared with 15 for the A300 in 1972 (Interviews 2, 5).

In further support of the argument, one could observe that the containment of the market failure in civil aeronautics is also reflected in the decreasing-cost nature of the civil aeronautical industry (Hartley 2014; Interviews 1, 2). An industry with decreasing costs is an economic sector where every unit of cost - development, production or other life-cycle cost - declines with better and larger individual and cumulative outputs generated (Stiglitz 1989; Hartley 2014). The decreasing cost-effect can be explained considering the centrality of the same R&D factor, which plays a crucial role in generating better product and process performances as well as in facilitating the generation of larger product volumes that are important to ensure increasing levels of economic profitability (Interviews 2,6). Indeed, in capital-intensive economies, such as those characterizing the high-tech aeronautics sector, R&D investments are constantly needed because learning effects derived by scientific and technological advancements get reflected in the intensity of the innovation rate as well as in the overall performance of the company (Interviews 1,6). R&D activities

can lead to the discovery of new materials or properties, to the refinement of production techniques, to the development of processes for efficient cost estimation (see next section 4.4).

While both civil and military aeronautic are capital-intensive high-technology sectors, the rationale beyond their logics of functioning has proved different. R&D investments in the civil aeronautical industry are made in a view to respond to objectives of productive efficiency by cutting long-term costs and improving production and organizational processes to deliver competitive products and increase production volumes to access economies of scale and maximize economic outputs (Interviews 1, 2, 6). In the case of military aeronautics instead, R&D investments have mainly aimed at elevating and perfecting the output of the technological performance, irrespective of the costs incurred (Gansler 1980: 94; Interviews 1, 2, 3). As observed earlier in the section, there is a tendency for costs to grow in absolute terms within a life-cycle and in exponential direction across life-cycles at any given generation of technological systems. Under this first TEP, the exponential growth of costs connected with military product development activities has become a problematic issue because a state-of-the-art technological performance has traditionally embodied the primary goal beyond the development of new systems of weapons in military aircrafts (Interviews 1,2,8,9,10). Significant increases in the technological output at each generation of weapons also meant increases in the unit of costs, not decreases, in the absence of economies of scale and in the light of the purposive rationale of R&D investments (Interviews 1,8,9,10).

It is sensible therefore to offer that, provided that both (civil/military) segments of the sector are characterized by the presence of the government in the special ‘double vest’ of sponsor and purchaser, an important element of departure exists in their underlying functioning logics. As it will be further documented in Chapter 5 to complete the analysis of TEP-1, the R&D-driven economic profitability feature attached to civil aeronautical markets progressively incentivized governments, on both sides of the Atlantic, to push for their internationalization and to consequently promote the consolidation between civil and military businesses within joint structures (e.g. aeronautical national champions). While such governmental strategy has clearly allowed capitalizing the innovation potential of the aeronautical sector by re-investing expanded commercial profits back into new military R&D activities, it

also indirectly contributed to a progressive corrosion of a long standing model of economic organization of society which has traditionally stood on the linearity (military-to-civil) of the innovation machine (e.g. where the military controls the pace and direction of expansion of the civil economy). The next section reconstructs major technological developments having impacted on the aeronautical industry in the timeframe under consideration with the aim to keep illuminating the characteristics of the first techno-economic paradigm (TEP-1) governing the functioning of military aeronautics markets, which have been steadily influenced by the philosophy and standards in use in the civil aeronautical sector. As it will be offered, the end of Cold war qualifies as a 'further' incentive under the techno-driven explanation.

4.4 Converging technological routes integrating TEP-1

This section reconstructs technological advances that struck the aeronautical sector in the decades that preceded and followed the end of the Cold War, exploring their broader political and economic implications. Developments analysed here concern a set of scientific breakthroughs and technological advancements comprising the discovery of new properties in materials and the development of new structural materials, as well as the related introduction of new techniques aiding design and industrial manufacturing processes and their computerized applications. From the late 1970s[140], namely in the wake of the 5th wave (See TEP-1 Fig.3 in Ch.3), a rich combination of materials, product, and process innovations registered an unprecedented impact on both segments of the aeronautical sector in its most critical technological domains, including aero-structures, engines, aerodynamics, avionics, software manufacturing, hydraulic systems (Freeman and Soete 1982: 158-187; Malerba 1985: 3-40; Interviews 1,2,7). The advent of ICT also mattered significantly for the evolution of the aeronautical industry (Forester 1980; Interviews 1,2,7,8,9, for a complete analysis of ICT-related developments see Ch. 5).

A first major advance in the aeronautical field was marked by the discovery of new properties in materials and by their incorporation into advanced structures. High-

[140] It is undeniable that a share of technological innovations that mattered for the future evolution of aeronautics – especially in the area of micro-electronics, telecommunications and information technologies - originates from inventions which occurred in the 1940s and 1950s of the calibre of transistors, superconductors, electronic computers, silicon-chips, integrated circuits and glass fibres, already received a certain degree of anticipation.

temperature advanced ceramics (substances shaped and hardened by the heat), carbon and glass mixed fibres, aluminium-lithium alloys, polymers and hybrid components belong to a family of materials named 'composites[141]' that completely reshaped the world of engineering possibilities in the field of aeronautical design structures, manufacturing, propulsion (namely engines), aircraft electronics and hydraulic systems (EIU 1986a: 44; 1986d: 40-41; CEC 1989: 31, 34; Williams and Starke 2003; Campbell 2010:18; Interviews 1,2,6). As composites derive from the consolidation of many old parts into a new entity, the physical and chemical transformation reduces the parts count and consequently their costs, resulting in a more compact, lighter and cost-efficient design structure in comparison to traditional materials, especially steel and aluminium (EIU 1987b: 40; Cantor et. al. 2001; Interviews 1, 6, 7).

In 1988 the US Office for Technological Assessment (OTA) estimated that materials accounted for 30 to 50% of the costs of most manufactured products, 60% if considering operational and support costs (OTA 1988a: 1, 34, 121). The use of advanced and composite materials, indeed, has been linked to tremendous increases in the structural and operational performance[142] of the aeronautical and aerospace sectors (Flower 1995; Cantor et al. 2001; Uleck at al 2002: 1134-35; Williams and Starke 2003: 5777-5779; Strong 2008; Interviews 2, 6). The commercial prospects in terms of opportunities for cost-effective/high performing innovative design and process techniques have not remained unnoticed (EIU 1987b: 40-45).

Composite materials became increasingly central to aeronautical markets. In Cold war times, R&D investments in these materials remained justified on military grounds, as these technologies were of primary importance for national security. The military segment of the market for high performing aircrafts had traditionally driven the R&D activities, also in this strategic technological domain (US-OTA 1988a: 190-191), and research in new materials was essential to guarantee the superior technological performance of the military aerial vehicles (e.g. linearity of the

[141] In materials engineering science, the word 'composite' refers to a new solid material made of two or more constituent components with significantly different physical and chemical properties bounded together by a common matrix or binder that surrounds and holds in place fibrous or particulate reinforcements (Uleck et al. 2002:1132; Strong 2008:1; Campbell 2010:1). The matrix gives shape and protection to the structure while reinforcements provide for mechanical properties and fibres' direction (US-OTA 1988a, Strong 2008, Campbell 2010, Interview.6).

[142] Cost efficiency indeed adds to an incredibly rich set of properties which characterize composites, namely high strength, stiffness, malleability, low-mass, light-weight, high levels of resistance to fatigue, lower exposure to corrosion, as well as the physical capacity to store and release energy, display fuel efficiency, ensure longer prospects for life service of manufactured products (US-OTA 1988a; EIU 1987b:40; Zweben 2002:359-360; Uleck et al 2002: 1146; Campbell 2006:9-10; 2010:14-17, Interviews 2,6,7).

innovation machine) (US-OTA 1988a: 83-84; Interviews 6, 7; See also: TEP-1 Fig. 3 in Ch. 3). It is indicative to report that in the early 1980s the US had a position of global leadership on the development of advanced composite materials, and that in 1987 the US Department of Defence (DoD) sponsored 60% (namely, 98 million USD) of the federal research budget on composites-related research (US-OTA 1988a: 269). In the same year, it was estimated that the US aeronautical consumption of composites would grow by 8.5 % a year and cover half of the total US composites production in less than 4 years (US-OTA 1988a: 83).

The reference to the United States is crucial to understand Europe, where the intersection between civil and military aeronautical markets was exploited with a higher degree of intensity. It is reported that, although military aeronautical research was mainly aimed at investigating special properties such as operating temperature, high toughness, lower radar observability and reduction in weight, a strong overlap in basic research activities existed for technological domains covering the development of airframes, engines, aero/thermo/fluid dynamics, in which the civil and military performance requirements were similar (US-OTA 1988a: 27-28; Braddon 1999: 81-88; Interviews 1, 2, 5; 7, 8, 25). In a way, although existing and informally exploited before the end of Cold War (see the reported cases of the military subsidised Airbus and Boeing), the convergence between civil and military aeronautical research needs was overshadowed while the Soviet threat still existed, with the consequence that technological requirements of military markets and the imperative of the superior technological performance formally drove the pace and direction of the innovation economy (Interviews 1,4,6,8). Consistent with the theory provided in Chapter 3, it is argued that the end of Cold war simply played as a further, not major, incentive of a process already initiated since the rise of TEP-1 (5^{th} wave), which celebrated the intensification of R&D cross-fertilization opportunities and the vertiginous expansion of the commercial aerial markets to feed back into the military innovation machine (Gummet and Reppy 1988: Ch. 1, 6; US-OTA 1993; Gummet and Stein 1997:19-24; Interviews1, 2, 8).

In the US, unlike Europe, where significant investments on military research were performed, the government pushed, in the context of a political strategy comprising the preservation of a competitive defence technological and industrial base (US-OTA 1988b; 1989; 1991a; 1991b), to the complementary direction of assessing the implications from large scale commercial applications of composites

(US-OTA 1988a) under multimillion research programmes as the one developed, under President Reagan's political support, in close collaboration between the US Department of Defence (DoD) and IBM laboratories, and making the ground-breaking scientific discovery of warm superconductivity[143] in advanced ceramics (EIU 1986a: 44; 1988b: 37; 1989a: 37-41; US-OTA 1988c). In a changing security scenario, the economic implications deriving from the extension (or 'spin out' according to technical military vocabulary) of R&D investments in advanced materials and technologies to commercial markets were subjected to an articulated estimation: it was calculated that in less than a decade the value of components produced from advanced structural ceramics would increase by 20 billion USD, considering only materials and structures. When considering the finite product, the estimated value went along the range of having a dramatic impact on gross national product, balance of trade and employment (US-OTA 1988a: 83).

Read towards Europe, the US decision to commercially exploit military discoveries and innovations, as in the illustrated case of composites technologies, was motivated by the intention to preserve an economic competitive posture on the global scene before the top-competitors Japan and Europe (Interviews 4, 5). Progressively, the US loss of competitive positions in new technologies was reflected in the changing balance in patent applications (as an R&D output indicator). While in the beginning of the 1980s, the number of applications of US patents in Europe in the field of Aeronautics and Astronautics was still much higher than the rest, in the second half of the decade the EU/US balance started to converge with a 124 (EU) versus 147 (US) patents applications between 1987 and 1989, with a +2.2 points for the Europeans with respect to the 1984-1986 period (CEC 1993: 87). More specifically, in the field of advanced materials, Europeans came to beat the Americans with a 27 (EU) versus 21.3 (US) share of inventions in the period 1988-1989 (CEC 1993: 92).

The stronger competitive position reached by European civil aeronautical firms was also reflected in the growing aeronautical investments, as well as in the larger economic profits and consolidated turnovers. In 1993, France, Germany and the

[143] Superconductivity is the capacity of certain composites to transmit electrical current without resistance. The discovery of superconductive properties in advanced ceramics can be regarded as one of the most crucial materials innovation having shaped the entire face of aeronautical production and having contributed to ground-breaking developments in the field of aero-structures, engine systems and avionics, missiles and arms propulsion systems; it was also at the heart of the development of space technologies such as shuttle structures, space power transmission systems, rocket engines etc.

UK had totalled an over 5 billion ECU investments in aeronautical R&D against the +1 billion generated by the US (CEC 1996: 171, 209-216)[144]. Germany, for instance, quadrupled the amount of R&D investments from 1983 until 1993, reaching a sum of 2.5 billion ECU in 1994 (CEC 1996: 201; CEC 1997a: 213). In 1996, roughly 8 billion ECU (18.3% of the total European aerospace consolidated turnover) was spent on R&D activities[145] (AECMA 1997:10). According to an annual survey conducted by the Commission of the European Communities' DG III, in 1994 three of the first ten aerospace manufacturers were European, namely DASA Daimler Benz, British Aerospace, and Aerospatiale, and generated an annual turnover of over 25 billion ECU against the 18.4 and 19.3 of Boeing and Lockheed Martin respectively (CEC 1996: 234). In 1994, the total aerospace turnover consolidated at the Community level on a figure of almost 35 billion ECU (CEC 1996: 180), while only 2 years later it reached 44 billion ECU with a trade balance of +22 billion ECU (AECMA 1997: 4) and 66 billion ECU in 1999 with a trade balance of +44 billion ECU in 5 years (AECMA 1999:11). In 1996, 35.6% of the aircraft product segment (44.7% of the turnover) was covered by large civil aircrafts and 34.6% by the military aircraft production, while of the total EU aerospace turnover, space products covered 10.5% (AECMA 1997:6). In less than a decade, 64.3% of the European turnover was generated by sales to the civil market versus a 35.7% share covered by the military (ADS 2003 quoted in Hartley 2006: 51).

In a TEP scenario for aeronautics dominated by advanced materials and composites as new structures, it became essential to ensure that the design and manufacturing processes were controlled and integrated via advanced methodologies and processes suitable to determine ex ante R&D requirements for intermediate and final structures (EIU 1986a: 43; 1988b: 35-37; Vos et al. 2003: 605, 609, 660; Interviews 2, 6). For this reason, new design and manufacturing methods became an integral part of the intelligent use of new materials, to which it went closely attached product performance optimization objectives such as, inter alia, the minimization of production times, costs, and margins of error, the shortening of production cycles versus the extension of the product life duration via diversification, personalization and customization targeted strategies (EIU 1986d: 35; 1989a: 27; Uleck et al 2002:

[144] Figures report aerospace products comprising complete aircraft systems, engines, equipment and space products. Space products include space vehicles, their engines and equipment, satellites, launchers, ground installations.
[145] 3% was reserved for space research.

1146; William and Strake 2003: 5775-5776; Interviews 4, 6). It became essential that new machines and new measurement methods could offer the appropriate technical support in the integration, in the military too, of a philosophy of the *'timelier, cheaper, and better'* which could replace a previous doctrine of the '*higher, faster and farther'* (EIU 1986a: 41, 43; 1987a: 35-36 Raj 1998; Murman et al. 2000). Inventions of the calibre of the computer programme CATIA[146] developed in 1977 by Francis Bernard from the French aircraft military manufacturer *Avions Marcel Dassault* to support the 3D design of military airplanes[147] have tremendously impacted on the competitive performance of the aeronautical industries (Interview n. 2) in the context of the analysed TEP.

Indeed, computer-based design programs such as CATIA can mathematically process and integrate information deriving from different and multidisciplinary sources, into formal performance optimization models, making obsolete the idea that one needs to make physical tries to push the trajectory of the technological performance forward (see the example of the use of wind tunnels for testing aircrafts). A computer-based approach furthermore promotes an integrated product and process development (IPPD) model, where the R&D and production phases are linked through the virtual anticipation (via modelling and simulation) of the design and productive reality minimizing structural and aerodynamic risks, and making more reliable, because predictable, the quality of the whole product development process (Bakerjian 1992; Raj 1998: 9; Interviews 1, 2).

Such considerations are deeply connected with another major chapter in the history of the aeronautical, and of the military sector *tout court* considered, namely the revolution in Information and Communication Technologies (ICT) and its impact on the consolidation and modernization course of defence industries. While a detailed account of such developments will be provided in the context of Chapter 5 (section 5.2), illustrating the incidence of technological changes on consolidation dynamics within the defence industrial sector, the present section concludes spending a circumscribed reflection on the incidence that ICT-related innovations played on the evolution of the aeronautical industry under TEP-1.

[146] Which stands for Computer Aided Three-Dimensional Interactive Application (in French: Conception Assistée Tridimensionnelle Interactive Appliquée).
[147] The programme built on previous experimental research advanced with the UNISURF programme developed by Pierre Béziers at Renault and designed to assist car body designing and tooling. CATIA and UNISURF helped to connect R&D more efficiently to the production stage.

In first instance, the advent of microprocessors and data transmission/surveillance systems impacted on both sides of the aeronautical industry, both at the level of materials innovation and of IPPD processes (Interviews 1,9,10). At the time, in the early 1980s, a number of major cooperative investments in defence aeronautical programmes in the US and Europe had been already agreed and many ICT-related technologies, including the first software applications and data systems for transmission, store and control, had to be retrofitted into the military. It has been reported by senior military engineers that integration was very difficult because governments had already technically defined with the other partners the specific programme requirements (Interviews 1, 9, 27). For example, digital control systems that eliminate the connection between pilots' mechanical actions and the aerial vehicle's response, known as 'Fly by Wire' technology, were first tested on missiles, and only subsequently on military aircrafts, due to the difficulty to integrate digital, telecommunications and surveillance functions (Interviews 1, 7).

The disruptive nature of some later digital innovations requiring large corporations to integrate hardware and software components into smaller and smaller products, or even to generate completely new product concepts, such as for example virtual products, in rapidly changing markets with technologies getting obsolete at a higher speed, seriously affected the capacity of the European military aeronautical industry to cope with reversing, namely civil to military, innovation trends, and take advantage of commercially-driven global technological innovation inputs in the military sector (Interviews 1, 9, 10). As it will be illustrated in Chapter 5 (section 5.2) disentangling the technological significance of defence industrial consolidation activities under TEP-1, technological systems and business integration activities have progressively acquired a central importance in delivering the advanced functional and operational performance of aeronautical and aerospace industries. These industries, that embodied a top-strategic asset for the defence sector under TEP-1 and TEP-2, have traditionally endorsed and promoted a linear model of technological innovation, which reflect the notion of long-lead product-dependent development. With such notion, military engineers and managers normally refer to a product development approach centred on the progressive iterative development of different components and architectural systems, integrated into platforms via modules, which can be cumulative or replaceable, depending on the specific operational function. Such an approach based on the iterative and independent integration of different modules

allows following a linear continuous trajectory during product development activities, which exposes indeed the functioning of the overall structure to minimal disruption risks (Interviews 1, 9,10, 27). As it will be explained in Chapters 5 and 6, the need to keep up control over the direction and pace of innovation activities brought governments of arms- producing countries in US and Europe to follow a specific strategy in the integration of technological change in the arms industry in an attempt, to avoid exposing defence strategic assets to the disruptive nature of certain innovations coming from the commercial world.

Technological developments illustrated in this subsection have provided for a first account of TEP-1 from the perspective of the most strategic segment of military production in the timeframe under consideration, namely aeronautical production. The characterization has included an analysis of breakthrough innovations occurred on both sides of the aeronautical industry in materials and process technologies, and marking an increasing degree of convergence and cross-fertilization opportunities between military and civil aeronautical technologies. It has been furthermore acknowledged how the emergence of a new cluster of technologies, the ICT-related ones, has played on the one hand a crucial importance in further advancing the IPPD model in aeronautical production, while, on the other hand, it unveiled an emerging set of weaknesses/criticalities in the traditional model of innovation based on the primacy of military-led R&D processes and the iterative product development activities.

While a comprehensive characterization of TEP-1 will be completed in Chapter 5 illustrating in depth the origins of the ICT revolution and the governmental responses to preserve the competitiveness of the defence industry in a changing techno-economic environment, the next section will concentrate on testing both layers of the proposed theory. The next section will reconstruct the fascinating early political history of the European Aeronautics Research Programme (EARP). The programme, inspired by a farsighted political vision, which wanted more Europe in military R&D cooperation, has been advanced under the policy entrepreneurial aegis of the European Commission (EC), which came to play strategically during negotiation activities by capitalizing on the political ambiguity circumscribing the, at the time, high degree of convergence/duality between civil and military aeronautical technologies, and proposing a civil programme to promote military research. Despite the purposive and wisely elaborated negotiation strategy, the EARP did not manage to

deliver the military dimension originally inspiring its early conception. The case study indeed provides evidence of an accomplished civil output, testing the unaccomplished socio-institutional adjustment in the defence institutional architecture (layer 2) in the lack of a completed shift in TEP (layer 1).

4.5 The curious antecedent of the European Aeronautics Research Programme

Given the historical economic importance and the element of industrial cooperation characterizing the sector, aeronautical industries have been for long time under the radar of the EC that has progressively tried to expand its competence in the direction of a research and technology policy, to address strategic industrial domains for Europe (Hayward 1994: 349; Interviews 1, 5). Before technological developments reconstructed in sub-section 4.4 came to change the functioning of the aeronautical sector, the model of organization for military production activities under TEP-1 represented a major obstacle to the convergence of political incentives for a concerted action/policy initiative to be initiated at the European level. Certainly, during the Cold war, no institutional actor on the politico-economic scene in Europe represented a valid interlocutor for the EC (Interviews 1, 2, 3, 5). Until the 1980s, indeed, the aeronautical industry on both sides of the Atlantic was firmly tied to the arm of governments that provided, directed, and controlled the totality of R&D investments in the aeronautical sector, with a sharp prevalence for military contracts (Interviews 1,2,4). In addition, governments of arms-producing countries in Europe and the US had progressively started to capitalize growing synergies between military and civil aeronautics technologies subsidizing from the military source the commercial segment of the market (see commented Airbus and Boeing cases), and preparing the construction of national aeronautical champions (for a more detailed account of domestic industrial consolidating experiences see Ch. 5) (Interviews 1, 4, 9,10).

In the process having led to the creation of (dual-use) national aeronautical champions (see Ch. 5), a significant input was provided by the tremendous economic success registered by the civil aeronautical consortium Airbus, and its impact on the decreasing competitiveness of the US aeronautical industry. Before the beginning of the 1980s, indeed, the '*enfant prodige'* Airbus had already, with the A300 variants,

penetrated the American market with 23 orders received on the A300B4 with options for a further 9 B4s and 25 B10s from Eastern Airlines (CEC 1978: 211 Annex 1). In less than a decade, the European civil aeronautical product became a consolidated reality, registering a European growth from 18.5% in 1970 to 52% in 1980 against American production, and inaugurating a history of commercial successes into the global airlines market (CEC 1989:384; Interviews 2,5,6). The impressive expansion of the European civil aeronautical markets under the pace of technological discoveries illustrated in subsection 4.4, and reflected in the growing number of EC patent applications and the exponential rise in European companies' turnovers, came directly to alarm the aerospace scientific and industrial community on the other side of the Atlantic Ocean. In the face of a more articulated US political strategy which aimed at maintaining an economic competitiveness posture while preserving the strategic hedge of a strong defence technological and industrial base (see Section 4.4), and in light of the growing importance space research was registering within the portfolio of the National Aeronautics Space Administration (NASA) activities, the American aeronautics community found itself in a difficult position of having to demonstrate to the US government that there was still a strong case for federal investments in aeronautical R&D (Interview 4). Suddenly, the American aeronautical industry and its technological potential had to come under a new political light.

During the late 1982 and early 1983 discussions were held between the Aeronautics and Space Engineering Board (ASEB) of the US National Research Council (NRC) and NASA's Administration Office of Aeronautics and Space Technology regarding the idea that a comprehensive study of the potential of aeronautical research and technology development could provide for a long range guidance for R&T programmes (US-NRC 1984). Indeed, in 1983 NASA asked the Aeronautics and Space Engineering Board (AEB) within the US-NRC to organize a workshop to provide an opportunity for scientists to come together and project the state of knowledge and capability in specific technological areas by the year 2000 (US-NRC 1984). The underlying objective was to create a political case supported by valid scientific and technical justifications for receiving additional investments from the Federal government towards aeronautical research and development activities (Interview 4). Shortfalls and gaps, in tandem with the need to improve the aeronautical 'state of the art' in R&D were highlighted in each of the technological domains assessed, with specific concerns expressed about the need to maintain a large

spectrum of research activities in the field of advanced materials, as well as to create and adapt new concepts to integrate systems and virtual technologies to traditional manufacture processes (Interviews 4, 7). The NRC report came in 1984, when major assessments were in the process of being made by the US government, via extensive studies conducted by the US Office for Technological Assessment (OTA), in the sense of seizing options and opportunities to develop a more generalized case for commercializing discoveries and innovations being generated in the military (US-OTA 1988a,c; 1989). It is sensible, therefore, to hypothesize that the need for additional funding to be allocated to aeronautical R&D activities highlighted in the report would have possibly been met, if in line with the idea of giving a political response to the growing commercial importance of the European civil aeronautical product, by launching, on a politically significant and rapidly evolving technological terrain, a commercial challenge to the Europeans (Interviews 4,5).

These developments did not leave Europe unresponsive. Commissioner Karl Hanz Narjes, who was in charge for industry, science and research under both Gaston Thorn's Commission (1981-1985) and Jaques Delors' Commission I (1985-1989), developed an interest in the aeronautical sector. Once appointed Vice-president of the EC under the first Delors' mandate, Commissioner Narjes seized the opportunity to shed new political light on aeronautical research. Since the early 1980s, supported by a member of his Cabinet and by a senior EC's official and national expert with previous experience in the field of defence aeronautical research, much attention had been focused to the particular situation of the European aeronautical industry (Interview 5). Despite the commercial success of Airbus, countries were increasingly reducing their military cooperation budgets and funds available for military R&D projects were decreasing (Interviews 1, 4, 8); at the same times, tensions were arising for defence technologies that were needed and were no longer affordable with a direct negative impact on the competitiveness of Europeans (Interviews 1,4,10).

Fully cognizant of the direct and strong link existing between aeronautical technologies and national security, the Commissioner and his two advisors came to the conclusion that a prospective change in the geopolitical scenario was likely to incentivize governments, in the absence of a formal political justification, to rely more on dual use technologies, in the aeronautical field highly intersecting, and keep subsidizing the military machine with incomes generated on commercial markets,

acknowledging that need to keep investing in expensive military technologies for national defence would not disappear completely (Interview 5). Furthermore they recognised the strong element of competition with the Americans and their plans to increase support for aerospace research and push the technological frontier in their own advantage (Interviews 4, 5). In a way, these developments directly exposed the capacity of the European aeronautical industry to keep generating, in a prospective decrease in military R&D funding, cutting edge advanced technologies and products (Interview 4). The strategic plan elaborated envisaged the promotion of a supranational cooperative research scheme to develop, under a collaborative dynamic framework, new aeronautical technologies leveraging on the dual use channel (Interviews 4, 5). The short-term political strategy envisaged an aeronautical programme that, under the formal veil of a civil effort and ambiguously playing on the strong element of intersection between civil and military aeronautical technologies, could support bottom-up collaborative R&D projects to pursue joint military objectives. The long-term political vision, instead, would have contemplated the creation of an autonomous supranational structure– at the time envisaged in the model of a 'Euro NASA' – to promote the development of a defence technological and industrial capacity (Interview 5). In other words, if the market-oriented approach was the instrument formally placed at the heart of the EC's political strategy, the long-term objective rested on the purposive determination to attach the construction of a competitive European Defence Technological and Industrial Base (EDTIB) to financing of common aeronautical R&D projects (Interviews 4,5).

With such a political vision in mind, the Commissioner and his two advisors created an informal senior advisory panel comprising a selection of three national personalities, namely Sir Frank Cooper, British civil servant who, at the time, was the UK Ministry of Defence's permanent under secretary, Herbert Curian, French senior scientist from the French Ministry of Defence whom later became Minister of Research in France, and Gero Madelung, German professor and CEO of Messerschmitt-Bölkow-Blohm (MBB) GmbH[148]. The 'three wise men' - a real prime to the of '*group of personalities*' concept formalized in the later history of the European aeronautics programme and a constitutive component of the governance of the EU security and defence research programmes - provided the fiduciary liaison

[148] As illustrated in Chapter 5 the company that later merged into DASA.

with the national authorities and the aeronautical industrial base (Interview 5). When the Triad spoke to national authorities in the three countries the reality was not recognized, as there was a tendency from the three sides to fear inappropriate intrusions as an expression of excessive 'European enthusiasm' (Interview 4). The only option left was to play strategically on the side of the industry to weaken big countries' governmental barriers and, at the policy-making level, directly with the small countries (Interview 5).

Having the conviction that such reinforcement of European cooperation was needed, two informal meetings were organized between 1985 and 1986 where Commissioner Narjes, through the support of three senior intermediaries and the two internal advisors, invited top executives of the aeronautical companies to discuss, over a dinner table, the future of the European aeronautical industry (Interview 4). Narjes relied upon an immediate exposition of his formal thesis, which was that America was organizing itself to make the best cooperative advances in aeronautics and that was going to have a massive impact on the competitiveness of the European aeronautical industry. Despite the short time frame separating the two meetings, a palpable change in the attitude of the industrial leaders was displayed. While at the time of the first dinner, industrialists could still confidently rely on safe and abundant financial support by their national governments and openly manifested reluctance to the idea to have to abandon a 'low risk-high gain' situation by possibly embarking on the uncertain European route, by the time the second meeting took place, the three ministries had already projected to their national industries an upcoming restrained financial reality and openly pushed the industry to find ways to extend their own sources of financing for their R&D activities (Interview 4). Industrialists soon came to the conclusion that a deteriorating supply of government money on the defence industrial side would directly impact also on the civil segment of the industry and affect their global economic competitive posture (Interviews 4,5).

In this sense, an EU supranational aeronautical research programme progressively emerged as a concrete solution to financing problems affecting European governments and the future of their aeronautical industries. Following the initial steps, positive progress came after the important political agreement achieved in 1986 at the second dinner meeting between the EC and the industrial executives of major European aeronautical companies, in the sense of launching a dedicated study,

in response to the previously mentioned US initiative (NRC 1984), to scientifically evidence the research and technological needs of the European aeronautical industrial base. The European Cooperative Measures for Aeronautical Research and Technology (EUROMART) Report (CEC 1988a) prepared for the EC by the major aeronautical companies in Europe[149] documented in technical terms the R&D and technological long-term requirements and existing gaps affecting the development of a competitive aeronautical technological capacity. As the technical orientation of the Report could in principle sustain both economic and security objectives - as R&D needs were essentially relevant for both markets - the strategic decision to prepare a technical study capitalized on the convergence amongst interests of political and economic actors, which were ultimately seeking financial support to reach either one or the other objective. In this light, it proves sensible to believe that the EUROMART Report set the politico-economic foundations of the European Aeronautical Research Programme (EARP).

In support of this technologically guided explanation, it is observed that identified key R&D gaps and requirements overlapped in both civil and military markets with those materials, ICT related and process innovations having been analysed in subsection 4.4 (CEC 1988a: 25-27, 34, 48, Appendix C and G)[150]. Technical considerations framed in the EUROMART report recall the point already made concerting the cost-saving and value-adding features of technological innovations under comment (CEC 1988a: 33-38), and justifying the need for common measures to keep supporting technological change and maintaining leading-edge positions in the competitive performance in expanding global markets (CEC 1988a: 29, 41). The military significance of the requested EU investments in aeronautical research and technologies becomes clear in the EUROMART report, when amongst types of aircrafts of importance for the competitive future of the European aeronautical industry, subsonic and supersonic military aircraft were explicitly included in the study's analytical categorization (CEC 1988a: 57 Appendix B).

A new approach to cooperation foresaw the need to include a common budget, increasing the current level of expenditure of 370 million ECU by 25% a year to match the requirements indicated and keep promoting enhanced cooperation and set a

[149] Aeroautical enterprise part of the Euromart study were Aeritalia, Aerospatiale, Avions Marcel Dassault-Breguet Aviation, British Aerospace, CASA, Dornier, Fokker, MMB and SABCA.
[150] Namely, advanced materials and structures, aerodynamics and propulsion systems, advanced design and manufacturing technologies, and computerized systems.

target value of 50-60% above current annual expenditure (CEC 1988a: 29, 48, 52). Proposals contained in the report indicated a selection of 9 out of 60 candidate projects for new cooperative programmes (CEC 1988a: 49, Appendix E). In a first phase, nevertheless, the EC preferred to support a more general approach towards precompetitive research rather than a market-oriented funding structure (CEC 1988b: Technical annex: 28; 1988c: 17 n. 294; Hayward 19994: 354, Interviews 2, 6) because such an approach would have contained possible distortive interferences from governments in the industry, promoting instead the option to keep open the frontier for new market possibilities. The basic-research-oriented model reflected, in legal terms, the structure of the fortunate experience of the European Strategic Programme for Research and Development in Information Technology (ESPRIT)[151], which worked as a successful research policy model and a real model of research programme, providing for a 50% EU coverage of total costs, including overhead costs sustained by selected research consortia retaining the 100% of intellectual proprietary rights (Stajano 2006: 294; CEC 1988b: 35; Interview 22).

As to the legal accommodation of the nascent EARP, the political solution proposed, also endorsed by the Council of the European Communities the same year the EUROMART Report was published, went in the direction of launching a pilot project dedicated to aeronautical research (Commission of the European Communities 1988b: 393) in the context of the already running Framework Programme (FP) 2 (1987-1991) by creating a new thematic area (Area 5 Aeronautics) under the existing BRITE-EURAM[152] research programme with an initial budget of 35 million ECU (7% of FP2). Programmes like BRITE-EURAM were key in the development and application of advanced materials and composites, which as evidenced in sub-section 4.4 had a tremendous impact on the performance of the aeronautical industry. FP 3 (1992-1994) inaugurated an independent chapter for the European Aeronautics Research Programme (Area 3 of the BRITE-EURAM II). After the positive evaluation of the specific activities relating to aeronautics carried out under FP 2

[151] There was a close professional interaction at the time between the two Commissioners Narjes and Davignon, and the respective cabinets.

[152] The BRITE-EURAM programme emerged as an amalgamation, under the responsibility of the Commission's DG XII, of two earlier programmes- European Research in Advanced Materials and Basic Research in Industrial Technologies- to sustain the development and application of new advanced materials, new industrial design, technologies and manufacturing processes of existing and new industries (Farrell 1998: 91-105; Economist Intelligence Unit 1987a: 47-51). The choice reflected the need to progress from an early to a more advanced technological development stage in the Technology Readiness Level (TRL) scale and reflected the nature of the research efforts initially needed in aeronautics to accompany the illustrated change in paradigm, namely research in science for new materials and advanced technologies and methods for manufacturing.

(CEC 1991: 26-45) the need to continue strengthening aeronautical research investments with an additional 53 million ECU for the period 1992-1994 was agreed in the Council's framework (Interview 5). Despite initial uncertainties (Hayward 1994:355; Jones 1996:95), the programme kept running successfully since it entered FP3, registering tremendous increases in budgetary allocations FP after FP: from the 35 million ECU of the pilot phase the European aeronautical programme, it reached a figure of 960 million euros (EUR) in FP7 (2007-2013) for collaborative research, while another 800 million EUR were dedicated to the Joint Technology Initiative Clean Sky and a further 350 million EUR was contributed towards financing SESAR Joint Undertaking (EC 2010:11).

The aeronautical programme has been progressively outlining a more substantial vision building on the message contained in the proposed lead projects of the EUROMART study, and supporting the promotion of a strategic product endowed with four characteristics: all composites-made, all electric/ autonomous, all integrated, and environmentally friendly (e.g. engaged in reducing environmental impact) (CEC 1988a: Annex E; Interview 5). The formula orienting R&D efforts towards a visionary product-related concept presented a strong commercial viability. In a more mature phase, once legal foundations were reinforced [153], the programme progressively moved towards more advanced projects to help the industry to consolidate and integrate previous basic research efforts (Interviews 2,6). Indeed, following the establishment in 1997 of an Aeronautics Task Force jointly by the three Commissioners Edith Cresson, Martin Bangemann and Neil Kinnock (CEC 1997b), the political focus shifted towards the development of common projects of industrial interest and demonstration initiatives, while the notion of technological platforms was adsorbed in the text of the 5th EC's FP.

In line with these developments, the political vision expressed by the ad hoc Group of Personalities in aeronautics and endorsed by Commissioner Philippe Busquin (ACARE 2001) oriented the air-transport sector to face the challenge of the market competition by meeting society's needs and establishing a global economic leadership position. Responding to the mandate to materialize this vision and its

[153] After the Single European Act (art 24) had recognized in 1987 the explicit legal competence og the EC in the role of strengthening the scientific and technological base of Europe (art. 130 f-130 q), the Maastricht Treaty (1992) introduced a complementary provision in art 130n assigning the EC the power to set up joint undertakings or any other structure for the execution of the Community research and technological development and demonstration activities.

market-oriented goals, Strategic Research Agendas (SRAs) were created by the newly formed Advisory Council for Aviation Research and Innovation (ACARE) in 2002 (ACARE 2002a,b) and expanded in 2004 (ACARE 2004a,b), addressing a set of challenges, namely the safety, efficiency, environmental sustainability, and security of the EU air-transport system, spelled out in the recalled vision (ACARE 2002:10; 2004:14). The SRAs inaugurated the phase of the large integrated projects to allow large demonstration initiatives to take place and evolved in the direction of the Joint Technological Initiatives (JTIs) (Clean Sky, SESAR) developed under the new contractual formula of the public-private partnerships (Interviews 2, 6). Reflecting only the commercial and environmental segment of the vision originally contained in the 1982 EUROMART study, the reported strategic technological initiatives progressively projected the European Aeronautical Research trajectory outside the military domain, marking an irreversible dissociation between the previously overlapping two research fields.

4.6 Conclusion

The chapter has offered an in-depth analysis of the main drivers having shaped the first involvement of the Commission of the European Communities (CEC, today EC) in the strategic domain of aeronautical research (under TEP-1) with the framing of a supranational research programme to cover this thematic area. After having introduced the topic of R&D and its political sensitivity, the case study has expanded on the political economy of aeronautical industries, their high-tech and capital-intensive nature. Provided that civil and military aeronautical industries respond to diverging rationales and functioning logics, the chapter has pointed at the impact of a set of scientific advancements and technological changes in determining convergent routes between civil and military R&D. The chapter has made the case for innovations in advanced materials research, ICT, and process technologies having primarily influenced the course of aeronautical production. It has furthermore stressed how these techno-dependent developments incentivized politico-economic actors in the US and Europe to adopt political strategies and capitalize over cross-fertilizations existing on both sides of aeronautical markets. Jointly considered, all these

advancements have portrayed a rich TEP-1 structure, whose fullest expansion will be outlined in the next chapter reconstructing the history/significance of ICT developments for the military, and the different national defence industrial consolidating experiences.

Formally justified as a response to the US-launched economic competitiveness challenge, a European Aeronautical Research Programme (EARP) was born as a political project from the visionary effort of a small number of personalities convinced of the need to strengthen the defence research and industrial capacity of Europe, which risked being corroded by a prospective cut in military investments in post-Cold war phase. In its original conception, the EARP embodied the first example of supranational programme funding research and technological development activities with relevance for both sides of the aeronautical industry, hence endowed with a potential military significance. It was also responsible for having consolidated the idea that pre-competitive basic research efforts are fundamental in a view to model a European industrial playing field; this idea is clearly reflected in the architecture of the current 'research window' of the nascent European Defence Research Programme (EDRP), which is conceptually and structurally distinct from a 'capability window' covering the development of mature industrial technologies and projects. By conceptualizing a security dimension in the notion of a European air-transport service responding to the needs of society, the 2001 political vision and SRAs paved the way to the work of the second Group of Personalities on security research, which in turn, was a milestone antecedent to the reflection that decanted the foundations of the EDRP.

On the other hand, and in full verification of both layers of the theory, the mature segment of the EARP has embraced a market-oriented route, reflected in the tremendous degree of technical elaboration in commercial key of its latest structures and policy instruments (e.g. technological platforms, SRAs, and JTUs). In its purely civil shape, its articulation has failed to deliver the military vision originally contained in the 1982 EUROMART Report, also reflected in a set of official Communications (CEC 1988b,c) having highlighted the need to strategize over technical dualities in civil and military aeronautical technologies, and integrate the fruits of military and civil R&D with the maximum of coherence and the minimum of duplication (CEC 1988c: 9) in a view to respond to future capability needs and preserve the strategic performance of the full segment of the industry, also accompanying its internal

consolidation process (CEC 1988b: 29;1988c: 3, 5, 8-9, 18, 20; 1992: 15-18, 29). According to the theoretical premises formulated in Chapter 3, it was not until a first major shift in the TEP governing forms of military production and organization occurred in the end of the 21-century, that a first set of adjustments in the European defence socio-economic architecture could finally materialize. In coherence with such theoretical anticipation, the next chapter will complete the substantiation of the first TEP, testing, from the perspective of the second EC's involvement into defence equipment markets in post Cold war time, the irrelevance of supranational policy entrepreneurialism in absence of an accomplished shift in the techno-economic paradigm governing that specific policy area.

CHAPTER 5

Non-EDEM in post-Cold War period:

Technological change, industrial consolidation and the EC's policy entrepreneurialism

5.1 Introduction

The previous chapter has provided a detailed account of the first EC's policy entrepreneurial attempt to pass a European supranational regime for collaborative aeronautical research activities, which should also have covered, in the mind of its conceivers, military R&D in support to the competitive positioning of defence aeronautical industries of Europe. The analysis primarily evidenced the significance of a set of technological advancements in shaping the face of a techno-economic paradigm (TEP-1) governing military production and organization. Under an evolving TEP-1, the military innovation machine has progressively displayed an increasing degree of reliance on quality standards, methods and processes imported from the commercial world. Due to the potential for further expansion of the same techno-economic paradigm, it was impossible to detect an adjustment in the European defence socio-institutional architecture. As evidenced, the European Aeronautical Research Programme (EARP) did not manage to capitalize in political terms over the strong element of convergence between civil and military aeronautical R&D and technologies, coming to deliver a purely civil output.

Developing this line of enquiry, the present chapter will provide for a further degree of empirical articulation on TEP-1, this time tracing the origins of the

information and communication technologies and telematics (ICT) revolution, with a view to evidence, in partial correction of the available literature, its ubiquitous significance in Europe and beyond for the defence industrial restructuring process, under TEP-1 (section 5.2). With the objective of shedding new light on internal dynamics of change under TEP-1, the following section (5.3) will concentrate in providing for a detailed reconstruction of two crucial and emblematic defence industrial consolidation experiences in Europe, namely the German (5.3.1) and French (5.3.2) ones, which led to the formation of national defence industrial champions in the field of aerospace and defence electronics. These case studies are crucial, not only to empirically evidence the technological significance of domestic consolidating exercises under TEP-1, but also to locate the origins of a trajectory that culminated, under the input of the same two countries, in the creation of a transnational consolidated company, the European Defence and Aerospace Company (EADS), analysed in Chapter 6 (TEP-2).

In further confirmation of the theory proposed, which subjects socio-institutional adjustments to accomplished shifts in TEPs, the second part of the chapter (section 5.4) will evidence the irrelevance of the EC's policy entrepreneurial activity under a TEP still in evolution, namely not having expired its expansive potential. Specifically, the case study analysis will reconstruct the EC's strategic plan, materialized in the two 1996[154] and 1997[155] EC's policy initiatives (CEC 1996b; 1997c) to pass EDEM in post Cold War period. The reconstructed EC's policy entrepreneurial attempt will document a mix of political vision, strategy and creativity in seeking to connect, for the first time, the different sides/ players of the policy-making arena, in a negotiation game of exponential political sophistication. The analysis will furthermore empirically identify and reconstruct, for the first time, the very origins of the defence industrial representation activity and early involvement with the EC in policy formulation and negotiation processes.

The chapter will conclude by recapitulating how the case study has tested *a contrario* both layers of the theory. Specifically, while the first part of the chapter will provide an account of the complexity of TEP-1 by disentangling techno-dependent dynamics of change in the defence industrial capital and organization via the case

[154] Commission of the European Communities, 'The challenges facing the European Defence related industry. A contribution for action at European level' (Communication)" COM (96) 10 final.
[155] Commission of the European Communities, 'Implementing European Union strategy on defence related industries' (Communication) COM (97) 583 final.

study analysis of the German and French national consolidating experiences, the second part of the chapter will provide verification to the theoretical provision subjecting adjustments in the defence socio-institutional structure (SIA) to an accomplished shift in TEP (layer n.1), evidencing indeed, through the experience of the EC's policy initiatives, the insignificance of policy entrepreneurial plans developed under a TEP not having accomplished its evolution (layer n.2).

5.2 The technological significance of the defence industrial consolidation activities

The previous chapter illustrated the role played by R&D investments in supporting a set of scientific breakthroughs and technological advancements in the aeronautical domain with the discovery of new properties in materials and process innovations proving responsible for an intense transformation in the structure of the aeronautics industries, which were, at the time, centre of strategic defence and commercial investments. As illustrated, an expansion in civil aeronautical markets and a growing significance attached to the commercial component for the performance of the military animated an intense competitive race between the US and Europe, which led, on both sides, to the strengthening of product oriented aeronautical research investments, and in the case of Europe to the successful creation of a supranational policy framework for EU aeronautical civil research activities. Despite significantly overlapping with several technological domains strategic for the military, the EU aeronautical research programme remained politically detached from military R&D efforts, normally financed under domestic and, to a less extent, intergovernmental frameworks in Europe.

The present section will document a strong and direct causal link existing between advancements in technology/innovation environment and the process of defence industrial consolidation under the evolution of TEP-1 Although originated in parallel to the spread of materials and process innovations, a less detailed account has been provided, in the analysis of the aeronautical sector contained in Chapter 4, regarding a set of revolutionary technological advancements which occurred in the area of micro-electronics. These developments shaped the face of information

communication and telematics fields (here referred with the acronym ICT) and deeply intersected with the evolution of strategic industries for the military, *in primis* aeronautics and aerospace. It is advanced here that techno-economic driven dynamics have played a crucial importance in the process having marked the qualitative modernization and rationalization of the defence industrial sector over the decades (e.g. under TEP-1 and beyond). Conversely, a subordinate importance is assigned to the end of Cold war variable which, it is argued, came to intersect an already running consolidation trajectory, influencing the process most prominently in quantitative terms via the cutting and conversion of abundant sites/resources on less strategic segments for future weapons systems development (e.g. tanks and land systems, heavy armoured vehicles and artillery pieces). As a matter of fact, as it will be evidenced hereinafter, economic conversion and rationalization activities never really halted or undermined the R&D investments flow and product development capacity of those high-tech sectors responsible for pushing the frontier of the military strategic performance forward.

Such claim adds a forgotten tile to the 1990s Conversion debate[156], which has traditionally analysed the process of rationalization/consolidation in the arms industry under the spotlight of the end of Cold war, often linking the reflection on the conversion of military production to the broader intellectual framework of the prospects for a peace economy to replace, via increasing R&D investments to the civil sector, an hegemonic militarized global economic order (inter alia: Melman 1988, 1991:xxii; Dumas 1989:8; Peattie 1989:26,32; Bischak 1991:121; Markusen and

[156] The Peace Dividend Debate, to which the intellectual item of Conversion belongs to, initiated in the US in the aftermath of the Cold War with prominent contributions, inter alia, by Peter Southwood, Judith Reppy, Ann Markusen, Sean Kostigan, John Lovering, Kenneth Flamm, Gregory Bishak, Jacques Gansler, Llloyd J. Dumas, Marek Thee, Mary Kaldor., Seymour Melman and Randall Forsberg. The US DoD Advanced Research Project Agency (DARPA) financed a programme to support the Conversion, Reinvestment and Transition of Defence Technology and Skills whose proceedings were published in 1993. The US Congress Office for Technological Assessment produced a Study on Defence Conversion the same year. The NATO Advanced Studies Institute (ASI) financed a comprehensive joint (US-EU) study on Defence Conversion Strategies (1996) edited by Robert F. Dundervill, Peter F. Gerity, Anthony K. Hyder, Lawrence H. Luessen, published out of conference proceedings. A similar debate indeed evolved in Europe, and partially intersected with the US one (see: NATO-ASI study), under the impulse of contributions from the field of economics by, inter alia, Michael Brzoska, Herbert Wulf, Ian Anthony, Elisabeth Sköns, Peter Lock, Philip Gummett, William Walker, Peter Schmidt, Keith Hartley, Elsner Wolfram, Jonathan Feldman, Jean-Paul Hébert, Claude Serfati, Luc Mampaey, also working on research projects in teams under the sponsorship of the Bonn Institute for Conversion Studies (BICC), the Stockholm Institute for Peace Studies Research (SIPRI) and the Groupe de recherche et d'information sur la paix et la sécurité (GRIP). The EC financed three dedicated EU programmes (e.g. PERIFRA, KONVER 1 and KONVER 2), which allocated approximately 250 million ECU in structural funds at sub-national/local level to support the requalification of the urban and extra-urban areas and employment conditions during post-Cold War demilitarization and conversion activities. In 1997 the EC a dedicated COST-Action on defence conversion (A10) comprising a dedicated chapter on the restructuring of defence industries to study different consolidation experiences and prospects in the MSs of the European Union edited by Michael Brzoska, Bjorn Hagelin, Ian Goudie, Elisabeth Skons, Win Smit, Reinhilde Weidacher for the Directorate General for Research and published by the European Publication Office.

Judken 1992:9,242,246,249ss; Hartley1993:3,31;1997:33-34; BICC1995a:6-8,20,24,32; 1995b:3-4). According to statistical analyses, the transformation of the defence industrial sector would emerge as a reaction to the economic impact the end of Cold War had on the evolution of military spending, corporate profits and employment levels both in the US and Europe (inter alia: BICC1995a:15-16; 1995b:4-7; 1996:110ss; elaboration on Anthony and Wulf 1992: 22-24; Wulf 1993:3-26, 148-159; Oden 1999: 78-103; Dunne 2009:13-21).

Indeed, as a direct consequence of the collapse of the Soviet Union and the eradication of the risk of a nuclear escalation with the US, a gradual shift characterized States' perceptions, which had previously justified high level of military expenditure, but which now moved in the direction of adjusting defence budgets to the changing geopolitical and security context (SIPRI 1990a: xxi-xxxi; SIPRI 1990b:3; Wulf 1993:4; Reppy 1993:50). For this reason, they registered a sharp decline in most of the major spending states (SIPRI 1992a: 189; 1995:389; Anthony and Wulf 1991:21; Markusen and Costigan 1999:6). World military expenditure was cut by an estimated 3.8% annually, from a total of nearly 1000 billion USD in 1987 (SIPRI 1990b: 8; SIPRI 1994:389) to approximately 815 billion USD in 1992 (Wulf 1993:3; BICC 1995a:8).

A reduced buying capacity from the side of arms importers led to a descent in both exports projections and in profits generated by supplying organizations, operating on contracting defence markets. Between 1988 and 1991 half of the major arms producing companies worldwide registered a significant decrease in their revenues (SIPRI 1992b:364, 392 appendix 9A; 1995b:457,462,485 appendix 13A; 1997:241,247,262 appendix 8A). Wulf (1993:18) reported that only in 1991 the level of profitability, as profit per dollar, of defence companies in US and Europe was 1/3 of the 1988 value, and ½ of the value reported on the civil market. Last but not least, another major indicator evidencing the impact of reversed growth rates on the defence industrial base has been the decreasing rate of employment amongst former Cold War adversaries. Worldwide employment in arms production declined by 37% from a 17.8 million posts in 1987 to around 11.1 million in 1995, in total by over 6.5 million jobs (BICC 1996:111-113; 272-274 Conversion Survey Appendix A4-1; Markusen and Costigan 1999:13). In USA, over 2 million jobs were lost between 1987 and 1995 (elaboration on Wulf 1993:9 and Reppy 1993:52-53; BICC 1996: 114-115) while in

Europe, between 1990 and 1995 the defence industry employment market contracted by 57% in Germany, 37% in UK and 21% in France (EUISS 2000c:13).

It is true that with defence budgets sharply contracting, profits reducing, cost raising and employment needs more than halved, the defence industry had to go through a process of intense readjustment to cut overcapacities via the liquidation of excess facilities and the dismissal of redundant employees to either remain competitive on the changing military markets or diversify/exit the defence business (SIPRI 1992b: 36; 1995b: 455-456, 461-463; SIPRI 1997:239,242,246-247; BICC 1996:115,121,125-129). The post-Cold War literature has looked at this process with a certain degree of empirical articulation by providing classifications amongst companies/industrial sectors based on geographical areas (e.g. US vs. Europe), structural organization (e.g. primes, second tiers and subcontractors), as well as corporate strategies (e.g. withdrawal from the defence business vs. stabilization/adjustment) and productive choices (e.g. military or pure play vs. dual or diversified) adopted to face the change in the geo-political and economic environment (Anthony and Wulf 1991:24-30; Wulf 1993: 21-26; Reppy 1993:54-62; Markusen 1998: 135-137-; Feldman 1997; Oden 1999: 76-78; Lovering 1999:337-342).

This economic literature refers to a set of emerging trends, which go beyond disarmament-related conversion and diversification activities, and directly characterize the process of defence industrial consolidation on both sides of the Atlantic. These trends included: - the rise in national mergers/acquisitions and cross-border mergers/take-overs; - the intensification (most prominently in Europe) of cooperative arrangements such as strategic alliances, consortia and joint ventures; - the internationalization of production processes via support to foreign sales, foreign direct investments, and the progressive delocalization of manufacturing, and the opening of paths to globalization in the arms industry (Reppy 1993:63-64; Sköns 1993:160-189; Sköns and Wulf 1994:43-57; Bitzinger 1994:170-189; 2003:63-79; 2009:182-185 Guay 1998b:96-99; Neal and Trevor 2001:337-360; Guay and Callum 2002:757-776; Oikonomou 2007b:362-375; Dombrowski and Ross 2009:160-162). It is contested that such reconstruction is only partially accurate in illustrating the defence industrial consolidation phenomenon, as it did not properly elaborate on the crucial and underlying role which technology and the state of advancement in research and technological development activities played in incentivizing government-supported restructuring activities initiated under TEP-1. By elaborating

further on the technological variable and its incidence on the composition of the DTIBs it is possible furthermore to place the aforementioned consolidating trends in a temporally coherent logical order/trajectory, which spams from TEP-1 to TEP-2 under different politico-economic configurations.

One needs in any case to acknowledge an exception to this lack of focus on the technological variable in the scholarly explanations on the consolidation of the defence industry. This exception is represented by a circumscribed US-based sub-literature of strategic studies derivation, quoted in Chapter 3 sub-section 3.3.3, which introduced the notion of 'Revolution in Military Affairs' (RMA) and elaborated the concept of *military-techno revolution* (MTR) to provide for an explanation of dynamics of transformation and modernization within the US defence industrial sector. This small literature has prominently concentrated on analysing RMA's external implications on the implementation, as a consequence of the transformation of threats and military warfare features, of new US doctrines and operational concepts supporting future military operations and crisis management interventions in conflict areas. Since the early 1990s, though, a second, even thinner, thread of research came to focus on RMA's internal implications on the US DoD administrative reform and industrial modernization (Cooper 1994:2-4, Lesser 1994:22ss; RAND 1999:76ss; US Senate 2002:8, Gansler and Lucyshyn 2009:5ss; Dombrowski and Ross 2009; Bitzinger 2009b:182-185). Within this line of investigation, and as explained in the concluding part of Chapter 3, Krepinevich (1992), Cooper (1994) and others developed an elaboration on MTRs as new organizing principles governing the internal transformation of US military organization. A micro-strand of RMA-derived literature has most recently concentrated on the role of the defence industry in pushing the RMA and military transformation forward (Dombrowski and Gholtz 2006).

Despite the evolution of these earlier perspectives and the empirical potential of RMA/MTR's theorizing, these contributions, which stress the importance of the technological component, have remained in a position of intellectual subordination with respect to the gran-debate on US strategic priorities and requirements. Instead, the present case study, and the thesis itself, wants to evidence how the technological race and R&D investments have progressively played a key role not only in directing the course of consolidation in the defence industrial sector under shifting TEPs but

also in shaping political strategies towards defence markets/defence industries accompanying SIAs over time.

The centrality of the technological variable can be acknowledged by adopting an historical and empirical angle. Indeed, in the years following the end of the Cold War, despite official governmental policies providing cuts in manpower, equipment and force planning, the process of developing new and sophisticated weapons systems have really never halted, with a decline in unit numbers having been offset by an increase in unit capabilities (SIPRI 1990a:322; SIPRI 1990b:10-11; 1990c: 322; BICC 1995:12, Gholtz and Sapolsky 1999/2000:22-23; SIPRI 2001:230; Interviews 9,19,20,31). Expenditure for defence-related research, development, testing and evaluation in US increased by 80% (volume terms) in a decade, with a core defence R&D figure passing from 21.7 billion USD in 1981 to 39.9 billion USD in 1990 (SIPRI 1991:124-126; Adams and Kosiak 1993:32-33). An increase of 47% has been registered in the following decade until financial year 1998 (SIPRI 2001:236) reflecting the emphasis in US policy to stay ahead on military R&D. In Europe, longitudinally considered, UK increased by 10.8% France by 14%, and FRG (later Germany) by 9.8% (SIPRI 1990b:11; SIPRI 2001:248). The priority given to military R&D in science, innovation and industrial policies of major defence spenders persisted over the decades with an aggregated figure for countries part of the Organization for Economic Cooperation and Development (OECD) of roughly 31% of total government R&D expenditure devoted to military purposes in 1998 (Reppy 1998:38-40; SIPRI 2001:231,233) in face of R&D costs tremendously increasing (Feddersen 1995:13; SIPRI 1997:213; for an explanation of the functioning of R&D costs in military aeronautical industries see Ch.4 section 4.3).

For this reason, what it has been perceived as a decline in military budgets, comprising the R&D component, in the years immediately following the end of the Cold War (SIPRI 1997:215; OECD 1995; 1996) was actually, if observed more accurately and on a longer timeline, only a shift in main arms producing countries' strategic vision on how to support evolving military requirements and changing characteristics of warfare, namely from large non-electronic dependent equipment inventories, including top-level investments devoted to the nuclear component, to the high-tech electronics/software/ICT integrated advanced defence systems, supporting both conventional weapons development activities and reform/modernization on forces organization and manufacturing/engineering processes (US-DSB 1985; US-

OTA 1985, 1986; US-DSB 1987a; 1987b; 1987c; US-IDA 1988; US-DSB 1990:10-22; 25-31,38-43, 46-52; US-OTA 1990; US-DSB 1997a:3-28; Interviews 9,10.31,37,39). Amongst the most advanced military powers, combat aircraft projects kept claiming the lion's share of R&D efforts with a main focus on armaments cooperation in Europe (SIPRI 1997:211,216). Between 1988 and 2001 (date of initial operations) 12 billion USD were spent jointly by UK, Germany, Italy and Spain for R&D activities connected to the Eurofighter Typhoon programme (with 620 aircraft); France alone allocated 7 billion USD for the development of 294 Raphale between 1987 and 2002 against the 17 billion USD allocated by the US Government for the development of F-22 (with 442 aircraft sold) between 1991 and 2004 (date of the initial operations) (SIPRI 1997:216-217).

In the TEP under comment, continuous government-led R&D investments in a set of top-strategic technological areas for military production, and most prominently, as illustrated, the aeronautics/aerospace sector, kept supporting and pushing the competitive evolution and transformation of the defence productive organization. As anticipated in Chapter 4, advancements in the microelectronics, information communication and informatics, namely telematics (e.g. ICT), fields have played an essential role in developing the superior performance of the military sector, and maintaining the strategic competitive edge of the defence technological and industrial base of major arms-producing countries. Such an outcome has been reached, as in the case of advanced materials and processes innovations, with capital-intensive investments in R&D activities, not only fuelling continuous progress in the microelectronics technological frontier, but also shaping the face of new technological domains of crucial importance for the military, as ICT/telematics is for defence electronics systems, and consequently directing the course of defence industrial consolidation activities.

Disentangling the complexity of the reported techno-driven dynamics allows making real sense of the transformations in the defence industrial productive organization, beyond the 'end of Cold War' argument. The point of departure to understand the European case is again the competitive race over technologies of strategic importance for military production and potential commercialization (e.g. spin-out of military innovation) with the United States of America (US). As opposed to the field of research in aeronautical materials and processes, in the microelectronics

field Europe has lagged far behind the American firms. After a season, pre and post-discovery of transistors in the mid 1940s, where European electrical firms detained advanced technological capabilities in electrical and electronics technologies (Nelson 1984:44; Interviews 1, 7, 14, 22), European companies started to report a huge gap in semiconductors markets registering heavy downturns from 33% in 1977 to 10% in 1988 of the global production (Malerba 1985:119; Sandholtz 1993:115). Despite the national attempts in France, the UK and Germany to support the semiconductor and electronic industry via ad hoc R&D programs, the US gained competitive advantage on Europe once a major innovation came to transform the existing semiconductor industry, namely integrated circuits (ICs) (OECD 1968: 8, 46; Nelson 1984:9; Malerba 1985:97, 103, 131, 137; US-OTA 1986: 9; Alic et al 1992: 258; Sandholtz: 1993:33; Interview 22). ICs inaugurated the birth of the field of microelectronics, or second-generation electronics technology, with the development of miniature electronic devices[157] (US-OTA 1986:27-28, Appendix A; Interviews 1, 2, 15, 22).

Electronics, and in turn microelectronics, technology has, generation after generation, been of crucial importance to the development of advanced systems of weapons (Nelson 1984:42-43; Interviews. 1, 9, 14, 15, 33). While transistor-based circuits dominated early military systems, the continuous drive for increasingly complex circuitry resulted in the need to find a solution to the practical problem of having to combine the overgrowing size (e.g. millions of connections, and hundreds of thousands components) of transistor-based circuits with the needs of the military demanding for smaller, faster, and hyper-reliable electronic devices (Interviews 1, 14, 15, 33). ICs permitted to fabricate wires and components on the same semiconductor material used to produce transistors, hence permitting to fabricate the entire circuit on a single piece, or chip. These integrated circuits began to be produced off the shelf on a large scale by US merchant[158] firms, such as Mostek, Intel, Motorola, and as a result, the American semiconductor industry underwent major structural transformations, as new industries, such as Texas Instrument and Fairchild, which proved innovative and had the 'fittest' routine, entered the business (Malerba

[157] Generations of electronics technology have spanned from vacuum tubes invented in the early 1900 until very large integrated circuits (VLIC) developed in the early 1980s with the intermediate steps of the transistors and the integrated circuits (ICs).

[158] As opposed to captive manufacturers which operate as part of vertically integrated companies (e.g. IBM, AT&T Bell Laboratories, General Motors, Hewlett-Packard) producing micro-electronic components for their own internal products and services, merchant companies sell standard micro-electronic products to users to be plugged in a variety of systems, including with time computers, communication systems, consumer products, and defence applications (Malerba 1985:44; US-OTA 1986:27: Fong 1990:281; Alic et al 1992:261).

1985:138; Alic et al 1992: 258; Interviews 1 22). They emerged as leaders in the ICs production, not only heavily exporting to Europe but also operating direct foreign investments on the European continent due to the retard of European companies in engaging in integrated chips production (Malerba 1985:5,106-108;131 Interviews 7, 14, 22)[159]. In other words, American hegemony on the production of these advanced technologies crucial for the performance of the military industry determined a condition of strategic dependency and loss of competitive posture to the detriment of Europeans, since, as it has been reported, over a certain integration density and speed microchips were not free and available to the commercial market (where licences were normally purchased) without American approval, and even to decode the signal of high precision GPS one needed to access a special chip which was available only for users certified by the American government (Interview 34).

Further incremental progress in microelectronics under TEP-1 has been essentially based on further shrinkage of the circuitry etched into chips with the invention in the course of the 1980s of the Very Large Scale Integrated Circuits (VLSICs) [160]. The trajectory followed continuous miniaturization and integration patterns to increase performance, functions and reliability at the same costs (US-DSB 1982: 19-20; Malerba 1985:25; 150; Interviews 1, 22, 34) with the average number of components packed per chip (e.g. level of integration) having almost doubled every year (Moore's law)[161] (US-OTA 1986:29 Appendix A; Interview 22). Smaller chips built on vertically integrated components meant shorter connections, stronger power and faster transmission of data[162], and that permitted to complete a significant number of operations into a single calculation, without breaking them down into several passages, as well as to run operations in parallel with a stronger processing power and memory cycles (Interviews 14, 15 22).

The strategic significance for military production of microelectronics technologies became even more prominent once advancements in technology

[159] The OTA (1986:38) calculated that in 1984 US companies claimed approximately 14 out of 26 billion USD in the world market for microelectronics ICs. The military market share for ICs sales fell in the range of 8% out of 92% occupied by commercial markets generating a proportion of 1:16 of the commercial revenues (DSB 1986:16; Alic et al 1992:260).

[160] In the mid-1980s the US DoD allocated a multibillion USD investment to the Defence Advanced Research Agency (DARPA) to run two high priority technology programs to push continuous miniaturization of Very Large Scale Integrated Circuits (VLSIC) via the development of new fabrication materials/tools and processes, as well as to bridge the divide between the ICs commercial systems designers and the military technological/operation requirements needs (US-DSB 1982; US-OTA 1986:21; Alic et al 1992: 268-269,271-272).

[161] From 2 to 64 transistors in the mid 1960s, to over 2 million components in the early 1980s with VLSICs fabricated on a single chip presenting a surface area of less than 1 square centimetre.

[162] In less than a decade, microchips moved from operating with a 4 (Faggin's chip) to a 64 bits register.

permitted to move from linear analogical microchips to digital ones. The imperative to ensure continuous miniaturization and technology insertion/strengthening activities in the upgrade of defence platforms and systems, including adaptation/modernization of service systems and manufacturing organization, was indeed progressively supported by the proliferation of software intensive technologies such as microprocessors, microcomputers, and data-transfer/processing technologies (US-OTA 1986:24; Alic et al 1992: 279; Interviews 1, 22, 34). Digital machines, such as micro and mini computers[163], progressively developed a complex data programming, transfer, processing, and control capacity, as opposed to previously existing simple micro and mini-calculators (Forrester 1985; US-OTA 1985; Alic et al 1992:283; Interview 22). Digital microchips inserted into micro and mini-computers made possible high-speed interconnected data transmission, transfer, processing and control functions[164] with options for a tremendous increase in the systems operational capacity (US-OTA 1985:16; Malerba 1985: 148; Forester 1985:5-6; 22-23; Flamm 1989:14; Sandholtz 1993:50, 211-212; Dalum et al 1999:111-112; Interviews 14, 15, 18, 22).

Software technologies, ranging from mentioned computer-aided software engineering tools (see: CATIA and UNISURF in Ch. 4) to software simulators of electronic warfare testing the technological readiness of military programs of the calibre of the Eurofighter Typhoon, contributed to the quantitative and qualitative sophistication in the product operational performance, since the full hardware architecture and product functions came to depend on capabilities associated with software-related characteristics and functions (Interviews 1,25,27,33). The strategic significance of these technologies has been reflected in the growing costs of software, with prices exponentially spiralling (as opposed to the RAMs prices instead vertiginously declining), and occupying as of today the dominant share (e.g. 80%) of product development and life-cycle costs (Malerba 1985:152; US-OTA 1985:21; Alic 1992:284, 287-288,292; Interviews 1, 9,10, 22).

[163] Micro and mini computers present a digital logic chip/central processing unit to perform and control operations, a semiconductor memory to store the high speed and copious flow of information, and a micro-processor, namely a software operating system, to execute programmes, including data processing, and control the operations of the hardware.

[164] Digital ICs, as opposed to analog circuits, have allowed telecoms networks to operate on the basis of digitized information whose representation (binary digits or strings of 1 and 0) is suitable to support the reliable transmission, via fibre optics and satellites, of any kind of data- from voice conversation to high speed data & high quality pictures- on the band without noise or electronic interferences, making unnecessary real-time signal modulation on the original message. High-speed and interconnected data transmission via switches became a crucial function included into miniaturized and integrated digital machines.

Growing interdependencies amongst data transmission and data processing capacities [165] under digitalization of linear functions processes, increased requirements for large systems integrators (LSI), including digital LSI semiconductor components, optics fibres for transmission, and powerful microprocessors for terminal equipment (Malerba 1985:183, 186; Interview 22). Enhanced data transmission and processing digital functions have been advanced via processes of continuous technological insertion and integration activities, which are taking place via the generation in turn of specific technological integration capabilities (Interviews 1, 10, 27, 31,33,39). Since digitally integrated systems reflect higher end-product reliability, increased operational performance, as well as stronger maintenance ease, the key imperative for the military became to ensure that the mentioned technological integration capabilities, in the hands of leading firms as large systems integrators, kept supporting product development activities and manufacturing processes within defence enterprises (Interviews 1, 9, 10, 27, 30, 31, 33, 37,39).

The reconstructed technical passages are crucial in the perspective to portray the richness of TEP-1 combining both key advancements in materials and process technologies (see Ch.4) and the emergence of brand new technological domains, such as ICT/telematics, resulting from the convergence between telecommunication/data transfer and informatics/data processing technological areas (Ch.5) of central importance for the military (Malerba 1985; US-OTA 1985; Flamm 1989:14-27). As part of the complexity that characterizes the TEP structure under comment, the evolution of the ICT trajectory, from microchips to advanced software applications, clearly revealed that each small advancement in the state of technology corresponded to an exponential increase, before unconceivable, in the extension and strength of the operational performance. It is therefore within the framework of the continuous struggle for leadership in the production and control of technologies of strategic importance for States' national security and economic prosperity, that one has to interpret the behaviour of governments of major arms-producing countries in the US and Europe entering the technological race and transforming their productive structures, so as to gain a strategic and commercial competitive advantage, via the generation of a superior and autonomous technological performance. Because of the

[165] While telecommunication companies prioritised a strategy enhancing the 'speed' of information compression, handling and transmission capacity, based on the idea of creating 'information superhighways' on 'integrated network digital services', ICT companies put more focus on 'intelligent terminals', and sought to link them via Local Areas Networks and Wide Areas Networks, according to a logic of 'expansive connection'.

recalled imperative for the military to generate and maintain technological primacy, namely the best state of advancement in R&D and product development, the activity of modernization and restructuring of defence productive structures, under the technological advancements illustrated, required to adopt a solution which ensured the most efficient and stable routine in technological development and integration activities (in light of their importance) across a long-term strategic horizon, beyond temporary arrangements normally pursued via alliance and consortia[166] (Interviews 1, 27, 31, 33, 37, 39).

Interviews for this thesis attested the fact that the end of Cold War came as a sort of 'coincidence' in the framework of already occurring qualitative industrial readjustments (Interviews 9, 27, 31, 35, 39). These qualitative processes, as opposed to the quantitative ones linked to the need to downsize and convert low-strategic productive lines/sites in post-Cold War phase, would comprise, in first instance, the upgrading of product development management and manufacturing methodologies (US-IDA 1988, see also IPPD/ concurrent engineering approaches and standards from the civil sector referred in Ch.4) and, secondly, the promotion of structural consolidation of productive entities presenting the highest technological development prospects, as well as the strongest capacity and finest knowledge/portfolio of competences in technological and business integration activities to deliver complex product systems solutions (Prencipe 2004; Gholtz 2005; Hobday et al 2005; Davies 2005; Davies and Hobday 2005; Interviews 1,9,10, 27, 31, 35, 39).

For this reason, there is a strong case to argue for a technologically dependent reading of the defence industrial consolidation process and of governmental strategies elaborated to accompany it. It is advanced here that technological drivers have deeply affected the course of defence industrial consolidation activities in the US and Europe, which, despite following different strategic routes, generated similar

[166] Although alliances and joint ventures have populated, with the same degree of intensity, the European history of international collaborations since the formation of the Airbus consortium and the numerous European armaments cooperation programs, it is observed that this phenomenon- especially in the civil aeronautical sector- became subordinate to the decision to consolidate production at national level first. The same Airbus consortium, after the national consolidation phase terminated, became part of a transnational integrated company, the European Aerospace and Defence Company (EADS), today the Airbus Group (see: Ch.6). Several other cross-national joint ventures such as, inter alia, Eurocopter, Thomson-Marconi-Sonar, Matra-Marconi, Matra.BAE dynamics, and Cassidian, became part of transnationally consolidating realities under TEP-2. In the view of key personalities interviewed, as involved in important national and transnational defence industrial consolidating exercises in Europe since the late 1980s, due to their temporary nature, it is impossible to attach to alliances and consortia a medium/long term vision on the R&D/productive strategy. In contrast, a consolidated company presents a more articulated corporate structure and governance, which allow the elaboration a temporarily more extended strategic plan/ corporate vision, as it is essential on the military segment of production.

outcomes under the present TEP. In the US, the position of strong leadership in a set of technological domains, and most prominently integrated circuits and software technologies, incentivized the government to push for a strong commercialization line of military inventions, as the discovery of superconductivity evidenced (see Ch.4, and US-OTA 1988c, 1995). At the same time, the US government financed a number of ad hoc research programmes, of the calibre of the earlier recalled VLSIC (p. 138 footnote n. 158) to modernize productive manufacturing processes and ensure a stronger cooperation between civil and military R&D activities in an attempt to contain risks for deterioration in the Defence Technological and Industrial Base (DTIB) composition, increasingly exposed to off-the-shelf solutions (COTS) provided by captive and merchant manufacturers[167] in over expanding commercial markets (US-DSB 1986, 1988a; US-DSB 1988b; US-OTA 1990: 161- 192; 1991: 9-13; US-DSB 1994, 1999).

In Europe, instead, where the position of strategic dependency on US semiconductor, microchips and software[168] technologies reduced the options for strategic spin-out and commercialization policies, the reaction was in the early 1980s to devote public support towards the ICT industry incentivizing national restructuring and the creation of national advanced capabilities (Malerba 1985:48, 139, 185, 188; Sandholtz 1993:74-75; 86-87; CEC 1989:58 12-8; elaborations on Interviews 11, 14 22). The national ICT supportive measures included, in the same timeframe, privatization plans for telecommunications equipment manufactures (CEC 1989:55

[167] Both captive manufacturers and merchant firms-companies operating on the commercial markets could represent, in a way, a threat for the stability and continuous cutting edge development of the defence technological and industrial base: indeed, captive manufacturers are able to concentrate a consistent amount of strategic power due to the intensity of internal R&D processes in the sense of directing the future course of product development activities de facto framing 'pre-packaged' markets around the users, and compromising the traditional linearity in military R&D activities; merchant companies, instead, offer commercial on the shelf products (COTS) which often prove unsuitable to satisfy the complexity of military requirements, with the risk for the military, in the case of continuous reliance on such a commercial model to erode their defence and technological base. Fong (1990:288) evidenced the adversarial behaviour shown by merchant companies in working with the US DoD due to the rigid requirements and market restriction clauses emanating from the military, which made it difficult for the industry to develop dual-use design and new competitive product-development concepts. For this reason, most of the merchants progressively exited the defence business, leaving captives to deal with overly-complex and demanding military specifications, such as those of high density memory chips not available on the commercial markets (Alic et al 1992:265).

[168] It has been calculated that in 1986 60% of the world computer market was in the hands of Cray and the other 40% in the hands of IBM, Fujitsu and Control Data (CEC 1989:45). More than 50% of emerging technologies industries was American, while IBM had more than 90% of installed computers in the West (Sandholtz 1993:73; Interview 22), with revenues increasing three-fold between 1977 and 1988 (Sandholtz 1993:118). Europe managed to defend itself only on the fronts of telecommunications equipment (35% of the global production), new materials (35% of the global production), computer integrated manufacturing (almost 30%), consumer electronics (almost 20%) and optoelectronics components (15%) on a market growing 20% a year, and responsible for key non-integrated circuits-dependent advancements, such as optic fibres used in telecommunications, lasers for optical recordings, display functions, and materials processing (CEC 1989:43).

12-5), a sector in which Europe reflected a 50% share of global digital production (CEC 1989:45) and a trade surplus of about 1.7 billion USD which went complemented by an active export practise (OECD 1983:133). The position of technological and commercial solidity reached by the Europeans in telecommunication equipment and services has been used as an entry door once telecommunications and ICT markets started to converge in the formation of the telematics domain, with a view to gaining competitive terrain to the detriment of the Americans (Dalum et al 1999:122; Interview 14, 15, 22).

From different entry points, both Americans and Europeans started to face in the course of the 1980s the similar dilemma of having to keep up investing to support the primacy of the military R&D innovation machine, and retain control over the pace of development in the civilian economy, with the complex prospect of a 'shrinking pie' for defence markets, as opposed to an over-expansion in civil aeronautical markets (see: Ch.4) and an uncontrolled growth rate in ICT ones (Ch.5). Confronted with the paradox of not being able to develop technology more advanced than that available on the commercial ICT markets, the solution envisaged on both sides of the Atlantic, was to support the direct acquisition of industrial entities presenting a portfolio of advanced ICT technological capacities, crucial for the long-term survival and positioning of DTIBs, and then incorporate this added value in the most strategic sector for the military in this timeframe, namely aeronautics/aerospace (Interviews 1, 9, 25, 27, 31, 37, 39). More specifically, the need to ensure long-term generation of advanced technological competences in the defence industrial sector has been progressively pursued via a consolidation strategy based on mergers and acquisitions (M&As). According to this plan[169], on the one hand, the strategic production in the aeronautical/aerospace sector has been vertically merged at national level, in order to reduce costs and keep capitalizing on the economic returns deriving from commercial aeronautical markets (see Ch. 4) and offering a stable accommodation to such mechanism (US-DSB 1997b:8[170]; Interviews 1,7,8,14,27,33). On the other hand, the superior performance of the aeronautics/aerospace sector has been guaranteed by acquiring productive segments in technological domains (e.g. micro-electronics/ICT)

[169] While a governmental plan was more visible under TEP-1 when industrial champions were created, defence corporation strategies acquired a prominent importance under TEP-2, which registered the internationalization and privatization of the defence industrial capital.

[170] In analysing the situation of the American arms industry, the US DoD eloquently observed that major defence firms increased high-tech strategic capabilities via processes of vertical integration oriented at reaching efficiency by coordinating internal processes, or ensuring high quality and uninterrupted supply (DSB 1997b:8).

of top strategic importance for the military (US-DSB 1997b:11[171]; Interviews 1,9,10,31,37,39).

For this reason, the process of defence industrial consolidation has in this timeframe (e.g. under TEP-1) followed a government-led trajectory to create a number of national industrial champions in the field of aeronautics/aerospace. In line with evidence generated by empirical studies in aeronautics sub-fields (FOA 1996; Miller et al. 1995; Prencipe 1997; 2004) these industrial champions, comprising the whole spectrum of aeronautical technologies, including missiles and complex weapons systems, have progressively acquired and incorporated advanced ICT systems integration competences in the emerging field of defence electronics. In order to ensure the sustainability of the present defence industrial consolidating model, governments of arms-producing countries have capitalized on the dualities existing between civil and military aeronautical technologies (see Ch. 4) not only by integrating R&D and productive structures of their national champions, but also by intensively renting on economies of scale in commercial aeronautical/aerospace markets to redirect capitals back into the military innovation machine, under the illusion to be able to control the effects of a globalizing economy on the competitiveness of their DTIBs (Interviews 1,9,10,31,37,39).

The next section empirical supports the argument that technology, and not the end of Cold war, drove the governmental decision in major arms-producing countries to consolidate defence production around national defence industrial champions in the field of aerospace/defence electronics. The analysis of the two French and German industrial consolidating experiences will document the technological significance of domestic defence consolidating exercises under TEP-1. Despite following different strategies, both countries, key defence players in Europe, came to concentrate on vertically merging and horizontally acquiring, the finest state of the technological art in aerospace and defence electronics. The German and Franco experiences also set the scene for the creation of a transnational consolidated company, the European Defence and Aerospace Company (EADS), analysed in Chapter 6 and marking the shift to TEP-2.

[171] In the same report it has been reported, furthermore, that: 'many defence firms are buying electronics and software integration capabilities' where they see options to strengthen future systems integration capabilities on the basis of those already acquired (DSB 1997b:11).

5.3 Exploring two national defence industrial consolidation experiences in Europe

5.3.1 The German case: a total concentration approach

The first and possibly most vivid example of the significance that technological motives played in incentivizing the restructuring of the arms industry in Europe is provided by the creation of Deutsche Aerospace (DASA) in Germany. In 1989, Germany's largest industrial firm, Daimler Benz established DASA from the merger and acquisition of Messerschmitt-Bölkow-Blohm GmbH (MBB), Dornier, MTU and two strategic business units of the electronic company Telefunken Systemtechnik (TST). This sub-section will reconstruct the crucial steps that led to such consolidation, highlighting the importance of technological considerations in the peculiar concentration strategy adopted.

The origins of the German defence industrial consolidation exercise intersect with the history of the domestic consortium Deutsch Airbus GMbH. In the course of the 1980s, the public shareholders of MBB, namely the State of Bavaria, the city-State of Bremen, the city-State of Hamburg, and the city of Berlin, wanted to 'get rid' of the commercial risk of Airbus, which they earlier undertook to support the launch of the civil aeronautical programme (Interview n. 27, for the broader picture see Ch. 4 Section 4.3). At the time, MBB was the largest firm in the aerospace sector in Germany, second being the privatized Dornier. Despite the bigger size its trail of economic losses scared public investors; for this reason the Federal Ministry of Economics in Bonn initiated talks with industrialists for a possible take over of MBB[172] (Brzoska and Lock 1992:120; Interviews 10,27).

[172] There were just a few companies in Germany who could take up the risk connected to MBB: the company BMW was not prepared to do that, although the State of Bavaria (MBB public shareholder) with the support of part of the politics would have preferred the automotive car-builder as the new shareholder of MBB (Interview 27). Rumours indicated that Siemens, also a shareholder of MBB, was also approached to investigate a potential interest, which was promptly denied (Brzoska and Lock 1992:121) once Siemens' board of directors informally qualified MBB as an 'incontrollable entity' (Interview 25). According to another reading, by the end of the 1980s, Siemens, whose involvement in defence markets was proving commercially non-rentable and technologically no-more affordable face to an extremely competitive top-tier capabilities development cluster, had already deliberated its own corporate strategy in the sense of opting-out from the military capital, not ranking anymore as a 'serious' player in advanced micro-electronics, having heavily invested instead into energy and telecommunication markets (Interview 31). For this reason, because MBB and Siemens were not available, the only option left was to turn to Daimler Benz for the acquisition of MBB.

By the mid-1980s Daimler Benz had instead already autonomously developed its own corporate strategic vision around the creation of a large *Systemführer'* (trad: Systems integrator*)*. In other words, Daimler wanted to become the most important integrated technology conglomerate (*Konzern*) in Germany (Interviews 1,9,25,27). The elaborated strategic decision envisaged the promotion of a private integrated mobility concept, covering not only car-builders but almost 'everything that moves'and the expansion of its business base towards product differentiation activities (Interviews 9,25,27). In order to achieve such objective and become less dependent on external technology providers, Daimler acquired the 100% of the capital of MTU, major engine supplier in Germany, two business units of AEG, which belonged to *Telefunken Systemtechnik (TST)*, namely TST High Frequency Technologies in Ulm and TST Marine Technology in Werer, both suppliers of major electronic equipment such as radar technologies and, later Dornier (Interview 27).

The acquisition of Dornier, indeed, further expanded the technological integration, product differentiation, and business expansion opportunities of Daimler (Interview 27); in those years, indeed Dornier was producing civil regional aircrafts for Airbus, private jets, and to a certain extent military vehicles and drones, having a privileged access to a tremendous amount of diverse technologies, and most prominently advanced micro-electronics (Interviews 25, 27). It furthermore owned significant R&D instalments and intensive application and testing plants (Brzoska and Lock 1992:125); additionally, Dornier was also direct competitor of MBB as they were both small systems integrators in their own field, with MBB providing systems integration capabilities in the Eurofighter programme and Dornier being the only German partner in the AlfaJet programme (Interviews 1,27).

After such important acquisition was completed, it became clear that the only suitable candidate to absorb the risk of MBB operation could have been Daimler. A convergence of interests emerged once the CEO of Daimler saw in a potential acquisition of MBB an opportunity to complete the technology conglomerate project, while from the other side there was the direct interest from the MBB's public investors to find a risk-sharing partner for Airbus GMbH (Interview 27). Reviving negotiations earlier initiated, the Federal Minister for Economic Affairs Martin Bangeman informally invited the Daimler's management to take over MBB; after the German government ensured its commitment via a guarantee with Deutsche Bank, to

pay the financial subsidies for the operation, Daimler's Board of Directors agreed to the operation in 1988 (Brzoska and Lock 1992:121; Interview 27).

The possibility for Daimler, having in the meantime united MTU, Dornier, and the two mentioned strategic TST parts of AEG, to also integrate MBB under the new corporate roof of DASA became a highly loaded political issue (Interviews 9,25,27). The successful completion of the operation would have concentrated into the newly-created structure DASA, *per se* a private company, a dominant share of the military aerial (e.g. aircrafts, missiles, drones, propulsion units) and electronics producing capacity of Germany (Interviews 9,25,27). At the same time the operation would have confirmed the critical value, in the strategic basket of military production, of aeronautical related-technologies, to the clear detriment of the shipbuilding sector. It has been referred by personalities interviewed that there was at the time a strong political support for the shipbuilding industry from German parliamentarians, with a strong unity across different parties (Interview 9). The German reputation in arms-production was particularly solid on land and water military equipment, from thanks to ships, from anti-mine warfare to submarines, while there was, in principle, no political 'selling point' on the aeronautical side outside the commercial case of Airbus, as the German military airpower grew along with that of the Americans, who always reserved special cooperative arrangements to the Germans, also granting special product development licences to them. For this reason, the only option left to support the consolidation of the arms industry was to push car-builders in a military direction under the integrated technology conglomerate strategy pursuing a, so to speak, 'total concentration approach' (Interview 9).

After the Federal Cartel Office found economic evidence of excessive concentration risks for the German arms market structure deriving from the prospected take-over, the Minister of Economics opposed on political grounds the economic national interest card to out-weight the costs of reduced competition, and, under indication received by an ad hoc-established Monopoly Commission, gave clearance to the take-over under the condition that MBB would sell some of its subsidiaries involved in naval (e.g. the business unit of Navy Technology of Bremen) and land production, as well as that Daimler Benz and MBB's managers would step out from their posts as members of supervisory boards of other arms producing companies (Brzoska and Lock 1992:121; Interview 27). The deal was accepted by both Daimler and MBB's boards of directors leading to the creation of DASA and its

organization into 5 units, namely: Aerospace, Space, Defence and Systems, Propulsion and Diversification (Interviews 1,2,9,25,27).

Despite the cross-fertilizations existing in the area of advanced electronics between aeronautical and shipbuilding technologies, most prominently missiles and sensors areas, the political decision to detach maritime and land technologies from MBB productive lines seemed clearly directed at concentrating the strategic core of military technological production into the aeronautical/aerospace sector. The national industrial champion DASA coherently reflected 'a total concentration approach,' which endorsed a set of strategic visions, namely the technological integrated conglomerate or *Konzern*, the product differentiation strategy, the dual use aeronautical R&D and productive orientation. The German total concentration strategy for DASA represents a first peculiar articulation of the defence industrial restructuring movement, having recognized the prominent importance of technological and business integration activities/capabilities as well as of the strategic determination to rent from economies of scale deriving from civil aeronautics, and redirect expanded incomes to keep financing the advanced performance of the military sector. It is clear that other sectors, namely land and naval, not presenting similar return prospects in terms of both technological integration capacity and commercial market opportunities registered lower levels of consolidation, also lacking the same level of public investment and strategic political consideration.

The vertical integration of a huge corporation such as DASA allowed continuous R&D and technological cross-fertilization between civil and military aeronautics, once barriers amongst pre-existing companies were physically eliminated. As confirmed in the course of the interviews, the proximity between the two innovation environments favoured the formation of a 'spin-back' mechanism under which a part of the dividends generated on commercial markets where systematically re-injected into the military innovation machine. At the same time, and in coherency with what anticipated in overall terms in section 5.2, the acquisition of companies branches with advanced competences in micro-electronics and systems integration capacities allowed to bridge aeronautical, aerospace and defence electronics (Brzoska and Lock 1992:126; Interviews 25, 27) and exponentially increment the technological/operative and business performance of final products on both defence and commercial markets (Interviews 1, 9, 25).

Such a technology-driven concentration approach in aeronautics/aerospace also marked the progressive divide between car and aircraft building activities; indeed, although the major Daimler R&T centre in Ulm (Germany) became a joint organization conducting basic research activities, after the creation of DASA, only three research areas were still working together (e.g. cars and aircrafts), which were carbon fibre composites materials[173], speech recognition[174] and the head up display[175] technologies, while all the remaining research areas were separated (Interviews 9,25,27). Despite the huge enthusiasm of the early days with joint teams working on advanced integrated concepts, a heavy divergence in product development activities started to emerge (Interview 25). In those years, while the Eurofighter German series production was assembling 15 military aircrafts per year, Daimler was delivering 3 cars per minute on the final production line: it was clear how the options for strategic convergence between the two sectors were essentially null (Interview 25). In contrast, with approximately 300 aircrafts placed on the commercial market per year, the over-expansion of the civil aeronautical sector clearly determined a strengthening of R&D activities; it has been reported that, progressively, R&D advancements in the civil aeronautical sector, for example in the domain of aircraft components design (e.g. fuselage and panels), led to the development of technologies for automation, such as automatic riveting, which were transferred and applied also in the military field (Interview 25). Such reversion of balance (e.g. military-civil) in R&D trends, only appearing under TEP-1, will manifest most prominently in the post-Eurofighter phase, namely the 2000s period, where a substantive lack of new major defence aeronautical cooperative programs in Europe led to a continuous stretching of national military R&D aeronautical facilities (Interviews 9,25,27).

In overall terms, the total concentration approach having characterized the German defence industrial consolidating experience saw its fullest articulation within the R&D and productive perimeters of aeronautical and aerospace industries, progressively distancing the automotive industry from the *Konzern* vision. Indeed, the technological integrated conglomerate, centred on the idea of a vertical and horizontal

[173] Dualities characterizing advanced materials technologies were fully illustrated in the course of Chapter 4.
[174] As speech recognition was planned to support the car driver and the combat pilot, the R&D domain remained of joint interest.
[175] Head-up display technologies allow the driver to visualize the speed displayed on the window without having to lean down consecutively. Head-up display is present both in aircrafts and in very expensive cars, hence the joint R&D efforts. This technology is the result of a combination of advancements in microelectronics and their integration on optics fibres.

consolidation amongst aeronautical, aerospace, and defence electronics segments, under a product differentiation (e.g. civil/military) strategy, coherently elevated the national champion DASA in a privileged position to detect, generate, and diffuse new advances in the technological world, and to anticipate and monitor future developments across strategic military and commercial markets.

5.3.2 The French case: a differentiated concentration strategy

The French defence industrial consolidation experience was delayed compared to the German one. The difference in the timeline of industrial restructuring activities undertaken in the French environment is to be prominently ascribed, according to those interviewed, to the specificities characterizing the French military and political environment. At the time, a prominent obstacle in the restructuring process was represented by the nature and organization of the national defence productive system: indeed, with a view to keep control and capillary ties over the most strategic segment of production for the country, France had traditionally[176] organized the functioning of the military industrial sector into a universe of State-establishments (arsenals)[177], State-owned enterprises [178], and publicly-controlled companies [179] (Kolodziej 1987:236; Hébert 1993:11, 103-114 1998a:128-129; Markusen and Serfati 2000:277; Serfati 2000b:24; Mampaey 2001:129; Interviews 30,31,35,37,39).

In light of the high political sensitivity embedded in the traditional State-controlled organization of the defence business, several public administrations had faced long-standing opposition, especially from leftist governmental coalitions, against the implementation of privatization plans into the defence industrial sector (Kolodziej 1987:284; Hérbert 1998b127; Serfati 2000b:24-25; Interviews n.30,31,35,39). In the second half of the 1980s indeed, a number of attempts played

[176] Ever since the inception of the Fifth Republic (1958) the arms industry has been conceived as the main leverage for industrial and technology policy so that defence contractors have remained the backbone of the national system of innovation (Kolodziej 1987; Hébert 1993; Serfati 1995, 2000a; 2001b).

[177] These are services under State control, without legal status and subject to the rules of public law. They are an integral part of the State and are managed by the Direction Générale de l'Armement (DGA), even if certain administrative systems can also provide them with a certain financial independence.

[178] These are companies owned by the State with legal status and subject to the rules of private law. They have financial and administrative independence.

[179] These are companies in which the State directly or indirectly holds the majority of shares. They are governed by the rules of the private law and generally take the form of public limited companies.

by the Chirac Government, while the socialist François Mitterrand was still President of France, to include defence in the first wave of reforms (1986-1989) having brought important companies in the field of telecommunications and electronics, such as Matra-Hachette, Lagardère Groupe and Alcatel–Alsthom, to become private enterprises (De Bandt 1998:92; Parker 1998:30), failed (Interviews 31,39). It was only in 1997, once Chirac became President and a centre-right government was formed, that a political plan could be advanced by, at the time, Minister of Defence, Charles Millon, to restructure the French arms industry (Serfati 2000b:25; Mampaey 2001:130; Interviews n. 30,31,39). The delay in the French political response, and consequently the necessity of actions to be tailored and implemented with a certain urgency, became evident once the earlier restructured German DASA had already initiated negotiations in the first half of the 1990s with the similarly restructured British Aerospace (BA) with a view to considering a potential transnational integration project (Interview 39). Sped up by the concrete risk that an Anglo-German defence industrial giant could emerge before, and without a completed restructuring of the French defence industrial base having happened, Millon's cabinet worked closely with the industry, and under its direct input, to develop and implement a restructuring plan, including intense privatizations (Interviews 31, 37,39).

The political project's objective was to create two distinct technological poles in the field of aerospace and defence electronics at national level (Hébert 2006:38-39; Hartley et al 2015:85-86 Interviews 31,37, 39). Candidates for the formation of an aeronautical pole were Dassault, Aerospatiale and Matra Hautes Technologies (Interviews 31,39). While Aerospatiale and Dassault were both State-owned[180], the relative smaller defence supplier Matra belonged to the successful entrepreneur and businessman Jean-Luc Lagardère (Interviews 31,39). At first, there were talks between Aerospatiale and Dassault in the sense of preparing a merge between the two companies, also comprising an ad hoc privatization plan. This first vertical consolidation attempt between aeronautical enterprises failed because the same French government opted for a different strategic corporate decision to split Dassault, at the time State-owned, into two separate entities: an aeronautical (e.g. Dassault Aeronatique) and an electronic one (Dassault Electronique), each complementing,

[180] Only the naval sector was at the time a State arsenal e.g. constituting integral part of the Government administration while the aeronautical, space and electronics fields were State-owned. In the French aerospace panorama, Matra was the only existing private company.

respectively and autonomously, the 'double technological pole' philosophy (Hartley et al 2015: 86; Interviews 31,36).

As a second option, Aerospatiale turned to Matra proposing the merger with the support of the French government which recognized indeed in the influential personality of Jean-Luc Lagardère, and his successful private sector-oriented standards and corporate management methods, a valuable and instrumental source to support and accompany the national process of privatization and restructuring of the French defence industrial capital (Interviews 31, 39). As will be evidenced in Chapter 6, and also in light of the temporal proximity[181] between the two strategic corporate operations, the personal interposition of Lagardère also played a primary role in establishing entrepreneurial ties with the fully- privatized DASA in the larger transnational defence consolidation project which led to the creation of the European Aeronautics and Defence Space Company (EADS) (Interviews 37,39). As a result of the Aerospatiale-Matra national consolidation operation, companies which for more than 30 years had experienced throat-cutting competition in missiles and satellites integrated their technological potential, essentially coming to agglomerate in the same R&D labs and manufacturing structures the full spectrum of strategic military industrial capabilities (e.g. air-to-air, air-to-ground, surface-to-air, artificials and explosives, observation and reconnaissance) (Interview 31).

While the Aerospatiale-Matra operation vertically consolidated the national dual-use technological aeronautical capacity similarly to the strategy followed by the Germans with DASA, the decision to support the creation of an autonomous R&D and productive reality with the Dassault Aviation guaranteed the preservation of a stand-alone, but most importantly State-controlled, advanced technological military segment, according to what could be defined 'a differentiated or two-track concentration strategy'. Such strategic differentiated approach is further reflected in the decision to keep two distinct technological poles in the field of aerospace and defence electronics at the national level. Indeed, besides the differentiated consolidation in the aeronautical/aerospace sector around a privatized company (e.g. Aerospatiale-Matra) and a State-controlled one (e.g. Dassault Aviation), the French government decided to concentrate a defence electronics pole at national level around

[181] Only 5 months passed between the creation of the new Aerospatiale-Matra aeronautical entity (June 1999) and the announcement of the merger between Aerospatiale-Matra and DASA into the European Aeronautics, Defence and Space Company (EADS).

the three companies Dassault Electronique (as from the partition of the company Dassault in two), Thomson-Brant and Alcatel Defence and Space. This triad went further consolidated around Thales Group (previously Thomson-CSF), which reunited in intermediate steps Thomson-Brandt, Dassault Elecronique and Alcatel Defence and Space (Interviews 31, 32, 35, 36, 39). It is to be noted that the parallel generation of two solid technological poles (aeronautics/aerospace and defence electronics) made France once again competitive, de facto re-emerging as a credible counter-balance to the Anglo-German evolving projects (Interviews 32, 35, 39). Indeed, the registered increase in companies' financial value on capital markets deriving from the economic consolidating operations, also comprising the development of an advanced defence electronics segment (which DASA did not have), led British Aerospace (BA) to reconsider a transnational integration move with the Germans and proceed instead to potentiate its own defence electronics technological capacity with the acquisition in 1999 of GEC-Marconi (hence become BAE Systems) (Interviews 35,39) in a strategic mistake, if observed ex post, which opened instead the door to the Franco-German negotiations on EADS.

These two examples have shown the importance of technological considerations in the process of defence industrial consolidation, which, having followed two different timelines under TEP-1, discredited the traditionally evoked 'end of Cold War' explanation. In line with theoretical anticipations made in Chapter 3 on TEPs structure, technological motives have pervaded the evolution of TEP-1 remaining at the heart of political and corporate strategies elaborated towards the defence industrial sector. In Germany, where the political environment has been historically (after WWII) characterized by a weaker State-tie over military productive activities, the process of national defence industrial consolidation initiated even before the Cold War ended (1989), and followed a total concentration approach with the creation of the aeronautical *Konzern* DASA, which included all the strategic technological capabilities in the same basket. In France, traditionally characterized (since the 5th Republic) by a pervasive State-led and controlled organization of military production strategically leveraging national industrial and technological policies, the process of restructuring has been slightly delayed, due to the reluctance displayed by several public administrations to politically accept the item of privatization of the defence industrial capital, in itself instrumental to support defence restructuring activities.

This same historical orientation to reserve to the State a more stringent role over the defence sector has inspired a different techno-dependent concentration strategy: as evidenced in this section, the hand of the French government has more vigorously guided the consolidation activities having opted to maintain a degree of strategic separation between hard-defence (Dassault Aviation) and dual-use (Aerospatiale-Matra) aeronautical/aerospace productive segments. Cognizant of the pervasive significance of the ICT revolution for the military, which in that specific timeframe went strategically attached to the aeronautics/aerospace business, yet aware of its propensity to project well beyond those specific products market-areas, the French government decided to strategic differentiate by creating a stand-alone defence electronics pole. Observed together, both reviewed consolidating experiences under TEP-1 mark the emergence of national industrial champions in aeronautics/aerospace with a strong projection over the defence electronics domain. After having elaborated a rich articulation of TEP-1, the second part of the chapter will provide for further empirical verification to the theory from the perspective to test the strength of the argument connecting shifts in TEPs to SIAs (layer n.1). In the absence of an accomplished shift in TEP-1, the analysis will evidence the irrelevance of the first EC entrepreneurial attempt to accompany an adjustment in the EDEM socio-institutional structure (layer n.2).

5.4 Understanding non-SIA in EDEM

This section analyses the first EC's attempt to advance a policy regime for defence equipment markets in Europe with the two recalled 1996 and 1997 policy initiatives (CEC 1996b;1997c). If the theoretical assumptions made in Chapter 3 were correct, the present case study would have in principle to evidence: 1) a failed socio-institutional adjustment in EDEM, namely a lack of regulatory change, in the absence of an accomplished shift in TEP-1; 2) the irrelevance/insignificance of the EC's policy entrepreneurial action, regardless of its level of technical, political and strategic elaboration, in the presence of a TEP-1 not yet having reached its full expansive potential.

The analysis starts by contesting the only available academic reconstruction of the two EC's strategic policy initiatives under comment. As anticipated in Chapter 2 (section 2.3.2) containing the review of the politics debate on EDEM, and in specific of European Integration (EI) derivate contributions, the only empirical study available on this totally understudied passage of the EU defence integration history adopts a theoretical framework inspired by organizational studies (Mörth 1999,2000,2003). While acknowledging, the sensitivity of the post-Cold War security environment and the pervasive sense of uncertainty characterizing the debate on the future of global international political relations, with a formal reactivation of a number of security institutions partially overlapping with the NATO's collective framework, Mörth advanced an institutional argument, placing the EC's policy-framing activities at the very centre of the analytical picture. More specifically, in providing for a theoretically supported reading of the EC's failure to frame a regime for defence equipment markets in Europe, she postulated that an internal tension would characterize two EC Directorate General involved, namely the Directorate-General (DG-IA) for multilateral political affairs and the DG- III for industry (Mörth 2000:179; 2003:42). As a matter of fact, the inter-pillared or cross-border nature of the armaments subject would in principle justify its political framing under both the 'defence field' and the 'market field' domains, creating controversy on competence and regulatory options available to policy-makers (Mörth 1999, 2000:174, 2003). Internally to the EC, clashing political visions regarding where to place (e.g. first/internal market pillar vs. second/CFSP pillar) and how to frame (e.g. liberalization of the internal market vs. development of a European defence and security identity) the armaments policy item have been elevated by Mörth, under an ideational reading inspired by an organizational scholarship, to the relevant, if not the major cause[182], having jeopardized the supranational institution's achievement of tangible results in policy-making activities directed to defence industries and equipment markets (Mörth 2003:17ss, 93ss).

It is proposed here, that a more accurate reconstruction of the causes and activities surrounding the failure of the first EC's policy entrepreneurial attempt towards EDEM requires coherently placing and reading the two political initiatives

[182] It is indicated that: 'frames are referents for action and that they give direction to the integration process [..] by legitimating certain decisions and activating certain issues, actors, and special types of knowledge. Thus frames concern power- the power to define and conceptualise' (Mörth 2000:173-174).

under the spotlight of 'real life' situations. As reconstructed in the first part of this chapter (sections 5.2, 5.3), the context in which TEP-1 evolves has been prominently shaped by a set of techno-dependent, politically-guided restructuring processes operating in the organization of the defence industrial sector in the US and Europe. Although the scholarly contribution under comment explicitly mentioned that the EC's framing activity directly touched on the subject matter of restructuring the European defence industry as prodromal to the removal of art 223 Treaty of Rome (today art. 346 TFEU) (Mörth 2000:174), no theoretical or empirical consideration of any kind is given to the analysis of dynamics of change in the military R&D and productive machine within major arms-producing countries. The referred dynamics had such central political importance for most of the developed defence technological and industrial economies of Europe involved in creating their own national defence industrial champions that, regardless of the level of internal EC's institutional elaboration, the defence industrial and market policy essentially qualified as a 'non-item' for MSs on the European political/policy- making agenda (Interviews 3, 8, 12, 13).

As a matter of fact, and as to be evidenced in the strategic analysis hereinafter developed, the politico-economic uncertainty/instability which characterized the post-Cold War security environment was detrimental, rather than beneficial, to the EC's entrepreneurial strategy which aimed at exploiting that political contingency as a 'window of opportunity' to reclaim a share of competence over the regulatory organization of defence equipment markets. It was not a coincidence, indeed, that by the end of this first unfortunate attempt to pass EDEM, MS of the major six arms-producing countries in Europe decided to politically reaffirm their exclusive competence over defence industrial and market-related matters by signing, in 1998, a Memorandum of Understanding (MoU) contained in a Letter of Intent (LoI)[183], and stipulating two years later an international agreement (e.g. the Farnborough Agreement)[184], making further explicit commitments[185] to accompany the future process of defence industrial consolidation at the intergovernmental level.

[183] Letter of Intent between 6 Defence Ministers on Measures to facilitate the Restructuring of the European Defence Industry signed in London, 06/07/1998

[184] Framework Agreement between the French Republic, the Federal Republic of Germany, the Italian Republic, the Kingdom of Spain, the Kingdom of Sweden, the United Kingdom of Great Britain and the Northern Ireland concerning measures to facilitate the restructuring and operation of the European Defence Industry, Farnborough 27/07/2000.

If it is evident that a wider and deeper set of causes was blocking the supranational socio-institutional adjustment in EDEM, the analysis of the internal strategic line implemented by the EC with the two policy initiatives provides a further degree of verification of the theory presented, and most specifically its 2nd layer, which postulates the insignificance of policy entrepreneurial activities undertaken under a TEP in evolution, namely not having fulfilled its expansive potential. The analysis, containing a rich elaboration of a unique set of oral and unedited historical archival sources, places, more than 20 years after its elaboration, the EC's policy entrepreneurial plan under a different light, namely re-projecting not only Mörth's original assumptions over the existence of an internal tension between the EC political (DG-IA) and industrial (DG-III) institutional wings, but also tracing for the very first time the origins of the defence industrial representation activity and early involvement with the EC in its policy formulation and negotiation processes.

In open contrast to what was previously postulated in the scholarly analysis reviewed, the EC's decision to exploit the political contingency, namely the end of the Cold War and its ubiquitous negative economic impact on the DTIBs of Europe, led to the formation of a very atypical strategic axis, composed of an existing 'enterprise/industrial affairs' channel (DG-III) and of a newly-created external/multilateral political affairs directorate (DG-I/A)[186] from the partition into two of the general DG-I, only covering, after the Maastricht Treaty, external commercial and economic affairs. As reported, the two Communications 96/10 and 97/583 had a 'spontaneous genesis' (Interview 16; HAEU AV 06.03-139 doc 10). They originated, in other words, from the concerted action of a small number of officials between DG-IA and DG-III under the III Delors' Commission, later continued under the Santer's one, with the key support received by Martin Bangemann's cabinet covering internal market, industrial affairs and ICT. Whilst the two Dutch Commissioners who consecutively came into office, namely Franz

[185] In the fields of security of supply (art. 1.3-1.5 LoI; art 4-12 FA), export procedures (art. 1.6-1.11 LoI;12-18 FA), security of classified information (art. 1.12-1.13 LoI; art. 19-27 FA); defence-related R&D (art. 1.14-1.15 LoI; 28-36 FA), treatment of technical information (art. 1-16-1.18 LoI; att. 37-44 FA), harmonization of military requirements (art. 1.19 LoI; 45-49 FA), protection of commercially sensitive information (art. 50-54 FA).

[186] It is curious to trace, here in the creation of DG IA, the very institutional origins of the movement which progressively led to the EC occupying a larger space in the foreign and security affairs field, to the detriment of the competences reserved by the Maastricht Treaty to the II intergovernmental pillar, with the successive creation of DG-Relex, later migrated with the Lisbon Treaty into a supranational hybrid structure, namely the European External Action Service (EEAS). Such spin-out will be further developed in Chapter 7, which will illustrate the further adjustment of the socio-institutional structure in EDTIB, and the importance of linking a defence industrial policy project to the strengthening of a EU foreign and security policy dimension.

Andriessen and Hans van den Broek, proved essentially uninterested in promoting the opening up of the European defence markets/ supporting the consolidation of the industry in the context of the ever-growing number of items falling under the external political relations frame, the two German directors of DG I (economic external affairs) and DG IA (external political affairs), respectively Horst Krenzler and Guther Burghardt, worked very closely with the Bangemann's team and DG-III for Enterprise and Industrial affairs (Interviews 16,18).

As anticipated, at the time the initiatives were prepared a huge element of uncertainty weighted on the future of Europe's security and defence architecture. Not only defence remained outside the scope of activities falling under the so-called *aquis communautaire* (e.g. ex-first pillar of the Maastricht Treaty), but a rule of *intergovernmentalism* characterizing the emerging CFSP-related matters (e.g. ex-second pillar of the Maastricht Treaty) reserved a functional competence over the harmonization of defence policies to a 1984 revitalized institution, namely the Western European Union (WEU). The WEU had nine subsidiary bodies endowed with autonomous legal status, two of them directly involved in the defence industrial and market-related subjects, namely the Western European Armaments Group (WEAG) and the Western European Armaments Organization (WEAO). While the WEAO comprised a small secretariat –only between 1996 and 2006- tasked to provide support to cooperative R&D projects developed under WEAG Panel II (the so called 'research cell') from which the European Cooperation for the Long-Term in Defence (EUCLID) and the Common European Priority Areas (CEPAS) emerged[187], the WEAG itself, the main institutional framework deputed to support armaments cooperation in Europe, represented a direct spin-off of the 1976 NATO established Independent European Armaments Group (IEAG) organized into three panels reporting to the National Armaments Directors (NADs) covering respectively, the harmonization of military requirements (Panel I), R&D projects (Panel II) and cooperative equipment programs (Panel III) (Kyrimis 1997: 135, 249-250; Interviews 8, 12, 14,18)[188].

[187] As it will be illustrated in the course of the second part of Chapter 7, the WEAO experience and legacy proved significant in inspiring the evolution of the European institutional cooperation in defence R&D under the European Defence Agency, and most recently under the European Commission's aegis.

[188] A further analysis of the activities conducted under WEAG Panel III will be contained in the course of Chapter 6 reconstructing the origins of EU institutional cooperation in defence equipment affairs, and the strategic plan elaborated by the EC under the occurring shift in TEP-1 to replace a WEAG expiring institutional capacity and retain its competence on EDEM affairs.

In light of the centrality of the formal institutional role played by WEAG at the time, in promoting cooperation in defence industrial and market-related affairs, it became essential, from the EC's perspective, to establish a first line of contact with the WEU/WEAG experts and the intergovernmental defence world. Such an objective necessitated the direct involvement of the newly created Directorate general for external political affairs (DG-IA), which acted as '*chef de file*' in the process (Interviews 16, 18). There were, nevertheless, a number of problematic aspects: firstly, since functionaries of DG-IA were selected from foreign affairs personnel in MS, the Directorate was essentially composed of a number of diplomats with no previous experience in military affairs or specific understanding of the military environment (Interview 16). Secondly, the same Directorate in charge of external political affairs could not identify a driving force in the existing political environment, namely a Member State or group of Member States with whom to play strategically to shortening the political divide with WEU/WEAG/WEAO and opening negotiation opportunities (Interviews 17, 18). For this reason personal relations amongst people having a military background became essential over formal political ones (Interview 3).

If the strategic channel opened by Bangemann's Cabinet via DG-IA on the side of MSs and the complex geometry of their different political/institutional agglomerations (e.g. bilateral, WEU, WEAO, WEAG, Council Permanent Working Group on Armaments Policy- POLARM- and later LoI) proceeded slowly, if not at all, in light of the fact that major arms-producing countries were not ready to liberalize defence equipment markets abolishing art. 223 TEC (today art. 346 TFEU) and open the EC route in the absence of a completed consolidation of their own defence industries under TEP-1, there was a co-piloting role for DG-III to play, the Directorate General which has traditionally represented the most direct interface with the industrial capital of Europe. The Directorate employed at the time a considerable number of engineers, namely national experts with advanced technical skills and expertise in the different industrial sectors. National experts, namely a number of military engineers with a previously successful career in the national armed forces played instrumental in opening, for the very first time, a direct communication channel with ex-colleagues from the national military environment transited to WEAG, and to the POLARM's Council working group as WEAG experts, as well

as with an early created body, the European Defence Industrial Group (EDIG)[189] deputed to represent the European defence industrial instances within WEAG (Interviews 3, 48, Informant 1).

After a general preliminary reflection, building on the political interactions carefully developed with the permanent armaments working group created at the Council level under German impulse, the POLARM, and internally potentiated between DG-IA and DG-III, a 'defence industrial manifesto' containing a thematic action plan (CEC 1996b:17-28) was issued with the first EC Communication from January 1996. It is noteworthy to observe how the EC officials strategically presented an illustration of existing industrial and economic challenges to legitimize the framing and implementation of a concerted political solution. The common effort would coordinate, at a technical level, a set of joint (e.g. Community plus CFSP) instruments, manifesting, however, on the first pillar side, a really narrow legal ground (CEC 1996b:14-15; elaborations on Interviews 3,16). Additionally, and this is really a unique source in the panorama of studies on the topic, it is reported by the senior policy officers who worked directly on the draft of Communication 96/10 that in the minds of those who first conceived its substance, EDEM would have represented an objective, and not a means, of a functioning European defence industrial policy (Interview 3). For this reason, and according to the reported interpretation, EDEM would not encompass a framework containing rules for the procurement and transfer of military equipment only. Instead, it would comprise an EDTIB in the first place, namely a strong EU R&D investment component, which was regarded as essential for the promotion of a level industrial playing field (Interviews 3,16). Consequently, the joint development of advanced technologies and products for the armed forces in Europe would slowly consolidate the supply side of a larger market, to which one could later attach ad hoc regulatory provisions (Interviews 3, 16). Such a perspective, highly favoured by 'old guard' officials, with technical and operational competence in military affairs, essentially nationally seconded in the EC, collided directly, if an internal tension had to be indicated, with a more 'legalistic' mind-set, which instead characterized the philosophy beyond the EC

[189] Set up in 1990 as an international association of Belgian law, EDIG drew its membership from all the national defence industry associations sectors of WEAG (Interviews 3,17,18). Considering the intra-Atlanticist and intergovernmental nature of EDIG's genesis, the liaison with the EC's supranational world would not come immediate (Interview 3).

internal market construction project, which in turn stands on the neoclassical economic notion of pure or perfect competition (see Ch. 3 subsection 3.1.3)[190].

For this reason, in the minds of military engineers, as opposed to competition lawyers, it proved totally fallacious to endorse such an economic rationale, also supporting the functioning of the whole internal market, to a special market ruled minimally by price but considerably by the sound of (costly) technological development activities (elaboration on Interviews 1, 3, 4, 15, 15, 17, 20, 35). Policy officers interviewed further stressed this point by observing that, despite the numerous attempts to involve the Directorate-General (DG-IV) at the time in charge of internal market and competition issues in the proposed defence-related initiatives, internal market/competition lawyers opposed a firm rejection (Interviews 3, 47). DG-IV, in the following decade split between DG-MARKT (covering internal market affairs) and DG-COMP (covering competition issues), found strong support by the EC's Secretary General (SEC-GEN), whose doctrinal views have traditionally, and for a long time, denied, according to a strict interpretation of Treaties' provisions, that the EU had legal competence in the defence market and industrial fields, hence *a principio* cutting legs to any EC political project for the promotion of EDEM (Interviews 3, 47).

In the absence of a direct bridge on the MSs' side, outside of the weak framework of the POLARM Council Working Party, and cut off by the legalistic EC's institutional component, DG-III had no other choice but, supported by DG-IA and the Bangemann's cabinet, to further expand the liaison with the transforming European defence industrial universe and its nascent representative association. For the first time in history, a concerted and structured round of consultations took place between the EC and the defence industries of Europe. An attentive investigation completed at archival level, and confirmed by oral contributions, suggests indeed that three formal meetings were conducted between July 1996 and October 1997, essentially building on the presented EC's Action Plan contained in Communication

[190] As illustrated in the course of Chapter 3 subsection 3.1.3, according to neoclassical theory, the economic efficiency of a market can be maximized by fragmenting the quota/shares of that market amongst a higher number of economic players, operating in conditions of pure or perfect competition. As a consequence, the optimal competitive performance is reached by selling more at a lower price until reaching a (projective/ideal) market equilibrium situation, where the price equates to the marginal cost, namely there is no more profit. Because of the technological significance of defence equipment markets, with multi-billion investments allocated to R&D activities, the competitive advantage for defence industries is never gained on price, but rather on the advance in the technological performance only few can afford to produce and buy.

10/1996 with a view to preparing, together with the defence industry, an implementation strategy, then transposed in the text of the EC Communication 583/1997 (HAEU AV 06 .03 139,144; Interviews 3, 16, 18)[191].

A first meeting was celebrated in July 1996 between Bangemann and the CEOs of the defence industries of Europe. Having managed to overcome an initial reluctance displayed on the industrial side[192], an agreement was reached in terms of tasking 3 EDIG rapporteurs, in a proposed second formal meeting with the EC, to deepen a reflection on three crucial themes for the effective consolidation of the European defence industrial base[193] (HAEU AV 139 doc. 10 annex 2, doc 11). EDIG rapporteurs' inputs represented the basis for discussion for a second important meeting with the defence industrial sector held in spring 1997, whose strategic approach was previously defined by DG III, playing this time as leading directorate in the presence of Commissioners Bangeman, Broek, Brittain and Cresson, and the EC's Directors General of Directorates involved. A third and final meeting took place in the fall of 1997, shortly before the publication of the EC's implementation plan (HAEU, AV 06.03 Files 139 doc. 11, 144).

Provided that the defence industrial restructuring process under a TEP-1 in evolution would have, in any case, blocked a successful policy entrepreneurial attempt to adjust socio-institutional structures in EDEM, as the case study under consideration documents (layer n.1 of the theory), one could further elaborate on the EC's strategy to evidence that, despite its level of internal (e.g. DG-IA/DG-III) and external (e.g. link with defence industries) development, there were essentially no chances to seize that window of opportunity in the absence of an accomplished shift in TEP (layer n. 2 of the theory). On the side of the interaction with the defence

191 The importance of seizing the political window of opportunity and reinforcing ties with the defence industrial component also emerges in a note contained in the private collection of a DG-IA official at the time, further evidencing the element of synergic cooperation with DG-III, which reads: '*The [defence] market is passing from the Russians to the Americans with the Europeans restarting. We need the blessing of the industrialists for a concrete action, Bangemann will support it*'. (HAEU, AV 06.03 Files 139 doc. 11).

192 According to what is indicated in the archival documents consulted, and specifically in an internal document prepared by the Cabinet of Van Den Broek, which reconstructs the background of the first EC's initiative (HAEU AV 06.03 139 doc. 10 annex 2), at first the ' *grands patrons*' of the industry did not react particularly warmly to Bangemann's call as they had the impression they had been consulted '*pour la forme*', or only for formal reasons, and they reproached the Commission for not having done it before, having preferred to work together ineffectively with the ad hoc created group of WEAG experts within the POLARM Council Working Party, as the discussion on the opening of defence markets illogically preceded the reflection on the consolidation of the defence technological and industrial base of Europe (Informant 1; Interview 3).

193 The three themes covered: I) how to work to the establishment of a European defence equipment market (covered by Mr. Hausmann from Thyssen Industrie AG); II) how to employ the existing EC legislative framework in the supporting the process of consolidation, taking into account the specificities of the arms industry (covered by Mr. Green from Rolls Royce plc); III) how to develop a EU framework in the field of military R&T/R&D for the financing of the consolidation process (covered by Mr. Antonini from Fincantieri Italia Spa).

industry (e.g. external liaison), prodromal to the preparation of the EC's implementation plan contained in Communication 583/1997, one could observe that a first problematic aspect, which hampered the achievement of a positive outcome, directly concerned the fragmentation of the defence industrial sector, and the lack of representativeness in the European Defence Industrial Group (EDIG) structure. According to a file contained in the preparatory documents for the spring 1997 meeting, 29 companies, 1 consortium (Eurocopter SA), 1 European defence industrial association (EDIG)[194], 1 French defence industrial association (GIAT) were invited to attend. Of the companies attending, 9 were operating in the aeronautical field[195], 6 were in engines and cars production[196], 5 were in naval and land[197], and 4 were in the advanced electronics and software-dependent business[198].

Such composition reflects on the one hand, the changing nature of the defence industrial panorama of Europe under the thrust of advancements in ICT and the increasing importance of new actors, namely electronics and software integrators in defence industrial consolidating exercises, as reconstructed in sections 5.2 and 5.3[199]. On the other hand, however, it proves indicative of the reduced unitary representative capacity of the EDIG within a defence sector characterized by a high degree of fragmentation between already consolidated and still consolidating industrial realities (Interviews 13,14,15). In the absence of a fully accomplished shift in TEP-1, the still fragmented defence industrial capital of Europe did not recognize in EDIG a collective representation instance (Interviews 14, 40).

Because of the commented, the reconstructed first EC-Defence industry interaction produced a set of generic, hardly implementable proposals. Indeed, although primarily centred on the need to implement actions necessary to boost the

[194] Born as the industrial rib of WEAG, EDIG represented the interests of the defence land and naval industries, namely everything that does not fly' (Interview 1). Although having tried to create a reference pole for the defence industries of Europe in this first delicate passage of the European defence integration history, its representative capacity decreased even more once talks over the development of a multimillionaire European aerial defence cooperative programme, namely the Eurofighter Typhoon, became a reality (Interviews 1, 25). This situation imposed to attach a defence dimension to the European association formally deputed to represent aeronautical industries, namely AECMA, which, in the meantime became an economic, prosperous industrial association, due to the commercial success of Airbus and the EU aeronautical research programme (Interviews 1, 25 and see Ch.4). For this reason, reflecting in turn a consolidation movement amongst associations, EDIG, AECMA and EuroSpace merged, to form the new European Aeronautical and Defence Association of Europe (ASD) in 2004 (Interviews 1, 19, 40), turning a very proactive reality EDIG into an almost forgotten detail of the past (Informant 1).
[195] namely, BA, Aerospatiale, Dassault Aviation, Matra, Alenia, Finmeccanica, CASA, DASA.
[196] Namely, Rolls Roys, Saab, SNECMA, Fiat, Daimler AG.
[197] Namely, DCN, Fincantieri, Rheinmetall Berlin AG, Thyssen Industrie AG, Ferrostaal AG.
[198] Namely, GEC Marconi, Thomson, Alcatel Alsthom, Siemens.
[199] Inexplicably, views of the electronics and software industries received a lower degree of attention in the overall discussion, while the traditional defence manufacturing sectors were essentially monopolizing the decision-making scene.

competitiveness of the European defence industrial sector, and formally framed around a demand, a supply and a horizontal policy component, the specific recommendations produced by the three EDIG's rapporteurs confusedly accumulated a mix of topics, overlapping across policy components, without a clear indication of the prioritization and strategic road-mapping activities needed to concretize the policy objective. For example, a European Company Statute was indicated as prodromal in the restructuring of the defence industry but no indication was provided regarding the modalities and legal ground chosen for the purpose; it is furthermore generically mentioned that defence-related industries could participate in calls for funding under the EU research framework programme, in light of the duality of some technological areas, but no reflection was offered on the importance of boosting joint military R&D investments to reduce the risk of national DTIBs deteriorating under the impact of globalization forces, nor was a deepening of the relation between conversion and military consolidation activities provided. Moreover, given that the proposal for a defence procurement regulation at the EU level was wrongly indicated as a supply side component of the strategy, while it is clearly a demand component, an exploration of the objectives of a potential legal harmonization of defence procurement procedures in Europe, and its impact on the preservation of a sound European defence industrial capacity in a market governed by its own logics, was also missing (HAEU AV 06.03 139 doc. 11, 144).

On the side of the EC's entrepreneurial strategy (e.g. internal coordination), it has been evidenced in the course of the case study analysis how the joint DG-IA/ DG-III front, having successfully expanded ties with the WEAG and POLARM Working Group, could not capitalize on the perceived window of opportunity (e.g. end of the Cold War) because of the lack of political incentives displayed by major arms-producing countries, who were, at the time, involved in domestically consolidating their defence industrial champions. The technical solution adopted, comprising a long list of policy actions organized on a time-table (CEC 1996:2-10) and a draft common position[200] (CEC 1997c:3-4), reflected a chaotic attempt to find the largest possible common denominator between positions expressed by the industry (EDIG 1996; N/A) and those emerging from the earlier interaction with the POLARM/WEAG experts (CEC 1997c:11-13 Appendix to Annex I). Interestingly, despite its internal

[200] Adopted on the basis of Article J.2 of the Treaty of Maastricht (in force at the time).

fragmentation, the industry expressed convergent support for political actions aimed at distributing funds for military research (eventually to coordinate with the activities of WEAG Panel II), as well as at promoting standardization activities and further transnational armaments cooperation (HAEU AV 06.03 145 doc. 13; Informant 1). On the front of POLARM, MSs, via their WEAG experts had identified, in the harmonization of regimes for defence procurement and intra-EU transfers across the European territory, two potential routes to further explore with a view to strengthening the competitive nature of European defence markets (CEU/POLARM: 1995:7[201], 8[202]). It is interpreted that such formal statements reflected more the need to address the ineffective functioning of WEAG's Panel III set of activities towards European defence markets (see more in Ch.6) rather than the real political ambition to set up a fully-fledged supranational armaments policy, given that the role of the WEU's defence component was never called into question (CEU/POLARM 1995:4-5; Interviews 3, 16, 45, 47). Lastly, and as indicated in the course of the analysis, the denied institutional support from the EC's legal services and the Directorate-General responsible for the regulation of the internal market, namely DG-IV, further compromised the coherency and technical strength of the draft common position[203], specifically framed under the 1997 EC's implementation plan, nullifying the chance of seeing green lights switching on at the European Council and Parliament gates.

5.5 Conclusion

The present chapter has provided for a technologically cognizant reading of the economic and political transformations which shaped the changing foundations of defence industrial production and organization under TEP-1, coming to contest the assumption having permeated the post-Cold War economic literature for the past 30 years, that identified, in the ending of the Cold War, the main explanatory variable of

[201] Paragraph 3.9 of the POLARM document 9458/95 reads as follows: 'procurement practices, procedures and regulations should be harmonized with the aim of reaching unimpeded competition, taking into account the experience gained in the context of the WEAG, and the EC single market'.
[202] Paragraph 4.1.2 of the POLARM document 9458/95 reads as follows: ' Progress in the direction of [a European armaments policy] necessitates definition of rules governing competition in purchasing- including procedures- which States would be obliged to apply. [..] To take account of the specific character of military equipment, the applicable binding rules could be an adaptation of the EC rules and, for example, be based on those in force within the WEAG framework.
[203] It is to note that the Commission did not opt, in the end, for a Community regulatory instrument, also in light of the lack of technical legal competences on the DG-IA/DG-III institutional fronts.

the defence industrial consolidation process. After having offered empirical evidence of the enduring significance of military R&D investments for the modernization of the defence industrial sector, the chapter has provided for an historical reconstruction of a set of revolutionary technological advancements which deeply affected, in tandem with changes analysed in Chapter 4, the evolution of defence production and structural organization in the TEP under comment. The particular orientation of the present analysis intended to consider and further expand, as in the case of Chapter 4, on the competitive race component between the US and European arms-producing countries in their development and strategic control over technologies of crucial importance for States' national defence and economic prosperity. With a significant differential in competitive positions, it has been evidenced how, via different routes, both the US and Europe achieved vertical and horizontal consolidation in military production through M&As around those strategic sectors, namely aeronautics/aerospace and defence electronics, with the most prominent technological generation and integration capacity, as well as with the highest commercial rents prospects (from the civil aeronautical segment). The chapter has tested the technological claim by case studying the national industrial consolidating experiences of two leading defence players in Europe. The analysis of the German and French defence industrial consolidating exercises has reconfirmed the significance of technological motives in domestic restructuring activities under TEP-1, which concentrated the aeronautics/aerospace and defence electronics sectors. As will be evidenced in Chapter 6, that same consolidating trajectory will culminate, under the input of the same two countries, in the creation of a transnational consolidated corporation, the European Defence and Aerospace Company (EADS), under TEP-2.

The second part of the chapter has provided for a further degree of verification of theoretical assumptions made in Chapter 3. More specifically, the case study has concentrated on disentangling relevant motives beyond the first unfortunate EC's policy entrepreneurial attempt to pass a supranational regime for defence equipment markets in the post-Cold War period. By looking deeply at the detail of EC's policy entrepreneurial strategy, with a peculiar DG-IA/DG-III integrated institutional axis under Bangemann's Cabinet favours, the scholarly analysis re-enlightened a totally understudied passage of the European defence industrial/market integration history, by identifying in the unaccomplished evolution of TEP-1, the main cause having

hampered the adjustment in the European socio-institutional structure with a regulatory change in EDEM (layer n.1). The analysis has furthermore evidenced the insensitivity, or incapability to generate an outcome, of the EC's entrepreneurial plan, regardless of its level of political and technical sophistication, in the absence of a change in TEP (layer n.2).

Supported by a unique collection of archival sources and interview materials concerning policy and industrial players at the time, the chapter has furthermore empirically situated and reconstructed the very origins of the European defence industrial representation activity and early involvement with the EC, in policy formulation and negotiation processes, providing for a further degree of theory verification. Indeed, under a TEP still ruled by a traditional model of organization of military production, around nationally consolidating defence enterprises, the nascent defence industrial representation group could not effectively integrate the transforming natures of the defence industrial panorama of Europe and liaise coherently with the EC policy entrepreneur to accompany regulatory change in EDEM. The same unfortunate EC's decision to frantically accumulate technical proposals from both the arms industry and the WEAG in POLARM's composition is to be read as the ultimate attempt, in the absence of a common political denominator, to gain any possible output from an all-embracing policy proposal. As predicted by the theory, in the absence of an accomplished shift in TEP the socio-institutional structure is insensitive to policy entrepreneurial activities. The next chapter will present the third case study, testing this time the theory of SIAs in positive terms via the experience of the EC's successful making of EDEM in the 2000s decade, under an accomplished shift in TEP.

CHAPTER 6

The successful making of EDEM in the 2000s:

European regulation as a response to global industrial consolidating dynamics

6.1 Introduction

Building on the case study analysis contained in Chapter 5 illustrating the failed EC's policy entrepreneurial attempt to pass a regime for defence markets in the post Cold War period, the present chapter provides an analysis of the successful making of EDEM in the 2000s period, as a consequence of the first accomplished shift in TEP. The EC's regulatory EDEM emerges as the result of a process initiated in the early 2000s and culminating in the adoption of the 2007 EC's Defence Package, comprising and EU Directive on Defence and Security Procurement (DSD) (OJEU 2009a), an EU Directive on intra-community transfers (OJEU 2009b), and a EC's strategy for a stronger and more competitive defence industry (EC 2007d).

The chapter is organized around a bipartite structure. The first part completes the analysis contained in Chapter 4 and further developed into Chapter 5, shedding light on techno-driven trajectories of change in the arms industry. Section 6.2 is empirically evidencing that a first shift in the TEP governing the politico-economic organization of the military industrial capital of Europe is taking place. Subsection 6.2.1 is illustrating the transition that brought defence industries, having integrated into defence national champions in aeronautics/aerospace and defence electronics under TEP-1, to further transform into technologically integrated Multinational Enterprises (MNEs) under TEP-2, until reaching a point of structural saturation. Further documenting the change in TEP, subsection 6.2.2 suggests that three post-national industrial consolidating experiences, reflecting the traditional features of the

model of MNEs, marked the evolution of the European defence business in a global direction. Of the three experiences, the formation of the European Aeronautic Defence and Space Company (EADS) embodied the attempted European consolidation route. The same subsection will evidence how the EADS model, elevated as a core political reference in the process of European defence industrial integration, presents a number of shortfalls, which have rendered it unsuitable to serve a broader and long-term political goal.

In line with theoretical premises made in Chapter 3, the second part of the chapter will provide for direct verification of the main argument, which connects an accomplished shift in TEP to an adjustment in the defence socio-institutional structure (SIA) (layer n.1 of the theory). The case study will also test the second layer of the theory, by articulating, this time in positive terms (due to the accomplished shift in TEP and consequent SIA) the type of policy entrepreneurialism having in turn accompanied regulatory change in EDEM (layer n.2 of the theory). More specifically, in the case study under analysis an EC's low-risk policy entrepreneurial strategy supported the achievement of a low-profile regulatory outcome, under the traditional EU internal market route with the two regulatory regimes contained in the 2007 Defence Package. Section 6.3 is parted into two subsections. Subsection 6.3.1 historically reconstructs the origins of intergovernmental EDEM as a long-standing, non-binding construct of weak politico-strategic importance. As will be evidenced, since the early 1980s (under TEP-1) cooperation activities were developed first under the IEPG's framework (as part of the NATO's defence component), and later via the WEAG Panel III (as part of the WEU's defence component). As documented in Chapter 5, there has been a strong political resistance to modifications to the traditional institutional allocation of competences in the European defence industrial and market-related policy fields. Subsection 6.3.2 will reconstruct the politico-institutional developments, which created, in the changed techno-economic reality governing military production under TEP-2, the opportunity for the EC to seize a small window of opportunity in the context of major transformations affecting the institutional architecture of European defence, and consequently to frame a regulatory regime for EDEM. It will be suggested that the work accomplished in the EC's Green Paper (GP) on defence procurement season represented an overarching passage in time, where a political agreement was found amongst political and economic forces regarding the need to accompany the progressive opening of European defence

markets via EC-driven regulatory instruments, with a view to containing the effects of globalizing forces on the DTIBs of Europe.

The chapter will conclude by recapitulating how the two layers of the theory have been positively tested via the case study analysis. It will also substantiate how the first supranational regulatory adjustment in EDEM represented the best/only possible outcome the system could generate under the policy entrepreneurial input provided by the EC, in the aftermath of a major shift in TEP governing military production, which impacted on the defence institutional architecture of Europe. Such transformations encompass, *inter alia*, the termination of the WEU/WEAG/WAEO, and the emergence of a standalone Common Security and Defence Policy (CSDP) segment. The 2007 EC's Defence Package was not the only adjustment occurring under TEP-2. After having illustrated the limits of EDEM, the last case study analysis contained in Chapter 7 will evidence how the trajectory of TEP-2, under a shorter 5th wave, will also project the first seeds for a EU new regulatory construct to emerge under EDTIB.

6.2. Defence industrial consolidation under TEP-2

6.2.1 Turning national champions into multinational global enterprises (MNEs)

Chapter 5 (Part I) argued that the impact of technological changes in the microelectronics and ICT environment created incentives for economic and political actors, in Europe and beyond, to promote the consolidation of the defence industrial sector. The national restructuring of the Western European defence industry came up against the consolidation of the US defence industry. The earlier-initiated US consolidation movement had, indeed allowed rationalization of and improvement in the performance of the American defence manufacture around three national defence champions, namely Lockheed Martin/Loral, Boeing/McDonnell Douglas and Raytheon/Hughes/Texas Instruments (Gummett 1996:145; Markusen 1997:28; 1999:41; Gholtz and Sapolsky 1999:23; Lovering1999:335; Bitzinger 1999:308). As a consequence of such highly politically driven consolidation activity new advanced systems of weapons, not yet existing in Europe, were developed, such as the Joint

Strike Fighter (JFS), whose production series was effectively streamlined with variants for the US national navy, land, and air forces, and even the UK Royal Navy, generating over 30 million USD of savings. Furthermore, and in line with what was explained in Chapter 5, the US consolidating defence industry hugely exploited, in light of its bigger size and more comprehensive rationalization plans, economies of scale, coming in the mid-1990s to export to Europe six time the value of products imported by Americans on European markets and capitalizing revenues of over 90 billion USD in 1995 alone (SIPRI 1996:412,415; Mezzadri 1998:13).

On the illustrated grounds, it soon became politically accepted in Europe too that the level of domestic competition amongst defence industries would have diminished as a consequence of the need to rationalize/improve[204] production processes, acquire critical mass and ensure the continuous generation of advanced technological capabilities in face of throat cutting competition on the expanding international marketplace (RAND 1992:x-xi, 68; FOA 1996:92-93; Hébert 1995:133-134; Hayward 1995:10, Guay 1998:13, 23,99; Interviews 1,9, 27,31,37,39). With a reduced degree of effectiveness due to the economic and political fragmentation of defence markets and R&D efforts channelled in Europe, such a process envisaged the creation of national defence champions integrating the aeronautics/aerospace and defence electronics production[205] (RAND 1992: 65-68, 75-94; Walker and Gummett 1993:16; Latham and Hopper 1995:18; Hayward 1995:1-2, 10-11: EUSS/De Vestel 1995: 14-15; FOA 1996:2-3; 32; Guay 1998:99-100; Mezzadri 1998: 10-11; 14-16; Brzoska 2001:9; Interviews 1,9,10,27,29,31,37,39). Deutsche Aerospace (DASA) in Germany, Aerospatiale-Matra, Dassault Avionics and Thompson CSF in France, as well as to a similar extent Finmeccanica in Italy, British Aerospace (BA) in UK, CASA in Spain, and Volvo Aero/SAAB in Sweden, provide evocative examples of the geometry of defence national consolidation activities having occurred in Europe under TEP-1.

In illustrating the evolution of TEP-1, it has been furthermore observed that the creation of national defence industrial champions has been accompanied, within

[204] As illustrated in Chapter 5, while rationalization activities comprised vertical integration via mergers of companies operative in the same product area to cut costs, redundancies and duplications as well as to achieve economies of scale, modernization processes comprised the horizontal acquisition of industrial entities presenting the highest technological growth and integration prospects, also including upgrade/automation in productive processes.

[205] As illustrated in Chapter 5, while disentangling the technological drivers in the consolidation process, in total 25% of the Western European electronic ownership changed hands between 1989 and 1991, as it became a crucial sector for the military.

progressively globalizing ICT-driven commercial economies, by processes of privatization[206] /liberalization of the defence financial capital (section 5.3.2) as well as of internationalization of arms production (section 5.2)[207]. These two trajectories have strategically supported the competitive positioning of consolidating defence enterprises on the expanding international market place. In an earlier phase under TEP-1, when arms industries were held at arm's length by their Governments[208], the gradual privatization of defence assets and the internationalization of production activities, especially in the variant of new international industrial linkages, came to sustain the entrepreneurial strategic orientation characterizing national industrial champions (RAND 1992:75; Hayward 1995:2; Guay 1998:99-100; Interview 27, 31,39).

In this framework, politically deliberated corporate strategies pushed in the direction of capitalizing the experience of international collaborations, especially in the aeronautical/aerospace field, and supported the creation of national industrial giants, suitable for projecting a long-term strategic vision on technological development, integration and corporate/business activities (Interviews 27,31,39 see also: Ch.5 section 5.2). On the one hand, although international alliances and joint ventures have significantly shaped the European history of international aeronautical cooperation since the formation of the Airbus consortium[209] (Hayward 1986; 1987/8; Hartley and Martin 1993; Dussage and Garrette 1993; EUISS/Schmidt 2000c:20), the decision to consolidate production at a national level and reserve a central role to the civil aeronautical segment meant that civil aeronautical collaborations became also

[206] This process touched most intensively on the defence industrial sector of Europe, registering, as illustrated in Chapter 5, a certain delay in countries, such as France, Italy and Spain, which favoured a prominent State-ownership tradition over military enterprises.

[207] With the term privatization one refers to the process under which the State sells out, to the public or the private sector, ownership rights over defence assets, potentially maintaining minority/majority control shares over previously State-owned enterprises. With the term liberalization or volatilization one refers to the condition of fragmented ownership of privatized companies where the financial capital structure is dispersed amongst a high number of shareholders, none retaining a majority ownership share. With the term internationalization of arms production, as also linked to the process of consolidation in the arms industry initiated under TEP-1, one refers to a set of activities comprising, inter alia, foreign trade, support of foreign sales, foreign direct investments, delocalization of manufacturing and international subcontracting, as well as new patterns of international industrial linkages, such as strategic alliances, joint ventures and cross-border cooperative arrangements (elaboration on Sköns 1993:161-162; ISS/ Walker and Gummett 1993: 30-35; Sköns and Wulf 1994:44-45; EUSS/Schmitt 2000c:14; Gummett 1996:145; Oikonomou 2007:363-364[207]; see also Ch.5).

[208] The expression 'at arm's length' employed to refer to the symbiotic relation between governments and their national defence industrial champions was coined by Terrence Guay (1998) in his book 'At arm's length'.

[209] The Airbus was born as a civil aeronautical project under a consortium structure as explained in Chapter 4; after the defence national consolidation phase terminated within the creation of DASA, Aerospatiale-Matra and CASA throughout the 1990s, the three Airbus national consortia turned into a transnational integrated company, EADS, later re-denominated the Airbus Group.

subordinated to reflect the international commercial projection of national industrial champions (Interviews 27,31,39).

On the other hand, intergovernmental cooperation in armaments, which has represented a long-standing practice amongst European countries after WWII, continued in parallel to the national industrial consolidating process in Europe (RAND 1992: 48-53; EUISS/Walker and Gummett 1993: 30-35; Feddersen 1995:41; Dussage and Garrett 1995:121; Butler et al 2000:310). Even if cooperative projects did not allow *per se* the articulation of a long-term strategic vision, they essentially remained 'the' major reference in Europe for the generation of advanced R&D and technological development activities, as the cases of the aeronautical programs Panavia Tornado (1982) and the Eurofighter Typhoon[210] (1998) clearly documented (Interviews 1,27,33,34). The long-lasting recourse to cooperation in armaments amongst Europeans has also contained the spiralling costs associated with the development of advanced systems of weapons, exponentially increasing with each generation (Gansler 1980; Kenny 1999:118 Neuman 2010; Bellais and Jackson 2014:233,235; Hartley 2014; Interviews 1,9,10,25,27,31,37,39) as comprehensively illustrated in Chapter 4 (section 4.3). Finally it is to be noted that, there will be an evolution on this front in a post-national industrial consolidating phase as, when successful and protracted in time, several defence cross-national collaborations and alliances tended to evolve into more permanent structures (via cross-border M&As) (EUISS 2000c/Schmitt: 50ss; Bitzinger 2009b:183)[211]. As anticipated in Chapter 5 (section 5.2), such decisions would be justified by top-executives, as in the case of the creation of national champions, with a view to ensuring stability and a long-term vision over the R&D/productive, technological integration and management strategy, which alliances, consortia and other cooperative projects cannot offer, due to their temporary and product-dependent nature (Interviews 1,25,27,31,39, see also: Ch.5 p.147 footnote 166).

[210] The Eurofighter Typhoon cooperation programme for example gave input to a number of advanced military R&D programs, such as the X-31 program. The X-31 was a new modular and integrated advanced control loads system that could aerodynamically control the aircraft and direct all the flight manoeuvres, reaching an operational performance (e.g. total control of the aircraft) inconceivable under the conventional control loads system operating on the Panavia Tornado. Military R&D initiatives of the calibre of the X-31 experimental one were dependent on the development of big cooperative armaments programs, such as the Eurofighter, and became outrun by commercial products once civil R&D investments came to outrun military ones under TEP-2.

[211] Several other cross-national joint ventures such as, inter alia, Eurocopter, Thomson-Marconi-Sonar, Matra-Marconi, Matra-BAE dynamics, and Cassidian, became part of transnationally consolidating realities under TEP-2.

The second trajectory across which the techno-driven defence industrial consolidation evolved was the privatization of State arsenals and State-owned enterprises. As illustrated in Chapter 5 (sections 5.3.1 and 5.3.2), privatization activities were primarily conducted through sales of public assets in the context of merging and acquisition operations (Interviews 31, 35, 37, 39). Similar to the case of telecommunications and other utility sectors (Parker 1999), the political decision to privatise by selling out proprietary rights to strategic investors served the purpose of strengthening companies' economic and corporate performance during restructuring activities (Vickers and Yarrow 1988:157; Dussage et Cornou 1998; Parker 1995:45; 1998:12, 18-19; OECD/Estrin 1998:11-12:21-22; 2003:35,92; Mampaey 2001:129; Interviews 27,31,35,39). The conversion of State arsenals and State-owned enterprises into State-controlled or participated companies has also comprised, since the end of the 1990s, the offering of public shares on stock exchange markets, or the sale contextual to the listing of the company on the stock market (OECD 2003:85,99; Interviews 31,39). Such a strategic choice normally serves the purpose of widening companies' share ownership, stimulating investments and access to new technologies, as well as to risk-related financial operations, including further technological integration and internationalization activities (Clarke and Pitelis 1993:4-5; Parker 1993:17,26; OECD/Estrin 1998:23,25; Interviews 31,37,39).

It is argued here that, under the intensified influence of ICT-driven motives reconstructed in Chapter 5 (section 5.2), the paradigm governing the techno-economic organization and functioning of the defence business around nationally consolidated industrial champions (e.g. TEP-1) expired its potential, marking a transition towards a new TEP (e.g. TEP-2). In other words, the support for privatization and internationalization activities, strategically aimed at projecting the competitive posture of nationally consolidating defence industries, outran the domestic trajectory governments initially sketched when they envisaged creating national champions (Hayward 1995:6-7; 1999:13; 2001:116, Bitzinger 1999:308 Interviews 1,9,10,12,29,39). It is postulated that this model collapsed by the end of the 20th century, when defence companies evolved into globalised post-national, commercially-driven enterprises, displaying more and more 'civilianized [212]

[212] The term has been employed by Pierre Vestel (EUISS 1995:16) in his analysis titled 'Defence Markets and Industries in Europe' to refer to the adoption by the defence industry of characteristics similar to those of the commercial industry in general. The author lists internationalization and the rise of technologies of civil origins from commercial markets as two key drivers in the process of civilianization of the defence industry.

(EUISS/De Vestel 1995:16) or 'secularized'[213](Gummett and Walker 1989; Gummett 1996) functioning attributes, as well as a progressive erosion of the traditional balance between R&D activities under previous TEP.

In contrast to a small segment of literature[214] that questions the notion of a globalized arms industry (Oikonomou 2007a:83; Oikonomou 2007b:363-4; Bialos et al 2009; Bellais and Jackson 2014:232,237[215]), it is argued here that a globalizing movement is transforming the defence industrial sector under TEP-2, and that it can be observed by cumulatively considering the evolution of three independent dimensions, namely the ownership of capital, the management/corporate architecture, and the R&D/manufacturing structure. It is suggested that a globalized defence corporation normally comes to present a combination of a privatized/fragmented capital ownership, a differentiated (e.g. principals/agents) corporate governance, and a commercially sensitive R&D/internationalized productive structure. Since the three dimensions follow in a globalised economy an expansive and disintegrating trajectory, namely liberalization, volatilization, multiplication, and enlargement, while the primary objective of the military is to concentrate, integrate, and retain control over the development/direction of strategic capabilities and technological activities, paradoxically these developments could lead to the formation of globalizing defence corporations, in the form of Multinational Enterprises (MNEs) presenting a cluster-like industrial consolidating dimension. For this reason, the term consolidation should be interpreted at this stage in time, namely under TEP-2, as a synonym for clustered global expansion.

Under TEP-2, the choice to 'de-nationalize' the defence industry via privatization processes deeply transformed its financial capital structure, accompanying a shift in the financial architecture of military enterprises, turned into finance-driven 'marketized' corporations (Lovering 1999:358; 2000:15; Bellais and Jackson 2014:236). A new family of shareholders, namely private and institutional

[213] The expression 'secularization' has been employed by Philippe Gummett and William Walker (1989:439) to refer to the civilianization of the new features and methods characterizing the functioning of the defence business and industrial organization.

[214] For an account of the literature on globalization in the arms industry see inter alia: Bitzinger (1994; 1999,2003,2009a,b), EUSS/De Vestel (1995), Lovering (1999,2000); Kenny (1999); Guay and Callum (2000); Neal and Taylor (2001); Hayward K. (1999, 2001,2009); Guay and Callum (2002); James (2002); Guay (2005; 2007); Neuman (2009); Dombrowski and Ross (2009).

[215] These authors maintain the internationalization of productive processes in the defence sector is not comparable to the globalization phenomenon having characterized the commercial sector. In their view cross-border M&As would have not contributed to a transnational consolidating exercise/outcome in the arms industry, but simply to a further internationalization move, which would characterize multi-domestic firms operating on multiple home markets.

investors such as banks and insurance companies, acquired access to the ownership of defence enterprises (Serfati 2000a:84-85; Mampaey 2001:125; Interviews 29,31,39). Financial instruments, such as equity shares and securitized borrowings, including bonds and convertible stocks, as well as other forms of loans from the referred institutions, became part of the defence economy (Serfati 2000a:87;2001a:179; Interviews 31,39). A financial practice in use has witnessed equity holders lending capitals to investors, under an interests-rated return condition, in order to acquire shares, namely ownership rights, on defence companies (Braddon and Bradley 2005; Interviews n. 31,39). Under such mechanism, financial institutions and insurance companies would operate in the military business as they would do in the commercial one, namely by displaying a wide array of risk-based financial operations and investment strategies with the sole objective to maximize economic returns from acquired capitals (Interviews 31,39).

If a higher volatility in the ownership structure is in principle suitable for stimulating higher levels of private investments, there is a serious risk in the military sector that an highly privatised/fragmented defence capital, not protected via golden shares[216], stable core guarantees[217] or other controlling arrangements[218], cannot ensure long-term stability, reliability, and controllability of R&D and product development activities (Fournet 1998; Serfati 2008; Interviews 31,37,39). As a matter of fact, due to the fluidity of the global financial commercial economy, there is no certainty that equity holders would keep lending capital to investors should the profitability of a

[216] Golden shares provide Governments with special control powers and veto rights in fully or partially privatized companies. They serve as a vehicle for Government intervention in company decisions concerning any investor/group of investor trying to concentrate/own more than a certain percentage of the capital firm, as well as for blocking the sale of any asset to protect national interests, with assets including both shares or technology, patents, trademarks, or any other tangible and intangible property; finally they grant Governments the right to name non-voting members on the board of directors (OECD 2003: 107-109). Although golden shares can represent an impediment to efficiency and stability, as they can undermine the effective functioning of the market, and for this reason investors do not favor them, their adoption has been linked to the protection of strategic industries, such as defence

[217] As an alternative to golden shares, the stable core of shareholders is a post-privatization control instrument guaranteeing that the ownership structure of the privatized company includes a stable number of shareholders, composed of a group of national investors to whom a significant stake in the privatized company is given. The intent is to create a stable core of shareholders in order to provide the company with stable governance in top strategic or early-born sectors (OECD 2003:111). Examples of the core of shareholders approach include cross-shareholdings, and the supplement of a shareholders' agreement to sales, as well as requirements for the retention of shares for a specified period of time. The stable core shareholder arrangements can affect the transparency, manageability and efficiency of the company (OECD 2003:113).

[218] As a further instrument for post-privatization control, there is the option for the Government to privatize a minority stake in the company while remaining committed to retaining public ownership and control in the long term as a means of protecting national or public interest. In this case the intent is to sell the minority stake only to improve performance via the infusion of private equity and management, but there is no plan to relinquish control. The choice of partial privatization can generate drawbacks on the side of a continuous State interference in the company commercial decisions, with impact on the economic vulnerability of the company (OECD 2003:114-115).

certain sector decrease, or just simply because another sector becomes more profitable in the investment portfolio (Interviews 9, 10, 31). Additionally, one has to consider that, if a bad investment in the commercial economy leads to a loss of money, in the military sector it directly impacts on the capabilities/technological performance of the DTIB, which, once deteriorated, could potentially not be re-established in the short-term due to the high-levels of competition characterizing the sector (Interviews 9, 10).

The transition towards TEP-2 has also witnessed, under the retrenchment of State's ownership rights from arms industries, a transformation in defence corporate structures since the State has passed from being unique owner/sponsor/manager of a company to acting as a co-owner amongst a multitude of shareholders (e.g. principals), mandating responsibility for the efficient administration and economic profitability of business operations to qualified, independent executive staff teams (e.g. agents), as would happen in any commercial private sector organization (Interviews 21,27,31,39). Under a basic articulation of this new model of governance, strategic decisions would be made by a Board of Directors[219], which would deliberate collectively after shareholders have exercised their voting rights. The same body would be in charge of nominating a Board of Management, which would have the mandate to run the day-to-day business, planning and operations. It would furthermore arrange the appointment of a Supervisory Board, which would in turn monitor ordinary administration activities approved by the Board of Management (Interviews 25,27,31,39). There is a risk that, if States do not hold a majority share or other protective guarantee in the company, such as the recalled ones, decisions made by a Board of Directors not presenting a unity of vision, due to the fragmentation of capital, can compromise the long-term coherency and effectiveness of the corporate strategy, which proves essential when it comes to deliberating over the development of multiannual and highly costly R&D programs (Interviews 10,25,27). Additionally, since the differentiated governance system allows executive teams a certain independence, there is also a risk that agents pursue their own interests, including diversion of the firm's resources during management activities, leaving owners to bear the residual responsibility for their conduct (OECD 1998:12-13).

[219] A board is an organized group of people or juridical entities with the collective authority to control and foster an institution that is usually administered by a qualified executive and staff. Governance is the act, process or power of governing.

A final aspect concerning the composition of TEP-2 is the progressive 'civilianization' or 'secularization' of R&D processes and productive organization. This process adds to the trend, which had already characterized the evolution in international direction of manufacturing and sales activities within national champions, which delocalized production to cut costs and maximized commercial profits renting on economies of scale. The very element of novelty, which prominently reflects the impact of globalization forces on the organization of defence activities under TEP-2, is the progressive erosion of the traditional R&D paradigm, which governed the course of technological development activities in major arms producing countries. This model had foreseen, since the post-WWII phase, that R&D investments support the development of national DTIBs, and only subordinately transfer or 'spin-off'[220] military-generated technologies to the commercial world (Gummett and Reppy 1987:3,12; Albrecht 1987:47; Di Filippo 1991:7,15-16, 18; Alic et al.1992:8-9; Heidenkamp and Taylor 2013c:66ss; Interviews 9,10,27,31,33,37,39). Already under TEP-1 from the early 1980s, governments of national defence champions started to face the dilemma of having to ensure the superior performance of their DTIBs in a context characterized by fast/disruptive technological changes and highly expanding/competitive commercial markets (US-DSB 1986, 1987b,1988a;b; US-OTA 1989, Bitzinger 1994:189; 2009b:182).

As illustrated, in the US even before the Cold War ended, a double-channel was opened with the attempt to seize opportunities for the 'spin-back'or 'spin-on[221]'of civil or previously commercialized innovations to test their potential return for the military (US-DSB 1986,1987,1988a;b), also seizing the opportunity for multiple-use technologies and civil-military integrations to take place (US-OTA 1995; Walsh 2009:132; Interviews 7,9,15). In Europe, where military R&D investments have been traditionally lower (see Ch.5 section 5.2) and the benefits of dual-use technologies, beyond the aeronautical field, often overestimated (Matelly and Lima 2016:69; Interviews 9,33), the strategic orientation of civil R&D investments has served, in parallel to the national champions policy, to shorten the technological divide with the US in some domains growing at ultra-speed (e.g. ICT) and leaving Europe essentially far behind. If, for the first part of TEP-1, civil R&D advancements were still operating

[220] First examples of spin-off technology include, materials innovations, engines, microelectronics and software technologies reconstructed in Chapters 4 and 5.
[221] As opposed to the spin-off mechanism, the spin-on or spin-in refers to the mechanism according to which the outputs of commercial innovations are tested and retrofitted for military application.

in the context of a synergistic (military-civil) technological innovation system, the uncontrolled expansion of commercial R&D investments in the subsequent decade led governments of major arms producing countries to face the same old question, namely how to protect the competitiveness of their DTIBs in times where the military depends more on the global marketplace for science, technology, and innovation (US-DSB 1998; 1999; Walsh 2009:136).

Clearly, if civil R&D investments constantly outgrow the military ones because of the multiplication effect produced by globalizing forces, there is no way the military can catch up but by marrying the same logic that governs the functioning of civil enterprises in commercial markets. The progressive erosion of military leadership in R&D activities means, in practical terms, loosing access to top-strategic high-tech niche sectors as the pace and direction of technological development activities is increasingly determined by the civil sector (Interviews 1,9,10,37,39). By proposing that the military, and not even in a worst-case scenario situation, would have to buy or adapt (e.g. retrofit) commercial off-the-shelf technologies (COTS) for the development of complex systems of weapons (Walsh 2009:134-135), one not only exposes the DTIBs' competitiveness, but the whole operational performance of the armed forces on the battlefield, with consequences in terms of life-loss (Interviews 1,9,10,37,39). For this reason, the reading provided here indicates that the governmental decision to further push and extend the consolidating trajectory/perimeters of defence productive activities beyond national champions towards trans/multi-national enterprise groups (MNEs) responded to the imperative of preserving a healthy DTIB in the face of challenges posed by a fast-globalizing commercial economy (Guay 2007:20,24-25; Hayward 2009:109-110; Interviews 1,10,26,27,31,39).

It is therefore suggested that an adaptation in the defence productive and organizational paradigm under TEP-2 has marked the emergence of 'post/trans-national' globally consolidating industrial poles (Hébert 2000:5[222]; Guay and Callum 2002:760; Neal and Taylor 2001:347 Guay 2005:25), which reflect the productive and organizational model of MNEs[223]. A study provided by the RAND Corporation

[222] The authoritative French military sociologist defines the post-1999 consolidation phase as 'The year zero of the Europeanization of the Armaments Industry' *(L'année zéro de l'Européanisation de l'industrie de l'armement*).

[223] MNEs have progressively emerged as forms of productive and business organization in modern world economies (Muchlinski 2007:8-9; 35; Forsgren 2008:5-6; Mevorach 2009:11), usually comprising companies or other entities established in more than one country and linked in a way that they might coordinate their activities in

portrayed the European military industry structure in the early 21st century covering the main market strategic segments, namely platform and major subsystems[224]. The picture emerging from the consolidating puzzle in Europe is the one of a 'Spaghetti bowl' with three main dominant industrial players, namely BAE Systems, the European Aeronautics & Defence Company (EADS), and Thales Group (formerly Thomson CFS) (RAND 2002:7; 48; Vlachos 2004:xvi, 6; Financial Times 2004:15; Meijer 2010:68). The three mega-companies[225] interact on the global marketplace by operating in a thick web of sub and cross-participations in the ownership structure of the global defence capital, as well as by extending the width of the productive organization system to include subsidiaries, satellites to holdings, secondary branches and entities of representation into globalized and de-localized supply chains (Bitzinger 2003:69, 74-79[226]; 2009b:184; Guay 2007:35-36,43). In strategic terms, they combine high-tech dependent competitive strategies to concentrate core capabilities and maintain a position of competitive advantage in the global market place with cooperation and trade-offs in technological areas that are not affordable alone, yet they present a top strategic development potential for the future of military combat systems (Serfati 2001a:178; RAND 2002:166 Vlachos 2004:70-71).

The next section will complete, empirically, the analysis of TEP-2 by digging into the three major reported transnational, global consolidating experiences which

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various ways with consequences for their legal autonomy (OECD 2000: Para 3). While economists employ a simple all-embracing formula, defining MNE as any corporation owning, controlling and managing income and generating assets in more than a country (Hood and Young 1979:5-9; Dunning 1993:3-4), lawyers provide a wider notion of MNEs as qualifying two or more connected companies or other forms of undertaking potentially linked via groups/sub-groups (potentially forming multinational enterprise groups- MEGs), in a way that they may be regarded as related entities, and that operate in a transnational setting (Mevorach 2009:10,16-19). Under such reading MNEs would differ from MEGs, comprising the latter a combination of the corporate group, namely a business comprising different legal units linked together, and the multinational enterprise, namely the enterprise operating in more than a country. From an integrated (law-economics) perspective, MNEs can be defined as a set of interlinked business and legal structures generating, operating and controlling material and immaterial assets, and productive resources across nations. While lawyers and economists have made reference to the notion of MNEs and MEGs, political scientists and defence analysts have employed the term of globalized arms industry/globalized defence corporations. In the present research, the wording will be used interchangeably to refer to the same legal and politico-economic phenomenon.

[224] Platforms comprise fixed-wing fighter and transport military aircrafts, civil and military helicopters unmanned aerial vehicles (UAVs), missile systems, land, naval and space systems. Subsystems comprise propulsion (aero-engines, missiles, land, naval and space propulsion), defence electronics, including radar, sonars, and electronic warfare and landing systems.

[225] With 13.2 (BAE), 4.6 (EADS) and 4.3 (THALES) billion dollars revenue respectively totalled in 2001, the three companies positioned at the top three in the EU defence industry ranking (RAND 2002:13; Vlachos 2004), generating a total turnover (over 22 billion USD) of less than half the US companies (almost 49 billion USD).

[226] In conceptualizing on the process of globalization and consolidation of arms production in this historical phase, Bitzinger (2003:74), borrowing from Wallerstein (1980:167), refers to a 'core-periphery' notion characterizing the industrial organization of globalized arms industries. In structural terms, it has been also compared to a 'hub and spoke' (2003:75) mechanism where first-tier firms are formed and operate at the centre by providing critical design, development and system integration activities. Second-tiers are subordinated to the work of firs- tiers via two-way production linkages, such as subcontracting relationships, joint venture partnerships, and foreign venture options. They would be responsible for supplying niche systems or less advanced sub-systems (Bitzinger 2003:75).

originated in Europe (e.g. BAE Systems, Thales, and EADS), and evidencing the political limits of the model of MNEs in the defence sector.

6.2.2 Global consolidating experiences and the political limits of the MNEs model in defence

The purpose of this section is to elaborate empirically on three different techno-dependent global consolidation trajectories under TEP-2 which have marked a further transformation in the DTIBs of Europe, with a progressive 'power shift' from governments to defence corporations in directing the course of consolidating developments (Bitzinger 2003:82; Vlachos 2004:109; Guay 2001:119; 2007:63). Each of the three defence MNEs have followed different restructuring patterns, with implications for the degree of governmental loss of control over companies' long-term strategic posture. The creation of BAE Systems in 1999, as opposed to a potential merger between British Aerospace (BA), the German DASA and the French Aerospatiale-Matra, reflected the strategic choice of the UK's national industrial champion in aeronautics to first complete the fusion with a giant in defence electronics, Marconi-Electronics Systems, a UK-based parent of the American General Electric Company (GEC)[227] (Ashbourne 1999; EUSS 2000c:35; RAND 2002 9,27; Finnegan 2009:98). The decision to follow a transatlantic path over an uncertain European route, and consolidate as a 'hyper national' defence player (Guay and Callum 2002:760) by acquiring GEC-Marconi's defence business, had direct consequences on the future strategic orientation of BAE systems.

The company, as a main prime contractor, has been oriented at building a wide and advanced portfolio of competences across the full military capability spectrum (RAND 2002:155; Vlachos 2004:8; Interviews 10, 14, 15). Indeed, the purchase of Marconi extended BA's technological expertise from military aircrafts (RAND 2002:83) to the land and naval systems field, while the 'GEC-segment' of Marconi expanded BA's portfolio of activities towards top-strategic defence electronics domains, such as Command, Control, Communications, Computers, and Intelligence

[227] With a 7.8 billion sterling merger between BA and GEC-Marconi, BAE positioned as the third largest defence company, just two steps, sales wise, behind Boeing and Lockheed Martin and totalling 13.2 USD billion revenues in 2001 (SIPRI 2002:348; RAND 2002:11), 35% of which coming from the North American markets (RAND 2002:18; 155; Vlachos 2004:9).

(C4I), surveillance & reconnaissance, electronic warfare[228] systems (Bitzinger 1999:341; ISS 1999; RAND 2002:155; Vlachos 2004:13; Interviews 14,15). With the exception of helicopters and parts of the missiles market, BAE systems has a major leadership position in almost every aspect of platforms and subsystems production, namely aircrafts, shipbuilding, space, defence electronics and warfare, land systems and propulsions (RAND 2002:154; Appendix A). The corporate giant sought to counterbalance dependency on US markets with the decision to develop secondary ties via the acquisition of shares in European corporate structures, such as Airbus A400M (20%), Astrium (25%), MBDA (50%), Eurofighter[229] (36%), Saab/Gripen (20%) (Bitzinger 1999:342; Serfati 2001a: 178; RAND 2002:28; 155; Vlachos 2004:11;16)[230].

In line with strategic choices illustrated, BAE has furthermore made 'systems integration' a top corporate priority (RAND 2002:153; Vlachos 2004:13; BAE 2005:14). In illustrating the technical passages which have pushed the trajectory of ICs and software systems forward, it has been evidenced that the integration of technological components and systems into advanced platforms became a central component of the functioning of modern defence corporations (Ch.5 p. 139-141, see also: Walker et al 1987: 29 Salposky 2003:25; Hobday et al 2005a:1116). By systems integration the business literature refers to the technical, manufacturing/industrial and organizational set of dynamic capabilities enabling companies to develop the necessary inputs to combine together and make 'interoperable' high-tech components, systems/sub-systems, software skills, human and management knowledge in the development of competitive products (Davies and Hobday 2005:88; Hobday et al 2005a: 1110; Hobsday et al 2005b:1,3). The added value of systems integrators lies in linking systems' engineering capabilities with knowledge of the manufacturing process to take advantage of production efficiencies in the design process (Gholtz 2005:287; Hobday et al 2005b: 1121).

[228] According to the 2017 BAE's last Annual Report (BAE 2017:27) defence electronics warfare systems remains a key strategic technological area, almost 2 decades after the creation of BAE systems. Areas of strategic focus include today: -stealth (which is a derivation of electronic warfare); - big data (e.g. technologies and capabilities gathering and processing relevant amount of information); - autonomy (e.g. development and integration of autonomous systems technologies; -laser directed energy weapons (including laser weapon integration capability and acceleration of operational services); - advanced manufacturing (e.g. advancing manufacturing to meet future product and platform demands via the exploitation of novel materials and advanced manufacturing technologies).
[229] Including Meteor, the air-to-air missile system for Eurofighter.
[230] Reaching an estimated revenue value of 9.3 billion EUR (defence only) in 1999.

The development of systems integration capabilities acquires an even more crucial importance in the transition towards TEP-2 in light of the global character of MNEs and of markets in which they operate. Indeed, MNEs are highly R&D-driven corporations expanding their technological base into several domains and relying on a growing number of specializing bodies of scientific and organizational knowledge to pursue multi-product competitive strategies (Prencipe 2003:696-697; Prencipe 2005:115). In the military sector, the growing complexity and costs of modern systems imposed defence corporations, even more significantly, to generate, via internationalized R&D processes[231], advanced knowledge-based multidisciplinary capabilities, which supported the integration of components and systems both within and amongst platforms throughout the manufacturing and acquisition phases (Gholtz 2005:280-282; Interviews 1,15,16,17). The strategy of 'lead firms' has been to develop at the top-tier level (e.g. the 'core' or 'hub') the generation, integration and coordination of the most advanced R&D, design and management systems, while outsourcing at the 2nd and 3rd tier level (e.g. the 'periphery' or 'spoke') the production of components, subcomponents, and even platforms across internationalized supply chains (RAND 2002:153; Vlachos 2004:13; Gholtz 2005:283,286; Bitzinger 2003:74; Finnegan 2009:96).

A systems integrative posture also characterized the strategy of the second emerging defence MNE in Europe. THALES Group is the result of a process of progressive consolidation between the aerospace, transports, space, advanced defence electronics and communication sectors (RAND 2002:158; Vlachos 2004:33 Interviews 29,30). The company has adapted its corporate strategy moving from being a French national champion to becoming a global player, with a leading portfolio of military and dual capabilities, by adopting a peculiar multi-domestic approach, based on a strategy of progressive internationalization, via the acquisition of medium sized companies abroad and, as 'second best' choice, the establishment of partnerships (Vlachos 2004:37; Interview 32). Acquired entities have been integrated into a 'glocalized[232]' productive system, namely a globalized system organized in

[231] Internationalized R&D processes, as opposed to State-centred ones characterizing defence national champions, increase options for technological advancement, specialization and coordination, including tapping into local innovation systems, and generating knowledge-based and advanced organizational capabilities for the enhancement of the MNEs' competitive advantage in the marketplace (Muchlinski 2007:32; Forsgren 2008:53-55).

[232] Glocalization is the simultaneous occurrence of both universalizing and particularizing tendencies in contemporary social, political, and economic systems. The term, a linguistic hybrid of globalisation and localisation was popularised by sociologist Roland Robertson.

conglomerates and clusters tapping at the local level. This particular articulation has provided THALES with a sort of 'autonomous international identity' in the global defence market place[233] (Flight Global International 2000; Interview 32).

The consolidation of this defence corporation took place in three steps between 1998 and 2001. In 1998 Thomson-CSF first integrated the strategic segment of the French electronics market with the acquisition of the military and space activities of Alcatel and of Dassault Electronics Systems. Two years later in 2000, the expanded Thomson-CSF merged with the British Racal Defence Electronics to form THALES Group. In 2001, after the merger between BA and GEC-Marconi, THALES bought shares in BAE System (BAE), to create THALES Underwater Systems. The second and third steps progressively linked THALES' business strategy to the UK's horizon; for the first time indeed this giant acquired a non-medium size player (Racal) and extended its ownership to the big colossus BAE with a view to project its competence towards the integration of naval and electronics/information warfare technologies (Les Echos 2000; Vlachos 2004:38-39; Interviews 29,30,32,35). This strategic choice, namely expanding its capability spectrum, gave THALES a marker leading position in key technological areas such as shipbuilding, space, defence electronics, radar and sonar, in direct competition with BAE (Hérbert 2001:7-8; RAND 2002:Appendix A). The price to pay for such a choice was an increased dependency on the UK (Hébert 2000:37), and hence on the transatlantic strategic horizon, which indeed led THALES to create teaming arrangements on cooperative programs with small and medium-size American firms, on both sides of the market (RAND 2002:159). The most successful partnership was established in 2001 via a joint venture with Raytheon, named THALES Raytheon Systems, to combine their radar and communication systems divisions (Vlachos 2004:40).

As a third model of post-national consolidation, the prospective creation of the European Aeronautics & Defence Company (EADC), that was scaled down in 1999 to the European Aeronautic Defence and Space Company (EADS), has represented an attempt to move away from transatlantic integration patterns, and embrace a more Europeanist approach. Faced with the announcement of a perspective merger between two American defence aeronautical heavyweights, Boeing and McDonnell Douglas in 1997 (Hébert 2000:94; Interview 25), the four Airbus partners at the time

[233] THALES group generated 11.billion euros revenues in 2002 making the company the 7th largest defence group worldwide and the 2nd largest in Europe, after BAE Systems (Vlachos 2004:33).

reinvigorated the long-standing idea to consolidate the Group of Economic Interest (GEI) *Airbus Industries* into a merged company (Les Echos 1996; Mezzadri 1998:32; Brzoska 2001:13; Serfati 2001a:169; Mörth 2003:74), hence overcoming limitations intrinsic to the nature of temporary agreements connecting the four national civil consortia into a single structure (Interviews 27,31,39).

It was the UK-France-Germany triad that in 1997 came to request their national aeronautical industrial champions to present a plan for the transformation of the Airbus consortium into a single integrated company by March 1998 (EUISS/Mezzadri 2000a: 29; Serfati 2001a:174; Mörth 2003:77-78; Kenny 2006: 489-490). Shortly after the presentation of a first report, Finmeccanica/Alenia (Italy), Saab (Sweden), and Dassault Aviation (France) joined the four Airbus partners (e.g. British Aerospace, DASA, CASA, Aerospatiale-Matra) and the six companies, together, concentrated in a memorandum proposals for the creation of a European Defence Aerospace Company (EADS)[234] (The Economist 1998; Ashbourne 1999; EUISS/Schmitt 2000c:29; Interviews 25,27,31,39). Industrialists involved in the preparation of the plan put a number of key points forward. Firstly, EADC would have been a fully integrated and internationally managed company, with a dual core (50/50) of military and civil activities. Secondly, the defence segment would have covered strategic technological domains for the military, namely aviation, helicopters, space launchers, orbital infrastructures, satellites, advanced operations, electronics systems. Thirdly, economic and financial performance criteria, oriented to reach profitability thresholds and enhancing shareholders' value, would have guided the company's business objectives. Finally, and as a consequence of the first point, the company would have been managed by an independent entity, which would own and control assets and resources (EUISS/Schmitt 2000c:30; Interviews 1,10,27,39).

Despite the talks of unity, the memorandum was more remarkable for the differences it revealed (The Economist 1998; Mörth 2003:81; Interviews 31,27,39). Firstly, there was divergence as to the vision beyond the integration activity: while BA wanted a new defence 'hyper-national' company, made in its own image, to over expand the portfolio of activities and catch broader/international military markets, Aerospatiale and DASA were more supportive of the creation of a transnational dual-use aeronautical champion, equipping European military markets and exploiting

[234] In the initial proposal, the company would have merged the four Airbus partners plus the Italian and Swedish defence national champions.

economies of scale on the civil side by making use of the commercial success of Airbus. Such difference in the underlying visions reflected on the corporate strategies proposed: while BA was pushing to extend (e.g. 'come-as-you-are' merger logic) the portfolio of military R&D/productive activities as much as possible, also setting as a precondition the integration of Dassault Aviation, and its unique set of technologically advanced aerial military productive capabilities, into the future company (The Economist 1998; Serfati 2001a:171), Aerospatiale-Matra and DASA were supporting a gradual 'step by step' approach, envisioning a sort of 'Airbus Plus' structure, comprising a core production of civil and military aircrafts, with the re-visitation of the GEI structure (Interviews 1,10,39). If it was clear that France did not want to put 'all the eggs in the same basket' while denying BA access to Dassault Aviation advanced technologies in the context of a potential merger in EADC, it was also clear that on the other side of the negotiation table there was a true defence heavyweight, BA, which, only in 1998, totalled a revenue figure of 20.57 billion USD (16.93 billions in defence), ranking as second world leader after Lockheed Martin with 28.07 billion USD (18.5 billions in defence) (Hébert 2000:11-12).

There was, furthermore, an ideological divergence amongst parties as to which possible model of corporate governance to adopt for the prospective company. Indeed, while the French, and to some extent the Germans, wanted to reserve protective guarantees via the insertion of golden shares or at least 'block of ownership' clauses to ensure coherency in the long-term strategic orientation of the military segment, the Britons prioritised a widely distributed shareholders value-oriented base with a sovereignty rule for stock markets (e.g. no shareholders ownership over 15% of the capital), and a very tight financial fit-check on the prospective companies entering the mergers (EUISS/Schmitt 2000c:31;Serfati 2001a:180). Yet, there were disagreements on the calculation of the individual financial value each company would carry to EADC. It has been reported that the French and German counterparts demanded that BA's top executives would reserve 40% of the potential future company each (Interview 27). Such an outcome would have left Britons in a detrimental position[235], since, as evidenced, BA was at the time the 2nd biggest defence player globally, also displaying, according to independent discounted cash flow calculations run in view of the merger, a stronger financial value

[235] Indeed, an inaccurate repartition of corporate shares would have determined a tremendous loss in the value of the company on stock markets, with direct economic and financial consequences for the British economy.

than its French and German equivalents (Interview 27). The unsuccessful EADC case proved that the prospect of concentrating in a single step all the defence industrial forces of Europe into a fully integrated transnational structure represented an impossible objective, in light of the different strategic visions characterizing main economic and political players as to the best formula to achieve it. Once BA abandoned the table of negotiation with the big 5 on EADC and with DASA to bilaterally pre-merge their productive structures, it became evident that the only possible option was to downsize the level of ambition and strengthen convergences amongst strategic corporate positions (The Economist 1999:63-64; EUISS/Schmitt 2000c:36-37; Interviews 25,27).

Sought and found as a negotiated decision amongst major defence industrialists of Europe, who this time deliberately kept political leaders out until the final stage of negotiations (Guay and 2001:2; Rossant/Business Week 2000:86; Interviews 9,10,27), convergence was found amongst Aérospatiale-Matra and DASA, later extended to CASA, on a model reviving the earlier 'Airbus Plus' concept but bringing it to the next level with the creation of the first transnational aerospace defence champion integrating productive and organizational structures. The agreement amongst corporate players was uploaded shortly after at a political level via the Strasbourg declaration[236], which launched to the public the creation of a European Aeronautic Defence and Space Company (EADS) (Hébert 2000:16; EUISS/Schmitt 2000c:38; Hébert 2001:7; Interviews 1,9,25,27). Under indications received by the national governments involved, EADS would present a two-level shareholding architecture[237] ensuring controlling shares to the three French, German and Spanish governments collectively (65,57%) over the long term strategic horizon. At the same time, there is a Franco-German co-management structure with no supervisory board, yet directly controlled by a non-executive board of directors and an executive committee (EUISS/Schmitt 2000c:40-42; Serfati 2001a:180; RAND 2002:157). In terms of strategic productive orientation, the politics also pushed to set a headline goal of a 50/50 (civil/military) productive orientation in aeronautical,

[236] Strasbourg Declaration (1999) Political Declaration by the French Prime Minister Lionel Jospin concerning the signature of the agreement between the industrial groups Aérospatiale Matra and DASA, Strasbourg 14/10/1999 available at http://discours.vie-publique.fr/notices/993002629.html accessed on 14/09/2018

[237] At the first level of the two-level shareholding architecture, the French Government retained 50% of a holding's capital while the other 50% is in the hands of French institutional investors. At the second level, there is a conglomerate under a contractual partnership amongst the French holding company (30%), Daimler Chrysler (German) (30%) and SEPI (Spanish) (5,57%), which controls 65.57% of the EADS company, while the remaining 34,43% floats on the stock markets.

missiles and space markets (EUISS/Schmitt 2000c:39-40,47; Interviews 25,27). Such an outcome should in principle have been targeted by promoting an horizontal integration strategy amongst aeronautics, helicopters and space, as well as relying in technical terms on the strengthening of systems integration capabilities over existing platforms (RAND 2002:153; Interviews 1,10).

Despite the good intentions of replicating the dual-use philosophy on a larger scale by expanding the perimeters of national aeronautical champions, the EADS model evidenced a number of flaws, which rendered it unsuitable to serve as a political reference in the process of European defence industrial/armaments integration. In the first place, the level of political ambition was not reflected in the architecture of the emerging transnational company. Despite the fact that the entrepreneurial component had been pushing, from the beginning, for a full rationalization of the R&D and productive sites/facilities, following an industrial logic of elimination of fixed costs and efficiency achievement (Interviews 9,10,27,31,39), the repartition of industrial competences amongst the merging entities followed a territorial and political logic on the military segment of the operation (French Senate 2007:11). Such organization meant that the development of strategic military research and development activities remained confined to a rigid repartition in product-dependent (e.g. missiles, defence electronics, combat aircrafts, helicopters, air transport) competences (EUSS/Schmitt 2000c:44) eventually shared in the context of joint cooperative programs, and clearly hindered after a French withdrawal from the Eurofighter Typhoon European collaboration (Interviews 27,31,35). The same '*logique de blocs*' or '*logique de camps'* (French Senate 2007:14-15) led to the formation of a two-headed, heavy, and non-integrated Franco-German management structure, which is characterized by a 'double command' at any level of strategic decision-making, including within the Board of Directors and Executive Committee's rooms (French Senate 2007:16-17).

It is therefore reasonable to postulate that within the EADS model there has been a direct clash between the politico-intergovernmental logic governing military activities and the industrial/commercial logic driving integration of R&D, productive and management structures on the civil side, to the clear detriment of the development of a truly forward-looking and integrated strategic industrial vision (Interviews 9,10,25). Already a few years after its creation, there was a general consensus over the need to make the EADS' governance evolve with a view to ensuring an

independent and more strategically organized management of the group (French Senate 2007:30-34; 39; Interviews 31,35,39).

Testing the theory, the reconstructed three post-national industrial consolidating experiences of BAE Systems, THALES, and EADS have documented a further transformation in the defence productive and organizational structures under TEP-2. Each of the three experiences has marked a techno-dependent evolution towards the model of MNEs, which has fallen into attrition with forms of public/ intergovernmental control over the course of defence enterprises' activities, operating on globalising economies. While a shift from 'governmental to corporate control' has had obvious results in the first two MNEs' consolidating experiences, the third one has clearly documented how there could be no intergovernmental political solution to the problem of European defence industrial consolidation. Indeed, as evidenced, under the illustrated premises, consolidation would fall either 'non European/ Americanized' (e.g. BAE Systems and THALES) or 'non/quasi military' (e.g. EADS). It is indicative to report that in less than 10 years, the repartition of productive activities in EADS registered a balance of 85% civil versus 15% military (with future projections even lower for the military) while the initial political objective was to keep a 50/50 balance (French Senate 2007:36; Interviews 1,10,25,27). Such an outcome makes clear that, since an intergovernmental model proved unfit to accompany a process of European consolidation for defence globalizing companies, the only solution left would be to upload a supranational political mechanism driving the process above and beyond nationalistic determinations. In no case, can the model of MNEs serve intergovernmental plans to expand the size of defence national champions under the illusion that these industries will acquire a European orientation by enlarging their commercial volumes only.

6.3 Explaining supranational institutional adjustment (SIA) in EDEM

6.3.1 EDEM by intergovernmental means

The first part of the Chapter (6.2) has evidenced the expiration of TEP-1 and the unfolding of TEP-2 with the formation of MNEs in defence, having either gone beyond Europe (e.g. BAE Systems, THALES), or developed inefficient European

industrial consolidating solutions (e.g. EADS). In further verification of the theory the second part of the chapter will illustrate the movement from an original EDEM 'by intergovernmental means' (6.3.1) to its expiration and the contextual socio-institutional adjustment (SIA) in a supranational direction. In verification of layer n.1 of the theory proposed, the analysis will connect the first shift in TEP (e.g. from TEP-1 to TEP-2) to the first SIA with the adoption under the 2007 EC's defence package of a new EU regulatory regime for the defence and security procurement and intra-EU transfer activities. In verification of layer n.2 of the theory advanced, the case study will expand on the EC's policy entrepreneurialism under TEP-2, which seized a new political window of opportunity and entered the defence policy field from the internal market route, preparing an ad hoc EU piece of regulation for European defence equipment markets.

A unified defence equipment market has constituted a long-standing objective in the mind of Europeans. It was back in 1985 that the Defence Ministers of the 13 European countries of NATO, reunited in the 1976 created Independent European Programme Group (IEPG) requested a study on the situation of the European defence armaments industry. The study, which took the name of Vredeling[238] Report or 'Report of the Wise Men' embodies a crucial technical reference in the identification of limiting and enabling conditions for EDEM, as well as in advancing a 'step by step' practical approach to accomplishing a stronger Europe in defence[239]. Taking up recommendations (44 to 50) contained in the Report (IEPG 1985:8-9) concerning potential improvements to defence programs and production, IEPG Defence Ministers recognized that a more efficient use of resources could be reached by harmonizing operational requirements and by developing common acquisition procedures so to open up and integrate European defence equipment markets (Zweerts and Campbell 1990:79-81; Kyrimis 1997:134; Nones and Traballesi 2001:3; Interviews 12,13). The objective to create a European-wide market was reflected in an 'Action Plan' (IEPG 1988) approved by IEPG defence ministers, which identified three main substantive areas of work reflected into three organizational structures (Zweerts and Campbell 19901990:84; WEU/Borderas 1994:8; Bauer 1992:37,41; WEU/Colvin 1998:8; Nones and Traballesi 2001:3). As anticipated in Chapter 5 (p.158), the three

[238] From the name of the (at the time) Dutch defence minister who presided and directed the Independent Study Team.
[239] The Report will be further recalled in Chapter 7 (section 7.3) to evidence the legacy it generated on the EDTIB construction process too.

trajectories encompassed: a) the definition of common operational requirements and components through ad hoc collaboration agreements (Panel I- Operational requirements and equipment development programs); b) the identification of R&D programs in the field of advanced technologies to develop via cooperation agreements (Panel II- Research and Development); c) the opening of the national military acquisitions to non-national enterprises, as to strengthen the competition and competitiveness amongst producers (Panel III- defence economics and procedures, including EDEM) (Kyrimis 1997: 135, 249-250; WEU/Colvin 1998:10; Interviews 8, 12, 14,18).

Building on such repartition of competences amongst the three panels, a step forward was taken in 1990 with the approval in the IEPG's Ministerial meeting in Copenhagen of a Coherent Policy Document setting a core of EDEM-related principles centred on the promotion of openness/transparency, non-discrimination and competition in the construction of a European defence market place (IEPG 1990; Nones and Traballesi 2001:5). In the same direction, following 1992 IEPG's Ministerial meeting in Bonn, which recognised the need to give implementation to the WEU's Declaration annexed to the Maastricht Treaty (TUE), the IEPG's Ministers proposed the merging of WEU into the EU institutional architecture[240] (Rees 1998:41; Mezzadri 1998:39), and the formation of a new forum/structure, the Western European Armaments Group (WEAG), in charge of promoting armaments cooperation in Europe[241] (WEU/Guirado/Dundee 1995:11, 27; Kyrimis 1997:134; Mezzadri 1998:39-40; WEU/O' Hara 1999:306; Interviews 12, 14). Logically the EDEM-oriented principles of the IEPG's Panel III became a substantive part of the new WEAG's Panel III, which kept dealing with the core aspects of a common defence economic armaments policy, and primarily, the creation of the political, economic and legal conditions for the functioning of a single EDEM (WEU/Guirado/Dundee 1995:11; Kyrimis 1997:137; WEU/O' Hara 1999:310; EUISS/Mezzadri 2000a:9; EUISS/Schmitt 2003a:21).

[240] As a consequence of such high-level political decision the WEU acquired a double institutional hat, functioning both as representation of European members of NATO and as the defence expression of the European Communities.

[241] Created in 1993, the WEAG has been recognized as the deputed armaments cooperation institutional forum within the WEU declaration attached to the Treaty of Maastricht (TUE) in 1991. Its objectives, agreed upon in 1992, comprised the more efficient use of resources through, inter alia, increased harmonization of requirements, the opening up of national defence markets to cross-border competition, and the strengthening of the European defence technological and industrial base, the promotion of cooperation in R&D.

A parallel intergovernmental route for the promotion of EDEM has been inaugurated by an IEPG's ministerial decision made at the Maastricht intergovernmental conference (IGC)[242] in the sense of enhancing cooperation in the field of armaments by supporting the creation of a European Armaments Agency, (EAA), which in turn led to the establishment of an ad hoc study group in 1993, tasked to investigate the conditions for the establishment of such Agency (WEU/O'Hara 1999:336; EUISS/Mezzadri 2000a:21). Despite the limited results achieved (WEU/Borderas 1994:9), the work of the ad hoc study group was reactivated in 1998 after the WEAG's defence ministers earlier agreed on a new action plan, this time a 'Master Plan'[243] for the development of the Armaments Agency (WEU/Colvin 19998:9; WEU 1999/O'Hara: 336-337; Mörth 2003:55). Although the WEAG's National Armaments Directors approved the Plan to be delivered by 1999, in view of the ministerial meeting to be held in Rome (Air &Space 1999:8), the political ambition attached to the creation of EAA was heavily frustrated.

While the political vision attached to the EAA's creation was to guide the EDEM-construction process top-down (Hartley and Cox 1992; Cox 1994), the intergovernmental project was clearly outrunning the configuration of States' strategic politico-economic interests under TEP-1. As evidenced in Chapter 5 (section 5.4), until the end of the 1990s, governments in Europe were interested in protecting their national defence markets, while still involved in completing defence industrial consolidation activities at the national level. The political discourse displayed by MSs in the sense of abolishing art. 223 TEC (today 346 TFEU) and creating a central procurement agency, namely the EAA, remained at the level of purely 'soup-talks' because the priority was the consolidation of the arms industry around national industrial champions. Such reading has been confirmed by interviews, which reported that governments of major arms-producing economies in Europe formally declared themselves in favour of abandoning protectionist approaches but at a point in time which was never clarified, and anyway after 'others' would have potentially done it (Interviews 3,16,18,39). Major defence countries were acting inconsistently towards

[242] The formal indication is only contained in the Protocol on art. J.7 of the WEU Declaration annexed to the Treaty of Amsterdam adopted by the Council of Ministers of the WEU on 22/07/1997.

[243] The Master Plan identified the following areas of work: a) measures providing for the legal and political framework for the EAA outside WEAG's authority (e.g. mainly EU activities) but with WEAG coordination and input; b) definition of principles and policies forming the basis for the operation of the Agency within WEAG's authority, including procurement rules and a plan of compatibility with OCCAR; c) measures providing for the administrative and operative basis for EAA to be defined by WEAG.

EDEM and on various political fronts: France, for example, after having tried to tie Germany to an impossible plan, the EAA, then extended to the WEU's framework, engaged in parallel with the UK for the liberalization of defence markets via the removal of art. 223 TEC. The covert political intent in both cases was evidently to save time, to enable completion of the internal industrial restructuring activities (see Ch.5 section 5.3.2) and decelerate the speed of bilateral talks occurring between DASA and BA, concerning a potential agglomeration of the Anglo-German aeronautical/aerospace defence technological capacity into a transnational industrial giant (Interviews 18, 31, 37,39).

A further factor blocking the materialization of a potential EAA, in turn reflecting the organization of political-economic interests under TEP-1, has been the lack of a broader politico-institutional framework of reference in which to strategically place and coherently interpret the sense of a technical/ ad hoc agency, which would conduct joint procurement activities for MSs of Europe. In a nutshell, the EAA project to establish an EDEM inter-governmentally and top-down died an early death in the absence of a common political project of any sort guiding the construction of a foreign, security and defence policy dimension for Europe, namely a Common Foreign and Security Policy and a Common Security and Defence Policy (e.g. CFSP/CSDP), as well as of political incentives for a true liberalization of defence markets in the contingency of (occurring) major national defence industrial consolidating exercises. The analysis of the first (failed) EC's entrepreneurial attempt has provided further evidence of the illustrated points. The next and final section will reconstruct the second (successful) EC's policy entrepreneurial plan, offering verification to both layers of the proposed theory.

6.3.2 Understanding SIA in EDEM

The present section will evidence the movement from an intergovernmental to a supranational EDEM. If the theoretical premises were correct the analysis should evidence: 1) a changing politico-economic configuration and the adjustment of the socio institutional structure in European direction under the first shift in TEP (layer n.1); 2) the significance of the EC's policy entrepreneurial activity in accompanying the SIA via the shaping an ad hoc regulatory regime for EDEM.

In verification of the first layer of the theory, the analysis acknowledges a change in the politico-economic institutional configuration under the new TEP. A new configuration in the policy interests/ forces unleashed two important political levers, which in turn played an instrumental role in the EC's entrepreneurial plan towards EDEM. The first condition, which was lacking when the EAA project was conceived, came to existence under an expiring TEP-1 with the framing of an autonomous Common Defence and Security Policy (CSDP) segment. The second condition, which emerged under the accomplished shift in TEP, concerns the progressive expiration of the institutional role of the WEU, and its legal bodies, namely the WEAG and WEAO, leaving, in the transition, an institutional gap, exploited by the EC as a window of opportunity.

The first development sets the broader institutional framework which hosts the instrumental lever 'EDEM' as a precondition for the generation of European defence industrial capabilities. Already in the context of the Petersberg Ministerial Declaration in 1992, Defence Ministers came to outline tasks of responsibility for the WEU, which was made into the defence arm of Europe, to develop a set of military capabilities, which would fall on the soft side of the military spectrum, namely covering conflict prevention and peace-keeping, crisis-management and peace making, humanitarian and rescue operations, and post conflict stabilization (Kyrimis 1997:253-255; EUISS/Rutten 2001; Mörth 2003:36-37). At the outset, the decision to allocate the WEU a range of soft-military tasks did not reflect a specific political ambition/programme of any kind. More simply, since the WEU was born as a contested institutional partition from the NATO's collective defence representation, the IEPG's Defence Ministers decided to keep a low-profile political posture, by deciding to allocate to WEU the less-strategic segment of military tasks, evidently leaving NATO still responsible for the hard-military component (Interviews 34,45). For this reason, the Petersberg declaration served more as a political manifesto rather than an operational document, as the tasks remained essentially dead letter.

In correspondence with the entry of TEP-2, the political landscape came to change significantly. In 1998 the Franco-British political declaration in Saint Malo spelled out the need to ensure an autonomous modicum of military capacity for EU force generation and readiness in operations to respond to international crises[244]. At

[244] Franco-British Joint Declaration on European Defence (paragraph 2).

the summit it was indicated that: *Europe needs strengthened armed forces that can react rapidly to new risks and which are supported by a strong and competitive European defence industry and technology* [245] (Howorth 2007:33-35; Koutrakos 2013:18). The same rationale emerges in the words expressed by the British Prime Minister Tony Blair, who declared: '*We should begin with capabilities [..] Europe needs to have modern forces and necessary equipment to conduct campaigns [..] we do need to cooperate better and this also mean greater integration in the defence industry and procurement' (*Agence Europe 1999 in Cameron 1999:79). Such a statement set the building blocks of a new political project, which anchored the objective of strengthening an autonomous military industrial capacity with the ambition of projecting Europe as a regional multilateral power in a set of operational activities, mirroring the soft-military WEU's Petersberg tasks (Cameron 1999:75; Howorth 1997:245; Interviews 34, 45,60). This decision originated on the poor experience of the military operations in Bosnia and Kosovo, where American support was often required, and which reflected the limited tactical, organizational and logistic preparedness capacity displayed by Europeans (WEU/O'Hara 1999:327; Cameron 1999:78; EUISS/Missiroli 2000b:24; Howorth 2007:5,12,34; 77; Koutrakos 2013:13; Interviews 12, 16, 18, 45).

The new horizon of reference in which to frame and place the armaments-related discussion became the CSDP segment of the CFSP. The technical and logistical aspects became instrumental conditions for the efficient deployment of international missions, merging civil and military aspects. In the 1999 Cologne Declaration [246] the Fifteen agreed on a '*need to undertake sustained efforts to strengthen the industrial and technological defence base, which they wanted to be competitive and dynamic',* which would require them to '*foster the restructuring of the European defence industries, work towards closer and more efficient defence industry collaboration, and seek further progress in the harmonisation of military requirements and the planning and procurement of arms'* (Cologne Declaration 1999: paragraph 2; WEU/O'Hara 1999:339).

The second trajectory of direct relevance for the evolution of the armaments-related discussion in Europe has been inaugurated under TEP-2, with the dissolution

[245] Franco-British Joint Declaration on European Defence (paragraphs 3-4).
[246] Cologne Declaration on strengthening the common European policy and security and defence, adopted by the Council of the European Union in Cologne on 04.06.1999, paragraph 2.

of the political role of the WEU[247] and consequently of its institutional competence in defence affairs. The progressive approximation and coordination between WEU and the EU structures was announced in the course of the Maastricht IGC, and better articulated in the Amsterdam IGC, while a potential phasing-out of WEU's activities was prospected in the Amsterdam's Treaty implementation phase. In November 1999 the WEU's Council of Ministers allowed the Council of the EU bodies to get direct access to the expertise of the WEU organization's operational structure, after its Ministers agreed on a total integration of WEU into the EU institutional architecture, with contextual absorption of the WEU's Petersberg tasks from the WEU to the EU (WEU 2000:47; Mörth 2003:52-53; Interviews 12,45) to better achieve and integrate, under the newly inaugurated CFSP/CSDP segments, the international civil/military crisis management objectives earlier indicated.

A diminished role for WEU impacted on the future of WEAG, its policies and initiatives, which had been politically activated in 1992 over the ashes of IEPG, but which presented a legal personality depending on WEU (see Ch.5 section 5.4). In imagining the future of WEAG in a post-Cologne phase, its Steering Board recognized '*how the objectives of WEAG were becoming more pressing and important in recent years due to the increasing pace of technological change and the widening of the technology gap between Americans and Europeans'* (WEU/O'Hara 1999:339) and explicitly suggested the option to better study an incorporation of WEAG into the EU umbrella with a view to be more closely connected with developments under CFSP/CSDP. This option became even more solid once the attempts to create an EAA vanished, leaving de facto the WEAG without a political reference, nor guidance, as to the framework under which to pursue its wide set of activities (WEU/O'Hara 343; Interviews 20,21,45).

It is in the context of the indicated transition that the EC stepped into this policy area and articulated a strategy to frame a supranational regime for defence equipment markets in Europe. When, in 2002, the Greeks took up the Presidency of the CEU, a very politically loaded agenda weighed on their shoulders, and a number of Gordian knots for the future of defence were still tied. First, there was the problem of the dismantling of the WEU and the multiple questions concerning the future

[247] Although announced in the context of the 1999 Cologne European Council, after the Treaty of Amsterdam had transferred the Petersberg tasks from the WEU to the EU, the formal dissolution of WEU, and termination of the Assembly and Council activities, took place only in 2009 with the entry into force of the Treaty of Lisbon.

evolution of baroque EU-WEU-NATO defence institutional architecture. Secondly, the political legacy of the 'never achieved' EAA was confronting the need for new institutions to address the capability development needs in an evolving CFSP/CSDP framework. Thirdly, the process of enlargement and the accession of new MSs raised questions as to how to structure future regimes to advance the European defence integration project (CEU 2003a; Interviews 21,39,45). With Denmark opting out from CSDP, the Greeks were allocated a yearlong Presidency to try to address these goals.

The Presidency endorsed a strategic line marrying the political vision encapsulated in the 2003 European Security Strategy (ESS), being prepared at the time under the EU-High Representative, Javier Solana. The EU-HR drafted a strategy that proposed a wider notion of European Security operating as an overarching umbrella, which places the military component as an instrumental mean for the advancement of the CFSP's objectives (CEU 2003b; Interviews 45,53,55). In the post- Cold War increasingly multipolar and interconnected world, the complex nature of threats impacting equally on the security of soldiers in CDSP missions as well as of citizens in their private lives, eliminated the traditional conceptual divide between defence and security (Howorth 2007:244ss; Interviews 45,53,55). For this reason, in the panoply of collective solutions the EU can provide the military is just one of the possible ones, which needs to be preserved against the corroding action of the secularization and globalization of the defence industrial capital of Europe (Interviews 45, 53,55).

In line with this political ambition, the 2002/2003 Greek Presidency of the CEU gave new input to the discussion around the armaments related subject by reactivating the 1995 Permanent Working Group on Armaments Policy (POLARM) (EUISS/Schmitt 2003a:31; Interview 45). The reopening of the POLARM forum proved an highly strategic choice: due to its inter-pillared nature it ensured the widest level of representation as Presidency, MSs, and the EC could attend monthly meetings and discuss issues on an equal footing (Interviews 21,45). From the side of MSs it was the very first time that WEAG national representatives, migrating from the WEU Assembly to the newly created EU Council Structures,[248] were in formal dialogue

[248] Newl- created structures within the CEU encompassed the EU Political and Security Committee (PSC), EU Military Committee (EUMC), and the EU Military Staff (EUMS).

with the EC's representatives from different Directorates-General (DGs)[249] under the direction of the CEU's Presidency (Interviews 45,53,55). It was a very different environment compared to the previous decade (see Ch.5 section 5.4) where the EC policy officers had to plan, in the shadow of NATO, informal meetings with the WEU/WEAG's representatives, essentially privately relying on professional contacts established in the domestic military environment to discuss European armaments-related subjects (Interviews 3,12,16,18).

Unlike the post-Cold War period, when the EC of Bangemann tried to establish a first institutional liaison with the defence industrialists of Europe, in the 2000s phase, there was not only a chair for the EC in Justus Lipsius Building (e.g. the Council of the European Union), but there was also a place and a role for the arms industry of Europe in the strategy advanced under the CEU's Greek Presidency (Interviews 40,42). By the early 2000, it became clear that the TEP governing defence production and organization had changed: the relationship between governments and their defence industries had deteriorated, as the national champions policy lacking robust military R&D investments, proved ill-suited for containing the impact of globalization forces on DTIBs of Europe. For this reason, as illustrated in section 6.2.1, the only option to maintain a competitive posture in a deeply changed environment under TEP-2 was to get globalized and less dependent on military markets. Prior to a formal and open discussion in POLARM format with MSs over criticalities affecting EDEM fragmentation and EDTIB loss of competitiveness, the Presidency strategically liaised with the defence industrial representation EDIG[250], by that time having concentrated a stronger political role. EDIG served as an intermediary with the industry to start disclosing opacities and malpractices in the functioning of European defence equipment markets. The parochialisms and economic distortions reported encompassed not only the wide spread MSs' tendency to privilege non-transparent and non-competitive tendering practices during public procurement activities, but also to readjust previously agreed volumes of military R&D investments in the course of delicate technological development operations, clearly exposing the capability of the industry to deliver secure supplies to armed

[249] DGs involved encompassed inter alia DG Relex (formerly DG I/A then transited into EEAS), DG RTD (formerly DG XII), DG Enterprise (formerly DG III), DG Market (formerly DG. IV), DG Trade (formerly DG XIV) and DG ECHO (formerly European Community Humanitarian Aid Office)

[250] In 2004 the EDIG will be merged with the AECMA (Civil Aeronautics) and EUROSPACE (Space) components to form the Association of the Aerospace and Defence Associations of Europe (ASD).

forces involved in various operational terrains, including high-intensity warfare scenarios (Interviews 40,42,45; Informant 1).

Once reunited in POLARM configuration, the rhetoric traditionally displayed by the diplomatic component of countries' delegations was circumvented once the military component gathered in the CEU's Political and Security Committee (CEU-PSC), EU Military Committee (EUMC), and EU Military Staff (EUMS) formats were openly questioned regarding the practical details concerning domestic experiences separately reported by the industry (Interviews 40,45; Informant 1). The third player, the EC, took an active role in the plan, capitalizing on the unique observatory position granted, and ensuring a further level of endorsement of the Presidency's strategy by providing technical data evidencing the critical state of functioning of defence equipment markets in Europe (Interviews 43,44,45). It was indeed in the context of the illustrated triangulation that the EC found an opportunity to step into the armaments policy field, as a sort of spinoff of the Presidency's main political accomplishment.

The CEU's Presidency was at the time working in synergy with the EU-HR Solana in an attempt to advance a competitive DTIB as an essential engine sustaining the credibility of the CFSP/CSDP segments. For this reason, the Greek Presidency, supported by the defence industrial component, pushed MSs in POLARM format to agree on a number of resolutions on the topical items of Standardization (CEU 2003c), Security of Supply (CEU 2003d), and Industrial Restructuring (CEU 2003e) (EUISS/Schmitt 2003a:32; Interviews 40,42,45; Informant 1). It also proposed a joint action for a 'EU cooperation programme for advanced research and technology (E.PA.SE.RE.TE)[251] (CEU 2003f), while the accomplishment of monitoring activities over the state of defence equipment markets was indicated as a key area for future EC's regulatory initiatives in a CEU's common position, which even anticipated potential EC legislation on defence-related intra-EU transfers (CEU 2003g)[252].

In further advancing this strategic line, the Greek Presidency concentrated the efforts on capitalizing on its very major accomplishment with the political agreement on the establishment of a brand new European institution to implement the POLARM

[251] It will be offered in the context of Chapter 7 expanding on EDTIB how the proposal for rules governing strategic R&T activities would be included into the area of activity of the EC's security research preparatory action.
[252] A regulation for intra-EU transfers became an integral part of the 2007 defence package with Directive 43/2009/EC.

resolutions and push forward the development of a joint defence technological and industrial component. The political anchor was found over discussions held during the late hours of the 2003 Thessaloniki European Council on the need to offer a vigorous institutional response to the Iraqi crisis, which had seen Europeans incapable of expressing a common position, with some countries (e.g. UK, Poland) joining the American call to the 'coalition of the willing' and some other countries not joining. Such a situation clearly created a visibility crisis for Europeans concentrated on setting the foundations of CFSP/CSDP, so that a compromise was found, with the aproval of the Britons, on establishing an intergovernmental agency, the European Defence Agency (EDA), promoting defence capabilities development, joint R&D and armaments cooperation amongst Europeans (CEU 2003h: paragraph 65; Interviews 39,45, 53,55)[253].

As it will be better elaborated in Chapter 7 (Section 7.2.1) reconstructing the EDTIB's origins, the transition to the EDA was not immediate since an Agency Establishment Team (AET) had to be formed under a Franco-British direction due to the failure of the 2003 Italian CEU's Presidency to deliver the task (Interviews 20,21,39,45). This time lag was strategic enabling the EC to capitalize on the Greek Presidency's experience, and in the absence of a formal institution claiming competence on the armaments terrain to advance EDEM, providing for practical implementation of the EU defence market harmonization objective outlined in the context of the 2003 EC political Communication (EC 2003; Interviews 23, 43, 44, 45). Jointly welcomed by the CEU's Presidency and the EDIG, which cumulatively stressed the need to place the initiative into a broader CSDP framework, as well as to consider the specificities and evolving features of arms industries in Europe (CEU 2003i: Annex III; EDIG 2003a; EDIG 2003b:3), the EC Communication spelled out clearly the intention to pick up the WEAG legacy by, *inter alia*, launching a EU monitoring activity over the defence industrial sector and contextually building a common framework of rules to support the progressive harmonization of defence

[253] Thessaloniki Council 19-20.06.2003, Presidency Conclusions 20.06.2003 Paragraph 65 states: 'The European Council, following the 2003 spring European Council, tasks the appropriate bodies of the Council to undertake the necessary actions towards creating, in the course of 2004, an intergovernmental agency in the field of defence capabilities development, research, acquisition and armaments. This agency, which shall be subject to the Council's authority and open to participation by all MSs, will aim at developing defence capabilities in the field of crisis management, promoting and enhancing European armaments cooperation, strengthening the EDTIB and creating a competitive EDEM, as well as promoting, in liaison with the EC's research activities where appropriate, research aimed at leadership in strategic technologies for future defence and security capabilities, thereby strengthening Europe's industrial potential in this domain'.

markets and respond to pressing challenges placed by globalization on DTIBs' performance (EC 2003: 11-12,15,19; Interview 48).

Specifically, the strategic line to expand EDEM via the internal market route built on the close interaction between the EC Enterprise and Market services, at this stage in time working in coordination, and the WEAG's component. Since its creation, WEAG's Panel III had worked on a cross-border collection of procurement/contract data to monitor the evolution of EDEM (Private Collection n.1/ WEAG Blue Book N/A; Interview 44). Through such engagement the EC gained privileged access to a significant amount of confidential information concerning the current state of defence equipment markets in Europe, including operational requirements and technical shortfalls evidenced in joint procurement programs and missions. It furthermore leveraged the earlier WEAG's political endeavour to agree on a number of common principles and guidelines to increase transparency and horizontality in procurement practices, including the launch of an internal WEAG bulletin listing contracting opportunities and the establishment of national contact points, as well as in the sense of working at the definition of the first basic sets of rules spelling out minimum qualification requirements and objective criteria for the awarding of contracts (Private Collection n.1/WEAG Blue Book N/A; Interviews 43,44).

For this reason, once the fiduciary tie was activated, the case for the EC's involvement in defence market-related activities was progressively strengthened in this initial and very delicate phase, by promoting trust-building activities with MSs and the earlier created Association for Defence and Aerospace Industries of Europe (ASD) (Private Collection n.2 /Green Paper Consultation Blue Book N/A; Interviews 43, 44). In an attempt to draw a connecting line with the WEAG's tradition, the EC undertook for the first time a comprehensive 'scoping' exercise over the state of EDEM by launching a public consultation amongst the politico and economic forces of Europe (Private Collection n.2 /Green Paper Consultation Blue Book N/A; CEU 2004; Interviews 44,45,47). Opened with the presentation in 2004 of a Green Paper (GP) on defence markets (EC 2004), the wide consultation culminated in an assessment report (EC 2005a;b), which evidenced an abusive reliance by MSs over art. 346 TFEU (ex. 296 TEU), as well as the unsuitability of the newly adopted EU public procurement regulation to address the several specificities and sensitivities of defence markets (See Ch.2 sub-section 2.2.2; Interviews 44,45,46,47).

In line with what anticipated in the legal analysis (Ch.2) and in verification of the theoretical framework (layer n.2) (Ch.3), one could observe that the politically sensitive role played by the EC in the GP phase has been strategically attached to a special EU entrepreneurial coalition composed of the Court of Justice of the European Union (CJEU), and of an ad hoc created EU task force with the European Institute of Strategic Studies (see Ch.2 sub-section 2.2.2). Following a low-risk strategy, the EC, which initially played as non-majoritarian actor on the defence policy-making scene, at first silently took up the WEAG's legacy (from the institutional vacuum left) and placed the CJEU at the forefront of an interpretative activity aimed at containing the scope of the military exemption ex art. 346 TFEU (EC 2006a,b). In a second phase, being confident of the positive trust-building output capitalized on the Green Paper initiative and of the CJEU's interpretative consolidating role, the EC promoted a strong coordination amongst DGs (Enterprise-Market-Trade) and the earlier created EUISS Task Force to cement its legal competence in the defence-market field, following the traditional/low-risk internal market route (Interviews 44,45,46,47). In line with theoretical premises, a EU rule-based EDEM embodies the only and best possible output the EC-guided entrepreneurial coalition could generate under the first major shift in TEP, which marked a deep transformation in the techno-economic organization of military production. Following a legislative procedure having lasted less than two years, the 2007 EC's Defence Package technically articulated two pieces of EU administrative law regulating, respectively, the procurement (EC 2007c; OJEU 2009a) and the intra-EU transfer (EC 2007f; OJEU 2009b) of defence and sensitive products, works and services in the European Union, as well as the 'skeleton' of a defence industrial strategy (EC 2007d,e).

6.4 Conclusion

The chapter has developed the third case study analysis, which covered the successful making of the EC supranational EDEM in the 2000s. In full verification of theoretical premises formulated in Chapter 3, the first part of the chapter (Section 6.2) has dug into main trajectories of change in the techno-dependent transition from TEP-1 to TEP-2. In doing so, the analysis has articulated on three dimensions (e.g. ownership capital, corporate governance, and R&D/productive structures) to evidence

the progressive affirmation of the model of MNEs for defence corporations. Such an analytical conclusion has been furthermore tested across the three main defence industrial consolidating examples under TEP-2, namely BAE Systems, THALES and EADS. While the first two cases marked a reorganization of the productive activities in fully globalized direction, the EADS model has been elevated as a core political reference in the process of European defence industrial integration. In digging into the main passages of the three consolidation experiences, the analysis has highlighted limitations beyond both MNEs' variants, namely the fully globalized defence corporation and the multi-national defence enterprise reproducing in larger scale the national champion philosophy.

The second part of the chapter (Section 6.3) has offered verification of the two layers of the theory, namely the positive accomplishment of a SIA in a supranational direction under a first shift in TEP, and the significance of the EC's policy entrepreneurial activity in determining the regulatory change. More specifically, the first part of the analysis has expanded on the status quo, namely EDEM by intergovernmental means, coming to expand on the IEPG/WEAG's institutional framework only sketched in the course of Chapter 5, which illustrated the first (failed) EC's attempt to pass a supranational EDEM in the post-Cold War period. The second, and core part of the analysis, has elaborated on the motives beyond the successful EC's policy entrepreneurialism in the 2000s phase. A first line has expanded on the emergence of a new configuration of politico-economic interests under TEP-2, which resulted in the emergence of an autonomous CSDP, as well as in the progressive expiration of the WEU/WEAG's institutional role. A second line has deepened on the EC's policy entrepreneurial activity by documenting a low-risk strategy which generated a high-gain output. In full adherence with theoretical premises made, the third case study analysis has documented a first shift in TEP and its impact on the defence socio-institutional architecture of Europe (layer n.1), as well as the significance/incidence of the EC's entrepreneurial choice made with the decision to set a solid coalition (e.g. CJEU, EUISS Task force, EC-DGs) and keep a low political profile, while advancing a legislative proposal following the internal market route on which the EC has specialized technical competence (DG-Market/ EC legal services).

The last case study will evidence the limits of EDEM, projecting the theoretical premises tested across the three cases study beyond EDEM, in EDTIB direction.

CHAPTER 7

Going beyond EDEM:

EDTIB, at last

7.1 Introduction

The cases study contained in the previous two chapters have tested both layers of the theory against EDEM. EDEM, nevertheless, is not the only output the first shift in TEP generated. Indeed, the theoretical framework contained in Chapter 3 suggested that, in correspondence with the gradual deterioration in the linearity (e.g. military towards civil) characterizing the traditional innovation model, the 5th wave (TEP-2) presents a peculiar structure. Such peculiarity concerns a halving of traditional TEPs' time-cycles over the 40 years of the full cycle, under a progressively commercially led organization of the global innovation machine. As a consequence of a fast-changing innovation economy and more rapidly expiring TEPs, also socio-institutional adaptations (SIAs) also become faster, and forms of policy entrepreneurialism accompanying them more purposive and elaborated (Ch.3 pp.86, 92-93). In adherence with the theoretical premises made, the present chapter evidences further institutional adaptation under TEP-2 with the setting of the building blocks of a new policy framework, EDTIB, already occurring in the very closing phase of wave 5th (e.g. 2010s). Despite its foundations already emerging in the sunset of TEP-2, the EDTIB's coherent implementation will take place in the post-2020 phase under a new TEP (e.g. TEP-3).

The chapter is structured into two parts. The first part of the chapter will project a connecting line with Chapter 6, complementing the analysis of the politico-

economic determinants of EDEM, which the previous case study reconstructed under a political science angle. Critically re-joining with considerations advanced in Chapter 2 reviewing the legal debate on EDEM, section 7.2 will reflect on the structural limits of EDEM, as shaped in the 2007 EC's Defence Package in an evolving techno-economic context affecting the situation of the arms industry worldwide. More specifically, in reviewing statistical data, also covering contract notices/ contract awards provisions and the use of procurement procedures (e.g. indicated as item b in Ch.2 p.24), the section will document the limited practical impact the EDEM regulatory construct generated a decade after its entry into force. In offering a final projection of politico-economic motives elaborated in Chapter 6, the analysis on the limits of EDEM will conclude by acknowledging a deviation from the original French-led strategic vision downsized to a minimum common denominator with a EU regulatory regime of residual strategic significance.

The second part of the chapter (Section 7.3) will provide for a further degree of verification, beyond the dependent variable EDEM, of the two layers of the theory. Similar to the analytical strategy adopted in Chapter 6, the first sub-section (7.3.1) will document the EDTIB's intergovernmental origins, from the WEAG experience to the EDA's joint R&T programs to come to evidence the effects of the shift in TEP on the supranational evolution of EDTIB. The second subsection (7.3.2) will reconstruct the rich EC's policy entrepreneurial plan towards EDTIB articulated in less than a decade from the EDEM coming into force and comprising important political initiatives with regulatory implications, such as the Preparatory Action for Defence Research (PADR) and the European Defence Action Plan (EDAP). As anticipated, these developments laid the foundations for a new phase to implement a mature supranationalism in defence market and industrial-related policy affairs.

The chapter ends by reflecting on the future prospects for EDTIB's emerging socio-institutional and regulatory structure to embody an effective regime to support, on the one hand, the competitiveness and innovation capacity of the defence technological and industrial base of Europe, and, on the other hand, to promote the Union's long-term political ambitions in security and defence policy. While it remains pretty clear that the creation of an EU supranational financing scheme such as the European Defence Fund (EDF) serves the purpose of generating incentives for companies to cooperate via consortia and retain a core of skills and technological know-how/capabilities in the European continent, it proves a less evident the

connection with the broader CFSP/CSDP's politico-strategic and operational dimensions. The conclusion to the present chapter will reconnect to the conclusion to the present PhD investigation.

7.2 The Limits of EDEM

Chapter 2 (Section 2.2) offered a comprehensive review of the legal debate on EDEM. In disentangling doctrinal and jurisprudential steps towards an EU rule-based EDEM, subsection 2.2.2 provided for a legal analysis of the EDEM's core piece, namely the Defence and Security Directive (DSD) containing a piece of EU administrative law regulating the MSs' defence and security procurement activities within the territory of the European Union. More specifically, the review of the legal debate concentrated on analysing the DSD's scope of application, which exempts all defence and security procurement falling under art. 346 TFEU, as well as under the list of exclusions indicated in articles 12 and 13 of the same Directive. Its over-restricted applicability, together with the need to ensure a fair balance in the representation of the political science debate on EDEM in the literature review chapter, motivated the decision to postpone the analysis of the DSD's substantive provisions, including contract notice/award provisions and procurement procedures, to this chapter with a view to documenting the limits of the regime under comment.

A point of departure in the analysis is the acknowledgment of a gap or mismatch existing between EC official statements[254] (EC 2007g) and the empirical reality characterizing EDEM (EC 2007a:13-14). As of today, a decade on from its coming into force, the ad hoc tailored EU regime registered less than a 10% market coverage in Europe (EC 2016c: 13) which corresponds to a very small figure when compared to the overall defence procurement expenditure (EC 2016c: 54, 116). Such a number is even more astounding if one were to consider that security markets, falling within the scope of application of the DSD, kept registering a fast expansion over the past several years (EC 2007a:12) due to the intensification of the terrorist threat after the 9/11 attacks. The same EC estimated that, in 2005 alone, the total

[254] The 2007 EC's Defence Package was announced as the milestone step in the construction of a truly harmonized, open and efficient EDEM.

security and procurement expenditures amounted to 194.5 billion USD, while defence and procurement expenditure was 173.6 billion USD (EC 2007a: 61,73).

The 2016 EC's ex-post evaluation assessing the DSD against a set of parameters[255] evidenced a positive variation in contract notices published on the Tender Electronic Daily (TED[256]) and the Electronic Bulletin (EBB[257]) which are reported to have increased from 1844 in the period 2008-2010[258] (EC 2016c:19) to 8700 notices[259] under the DSD between 2011 and 2015 (EC 2016c:30)[260]. The EC's calculation, nevertheless, does not seem to reflect data contained in a Study prepared for the European Parliament (EP), which reports a lower figure, namely 3057 contract notices for the period 2011-2014, and 2373 contract awards published on TED (European Parliament- EP- 2015:19-22). Additionally, the emerging contract notices and award notices picture is very fragmented with more than 70% of the contract notices issued by five MSs[261] (EC 2016c: 32) and almost 60% of the total EU share market, namely award notices, covered by only three countries[262] while six MSs[263] registered zero contract award notices (EP 2015:19-22).

Another set of data could give a better sense of the uneven results generated by the DSD. Out of a totality of 2373 contract award notices published between 2011 and 2015, 562 include no information regarding the value of the contract, while only 255 (e.g. less than 10%) of contracts awarded valued over 5 million EUR (EP 2015:24,26). Statistics evidenced how the vast majority (e.g. over 90%) of contracts awarded under the DSD encompassed amounts below 5 million EUR, namely acquisitions of low strategic importance, such as technical repair, maintenance, training and simulation activities, whereas the hard core of defence acquisitions still follows art. 346 TFEU (EP 2015: 31,33,40, Annex V; EC 2016c: 70, 73-74). In terms of procurement procedures, a general preference has been registered for the negotiated procedure without prior publication of a contract notice or call for tender,

[255] Namely, effectiveness, efficiency, relevance, coherence and added EU value.
[256] TED (Tenders Electronic Daily) is the online version of the Supplement to the Official Journal of the European Union (OJEU), dedicated to European public procurement. Contract notices and contract award notices can be visualized by registering on the TED website at the following address: https://ted.europa.eu/TED/main/HomePage.do
[257] The European Electronic Bulletin (EBB) run by EDA was abolished in 2015.
[258] Which passed from 1548 to 4024 (TED only) and from 1844 to 8700 (TED plus EBB).
[259] The broad calculation includes prior information notices, contract notices, contract award notices, and subcontract notices.
[260] The total figure would account for 3682 contract award notices, accounting for nearly 30.85 billion EUR while they were only 8.8 in 2010 (EC 2016c:19,31, 70).
[261] Namely, Germany, France, Italy, Poland and UK.
[262] Namely, France, Germany and Italy.
[263] Namely, Cyprus, Greece, Ireland, Malta, Luxembourg and Spain.

while only some countries such as the UK and Denmark made use of voluntary ex ante transparency notices ex art. 60(4) DSD to award contracts without prior publication of contract notice. The negotiated procedure without prior contract notice has been employed almost 50% of the time a high-value contract (e.g. over 10 million EUR) was awarded (EP 2015:28), while over 80% of successful economic operators are still based on the national territory for above 95% of the contract value (EP 2015:34-35). These figures do not seem to reflect a significant variation on the initial data, which reported a 0.86% share of cross-border contract awards between 2008 and 2010 for a value equivalent only to the 3.3% of the total EU defence procurement expenditure (EC 2016c: 19).

In overall terms, the reported data set indicates that, besides the problematic aspect concerning its circumscribed scope of application (see Ch.2, subsection 2.2.2), the DSD presents difficulties in combining the application of the traditional internal market principles with the specificities characterizing the functioning of defence markets and their strategic industries. In other words, although the application of the legal principles of transparency, non-discrimination, and competition is formally recognized as a core-pillar of the DSD's architecture, their practical implementation is often overlooked in light of the need for flexibility requirements. An example in this sense is offered by the rules concerning procurement procedures. Despite the fact that the restricted and negotiated procedures with prior notice are considered standard procedures, reflecting the implementation of internal market principles (Gabriel and Weiner 2010:24-25; Heuninckx 2011b:14; Weiner 2012:16), the negotiated procedure without prior publication of a contract notice/ call for tender has been systematically applied in view of its flexible nature (see EP 2015:28 quoted). Although this procedure was designed to cover circumscribed and exceptional cases [264] (Heuninckx 2011b:16-17; Trybus 2013:311,319; 2014:336-337) as containing only few guarantees, namely very few rules on how the negotiation should be conducted (Trybus 2014:323-324), MSs are essentially applying it by default and awarding half the total share of medium to high-value contracts to national suppliers on this channel (see EP 2015 quoted).

[264] Art 28 DSD lists inter alia situations of urgency and crisis (art. 28.1.c), as well as the procurement of R&D services (art. 28.2.a), maintenance and recurrent contracts (art. 28.3.a) as well as additional contracts (art. 28.4), and finally situations involving armed forces abroad (art 28.5). The general obligation for public administrations to issue contract notices is recalled also in Recital 58 DSD.

A second example is provided by the rule which sets out criteria for the awarding of defence and security contracts. Under the DSD, the definition/choice of the most advantageous tender can be made, when the award is completed to the most economically advantageous tender, following a set of sub-criteria, which include quality, price, technical merit, functional and environmental characteristics, running and life-cycle costs, cost-effectiveness, after sale and delivery conditions, security of supply, interoperability and operational factors (Masson and Martin 2015:14)[265]. It has recently been suggested by legal academia (Trybus 2013:24-25; 2014:401) that these sub-criteria, listed as alternatives, should instead replace the lowest price criterion, which plays minimal importance for off-the-shelf technologically intensive contracts. It is argued that the proposed doctrinal interpretation is arbitrary and goes against the letter of the law, which not only clearly states that these criteria, including price, are subordinate/integrative (e.g. sub-criteria) to the main one, namely the most economically advantageous tender, but also that the lowest price only is a possible and alternative criterion to award defence and security contracts under the DSD, without any differentiation between high and low-technology contracts.

While this being the current state of affairs in EDEM, the second part of this section will shed further lights on its limits, before analysing the last SIA in EDTIB. More specifically, it investigates to what extent the final version of the recalled DSD reflected, integrated or sacrificed parts of the different original political visions/positions during policy negotiation activities. It has been indicated in the closing of the analysis contained in Chapter 6 that the Green Paper (GP)'s season represented a milestone passage which sealed an important political agreement amongst-policy making forces over the need to support the progressive opening of defence equipment markets in Europe, and also paved the way to the 2007 EC's legislative proposal. There is, nevertheless, another step, which has not been covered in the third case study analysis, and that concerns the politico-economic negotiation amongst policy-making actors on the 2007 Defence package, comprising an EU legal regime for the defence and security procurement of MSs in the EU, namely the DSD. Such negotiation was been carried out during an intense 18-month process under the French Presidency to the Council of the European Union (CEU), and finally delivered the technical shape of the EDEM's regulatory core piece, by chiselling from the rock

[265] Art. 47(1) DSD lists a set of sub-criteria as integrative to the most economic advantageous one (a), and alternative to the lowest price one (b).

of the EC's draft legislative proposal (EUISS/Schmitt 2005c:25; Interviews 41, 42, 43, 47).

The analysis departs by acknowledging the leading role played by the French Government, via the channel of the CEU's Presidency, in the negotiation activities around the 2007 Defence Package (Hoeffler 2012:435; Fiott 2018:110-111,120). The promotion of a more liberalized and harmonized competitive defence equipment market in Europe has represented a cardinal aspect of the French national reflection in the years anticipating and following the entry into force of the EDEM regime[266] (French Parliament/National Assembly 2008: 23-25; French Parliament/Senate 2010:94ss; Interviews 23, 30, 35, 39, 47). More specifically, on such reflection, a new political vision on the subject matter of EDEM progressively evolved, in a fast changing techno-economic context characterized by an intense globalizing pressure over defence industries (Interviews 23, 29, 35, 47). In line with what was commented in Chapter 6, since the spread of a globalized defence industrial capital, governments of major arms-producing countries started to lose their grip on the strategic orientation of military production once defence corporations transformed into MNEs with a less structured presence in Europe (see Ch.6, section 6.2). In correspondence with the rise of TEP-2, a new configuration of interests amongst policy entrepreneurial forces started to emerge with main arms-producing players in Europe gradually reconsidering their traditional domestic preferences over the politico-economic organization of defence equipment markets (Interviews 21, 30, 35, 47).

First amongst other political actors in Europe, the French Government started to display a more open/supportive attitude towards an EC policy-making involvement in the defence market-related affairs (Interviews 32, 35, 37, 47). Such political posture evolved in parallel, and not without incoherencies, with another line of political support towards the EDA's intergovernmental activity on the more sensitive research and military capabilities development side, across a sort of strategic double track (Interviews 32, 35, 39, 47). By further disentangling the French political vision one could not only interpret shortages affecting EDEM in the light of the political

[266] The French strategic reflection over EDEM has articulated in a number of assessments, hearings and special reports/analyses produced by the French Senate and the National Assembly in the years before and after the entry into force of the 2007 Defence Package. A number of ad hoc hearings have also involved defence managers from the top of the defence industry and industrial representatives, as well as armaments directors and top military personnel from the National Armaments Directorate (DGA). The same level of articulation in the national reflection has not been reached in other MSs. The reflection articulated in the French national environment has instead supported a leadership role to this country in the strategic development of defence market and industrial-related policies in Europe.

divergence with other policy players, but also better illuminates the analysis on the second socio-institutional adjustment in EDTIB. Indeed, by reconstructing the changing politics of EDTIB, the next section (7.3) will document how the mentioned two-track/double approach has smoothly recomposed once the residual incidence registered by the EDEM regulatory regime incentivized political convergence for a stronger EC's policy entrepreneurialism to support, under TEP-2, the transition from an intergovernmental to a supranational EDTIB.

A first element of divergence opposed France to the EC's traditional approach towards EDEM on the item of the application of the internal market principles permeating the EU Treaties and the European public procurement legislation into the defence market. As anticipated in Chapter 2 (Subsection 2.2.2), a point of departure in the construction of an EU-rule based EDEM was the acknowledgement, reiterated in the ex ante EC regulatory impact assessment (EC 2007a: 15, 19, 27, 41, 59) and in the legislative proposal (EC 2007a:8), that the existing legislative framework for defence procurement in Europe was ill-suited to accommodate the specificities of defence markets so as to overcome fragmentations, duplications and inefficiencies in their functioning (EUISS/Schmitt 2005c:14-15; see more extensively Ch.2 pp.25-26). While the unsuitability of general public procurement procedural rules, in tandem with the lack of specific provisions on security of supply and technical specifications, were deemed essential aspects in the GP's consultation for the preparation of a new regulatory regime for EDEM (see Ch. 2 p.25; Ch. 6 pp. 204-205), there is actually no evidence, nor in the ex-ante EC impact assessment (EC 2007a) or in the legislative proposal (EC 2007c) of the fact that a top-down application of EC's internal market principles in the defence market field could generate heuristic effects on the strengthening of EDTIB on which the functioning of EDEM primarily rests (EC 2016c:17).

Opposing a rigid application of free market principles in the defence sector, the French vision has instead, from the beginning, anchored the EDEM's construction project to the objective of reinforcing and protecting a competitive EDTIB (French Parliament/National Assembly 2008: 24; French Parliament/Senate 2010:109; 112; French Parliament/National Assembly 2011a: 9,17,30,115; French Parliament/Senate 2011b:18-21,45,137; Interviews 29, 30, 39, 47). Such orientation clearly aimed at recasting political attention in Europe on the strategic importance of defence markets, rather than on their economic efficiency component only, for the preservation of

national DTIBs and the Security of Supplies (SoSs). As recalled in various parts of the present investigation, defence markets are characterized by hyper-costly R&T/R&D governmental investments that are injected across long and complex product lifecycles. Capital-intensive R&D-driven product development activities are in most cases destined to set the next level of advancement, if not a real disruption, in the existing technological frontier, and ultimately to determine the superiority in the operational performance of the military. For this reason, the French vision has, from its early stage, rejected an inflexible application of internal market principles promoting an excessive fragmentation amongst economic/productive units in the name of competition, on a market not ruled by price-related considerations (Interviews 21, 29, 30, 32, 35, 39). In contrast, the progressive opening of defence markets should have been promoted, in the first place, by supporting the acquisition of technologies and products developed on the extended perimeters of EDEM, rather than on national DEMs (Interviews 35, 37, 39).

The balance between economic instances, namely the functioning of the internal market, and strategic ones, namely the protection of the defence technological and industrial capacity, has not found a proper accommodation in the regulatory regime as the DSD, on the one hand, formally stands on the traditional internal market principles which support the architecture of the defence and security procurement legislation, while, on the other hand, it lowers their practical application by shrinking substantive and procedural guarantees in the name of flexibility (see above in the section). The crucial visionary objective to anchor the EDEM's construction project to the strengthening of an EDTIB's dimension is of secondary importance in the final technical articulation of the regime, as it only appears in Recitals 2[267], 3[268], 4[269]

[267] Recital 2 DSD states that the gradual establishment of a European defence equipment market is essential for strengthening the European Defence Technological and Industrial Base and developing the military capabilities required implementing the European Security and Defence Policy.

[268] Recital 3 DSD states that MSs agree on the need to foster, develop and sustain a European Defence Technological and Industrial Base that is capability driven, competent and competitive. In order to achieve this objective, MSs may use different tools, in conformity with Community law, aiming at a truly European defence equipment market and a level playing field at both European and global levels. They should also contribute to the in-depth development of the diversity of the European defence-related supplier base, in particular by supporting the involvement of small and medium-sized enterprises (SMEs) and non-traditional suppliers in the European Defence Technological and Industrial Base, fostering industrial cooperation and promoting efficient and responsive lower tier suppliers. In this context, they should take into account the EC's Interpretative Communication (2006) on the application of Article 296 of the Treaty in the field of defence procurement and the EC's Communication (2007) on a Strategy for a stronger and more competitive European defence industry.

[269] Recital 4 DSD states that one prerequisite for the creation of a European defence equipment market is the establishment of an appropriate legislative framework. In the field of procurement, this involves the coordination of procedures for the award of contracts to meet the security requirements of MSs and the obligations arising from the Treaty.

containing general statements anticipating the body of mandatory normative provisions. As of today, not only a causal link between the Directive and the development of EDTIB cannot be established (EC 2016c:86-87,117) but, in the words of the Association grouping the Defence and Aerospace Industries of Europe (ASD): '*these rules are not sufficient to ensure the proper functioning of the market, even more importantly from an industrial perspective in its size and structure*' (EC 2016c:86).

A second element of divergence, which has also significantly resized the DSD's strategic ambition, led France to oppose a block of MSs less willing to liberalize their markets on the prospective idea to tie defence purchases to a European market only. A core aspect supporting the French strategic vision of 'creating EDEM to protect and reinforce EDTIB' encompassed the inclusion of a 'European preference' clause over military purchases performed under the EU defence and security Directive regime (French Parliament/ National Assembly 2011a:21, 27, 79; French Parliament/ Senate 2011b:8; 21, 146, 151, 161; French Parliament/Senate 2011c:10-14; Interviews 39, 41, 47). As pointed out in various Parliamentary discussions amongst law-makers and top-industrialists in Paris, the insertion of a 'buying European' provision in the text of EDEM regulatory core-piece would have represented a central politico-strategic achievement in different ways. Firstly, by liberalizing markets of their European counterparts, such a clause would have essentially strengthened the economic and industrial position of big defence players, granting them privileged access to new markets and multiplying business opportunities beyond their national ones (French Parliament/National Assembly 2011b:154; 2011c:134; Interviews 43, 46, 47). Secondly, by injecting a standardized legal discipline throughout Europe, the clause would have potentially contrasted the economically distortive practice of offsets[270] on which small countries relied most

[270] Offsets are industrial compensation practices followed by procuring Governments with the aim of ensuring some form of return on their investment, namely the payment given to a foreign defence contractor for the acquisition of defence equipment or related services, for their domestic industry (Georgopoulos 2011:31) and sometimes even exceeding the 100% of the contract value (Trybus 2014:56; Heuninckx and Arrowsmith 2018:149). An offset arrangement is a contract separate from the initial procurement contract, but that separate contract is a condition for the latter. Direct military offsets require a direct or indirect compensation for the original defence procurement contract, whereas indirect military offsets are independent fof the performance of the defence procurement contract but still require compensation in the form of contracts with the defence industries of the awarding state of the original contract. Indirect offsets to the civilian industry or indirect civil offsets are independent of both the original contract and the defence industrial sector of the awarding state (Trybus 2014:55). Other caracterizations are included in Erikson at al (2007:14); Eisenhut (2013:393-394); Heuninckx (2014:35) and Heunincks and Arrowsmith (2018:149). For a comprehensive study on the economics of offsets see: Martin (1996) (ed.), and Bauer and Dunne (2004) (eds). For a legal analysis on offsets see: Georgopoulos (2004: 344-356;

prominently against the indirect support of their national defence industry's technological capacity (EUISS/Schmitt 2005d:4; Ostwall et al 2012; Heuninckx and Arrowsmith 2018:150[271]; Interviews 20,21,47). Thirdly, and most significantly, by gradually modelling the perimeters of a European basket of defence technologies and products acquired, the clause would have progressively phased out foreign interferences in the strategic composition of the EDTIB (Georgopoulos 2004:337; French Parliament/Senate 2011b:163; Interviews 21,23, 37,47).

In the absence of such provision the opening of EDEM would proceed asymmetrically and in direct detriment to the emergence of EDTIB (French Parliament/Senate 2011b: 151; Interviews n. 30, 32, 35, 37, 47)[272]. Indeed, while Europeans were constantly exposing EDEM to global competition forces when expressing their procurement needs, other international players proved attentive in providing for regulatory mechanisms to protect their strategic national assets (French Parliament/Senate 2011b: 45; Interviews 23,30,31,35,39). In the US, for example, the *Buy American Act* contains a national preference rule on the supply and work contracts placed on federal markets, as defence ones are not covered by international trade agreements, such as the World Trade Organization (WTO) Global Procurement Agreement (GPA); the *Balance of Payment Program* furthermore applies to defence markets delivering supplies and works outside the US territory, and other complementary protectionist measures include the *Appropriation Acts* containing amendments to the national budget law and interdicting the US DoD to acquire certain products from foreign sources, especially in the field of Research, Development, Testing and Evaluation activities (R&D+T+E) (French Parliament/Senate 2011b:122-127). As a further guarantee, an inter-agency Committee on Foreign Investments in the US (CFIUS) is authorized since 1975[273] to

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2011:29-42), Eisenhut (2011:393-403); Heuninckx (2014:35-38 and footnote 12); Tryubs (2014: 55-58; 198-204; 406-422); Heuninckx and Arrowsmith (2018:149-151). For a comprehensive study on the effects of offsets on the development of a European defence industry and market see: Eriksson et al (2007) for EDA.

[271] Indeed Heuninckx and Arrowmisth (2018:150) observe that: while the primary means of ensuring security of supply is procuring defence equipment from domestic companies, with major weapon systems this is only possible for arms-producing countries whose industry is already able to design and produce a broad range of complex military equipment. Offsets can be a solution because this option is not available at a reasonable price for smaller countries.

[272] It does not come as a surprise that, interviewed in the context of a public hearing as part of the legislative iter, former French Prime Minister, Alain Juppé, commented the solution contained in the Directive to open national markets to international forces as a '*naïvité* ' (trad. naïve thing) clearly evidencing that MSs of the European Union are '*not all playing the same game'* (French Parliament/Senate 2011b: 137, 146).

[273] CFIUS's authority was last updated with the passage of the Foreign Investment and National Security Act (FINSA) of 2007, which currently guides the CFIUS process. FINSA is the most recent amendment to section 721 of the US Defence Production Act of 1950. Pub. L. No. 110-49, 121 Stat. 246 (2007) (amending section 721 of the Defense Production Act of 1950, codified as amended at 50 U.S.C. § 4565). Amongst other changes, this

review covered transactions[274] involving foreign investments in the US in order to determine the effects of such transactions on the economy and identify potential national security concerns (GAO 2018:3; Interviews 23, 47).

In the face of a 'Fortress US', the prospective creation of a 'Fortress Europe' was opposed by the UK Government. Similarly to Germany, the UK traditionally supported the idea of introducing value for money/greater competition, innovative tenders, standardized procedures and benefit from increased opportunities in wider EU markets (UK Government/MoD 2005:10-11; 2011:14; 2012:13,19-20; Heuninckx and Arrowsmith 2018:144-145; Interviews 20, 42, 46). At the same time, nevertheless, Britons wanted to make sure that the proposed regulation would not contain a European preference clause (UK Parliament/HoC 2011:13-14) potentially hampering the strategic trade flow with the US (UK Government/MoD 2005:6 [xi-xii[275]]; 26 [A3.18][276;]) and that it would not touch sensitive technological areas and intelligence activities (UK Government/MoD 2005:17, 59ss; UK Parliament/HoL 2008:4). The introduction of such a clause would have furthermore come into conflict with the strategic choice, operated earlier at the corporate level by the consolidated defence giant BAE Systems, and commented in Chapter 6 (section 6.2.2) in the sense of favouring the transatlantic route[277] and becoming a global systems' integrator (RAND 2002:124, 153-155[278]; Vlachos 2004:13; BAE 2005:14 in Ch. 6 pp. 188-189). Clearly, the prospect of seeing EU legislation in force affecting the transatlantic orientation of their businesses and international supply chains could in no way be welcomed (Interviews 7,30).

The absence of a political agreement on a European preference clause not only destroyed the idea of a 'Fortress Europe', but also further debilitated the prospective

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legislation formalized agency responsibilities and added additional factors agencies should consider as part of their review. In 2017, bills were introduced in the Congress proposing further revisions to CFIUS.

[274] The term 'covered transaction' means any merger, acquisition or take-over that is proposed or pending with any foreign person that could result in foreign control of any person engaged in interstate commerce in the US.

[275] More specifically, sections xi and xii indicate: (xi) 'We recognise that in the UK we have a successful and sophisticated industrial base with a broad range of capabilities and which delivers a large proportion of our defence equipment and services. We welcome overseas investment where this creates value, employment, technology or intellectual assets in the UK; (xii) We also recognize the attractions of the US market, given its scale and high levels of investment in research and technology, and that the level of influence and attractiveness of MOD business varies by sector and by type of company'.

[276] In the UK Government 2005 National Defence Industrial Strategy it has been reported that (A3.18) UK companies totalled around £2 billion of US acquisitions in 2004 only in almost forty separate purchasing operations.

[277] BAE System is the only defence company in Europe participant in the US Joint Strike Fighter (JFS) project.

[278] In 2000 BAE ranked first defence company in Europe in avionics, communications, C4I, EW (defence electronics) with an estimated 4 billion USD revenue figure. As of 2017, BAE was still ranking on top of worldwide defence electronics business and further extended its portfolio of capabilities to new emerging technologies (see BAE 2017:27 in Ch.6).

state of EDTIB; the provision contained in Recital 18(2)[279] allows MSs to retain the power to decide whether or not to allow third country operators to participate in the procurement procedures prescribed under the DSD. It follows that MSs can award a contract to a third country operator on a competitive basis without recourse to art. 346 TFEU in the first instance, if the contracting authority awards that same contract in accordance with one of the DSD's regulated procedures (Butler 2017:163). Regardless of the fact that MSs award to third country operators on the basis of competitive (e.g. under the DSD) or non-competitive (e.g. under art. 346 TFEU) basis, what it is essential to point out here[280] is that in both cases the absence of a European protective clause exposes the state of EDEM, which will be progressively equipped with foreign technologies and products, hence reducing the EDTIB's degree of strategic autonomy and of competitive advantage.

As a consequence of this, small European countries with a limited technological and industrial capacity will keep trying to purchase from the global marketplace where offsets are still a widespread practice[281] (Eriksson et al 2007:Ch.3, 61-62) as opposed to seeking access to foreign supply chains via the subcontracting

[279] Recital 18(2) DSD states that the exclusion of the DSD from the scope of application of the WTO Government Procurement Agreement means also that in the specific context of defence and security markets, MSs retain the power to decide whether or not their contracting authority/entity may allow economic operators from third countries to participate in contract award procedures. They should take that decision on grounds of value for money, recognizing the need for a globally competitive EDTIB, the importance of open and fair markets and the obtaining of mutual benefits. MSs should press for increasingly open markets. Their partners should also demonstrate openness, on the basis of internationally agreed rules, in particular as concerns open and fair competition.

[280] This crucial point is always missed in the legal reflection on EDEM, which concentrates instead on analysing doctrinal and jurisprudential aspects linked to the applicability vs. non-applicability of DSD. The legal analysis is insensitive to the implications that the uneven penetration of foreign suppliers could generate on the state of EDTIB competitiveness, as well as on the prospect of developing strategic autonomy at the EU level to support the functioning of CSDP operations.

[281] Defence offsets have been since 2008 part of an EDA Code of Conduct on Offsets (CoCO) (EDA 2008a; Gabriel and Weiner 2010:27; Georgopoulos 2011:30-31; Weiner 2012:17). The Code inaugurated on 24/10/2008 (made effective as from 01/07/2009) with the signature of 25 MSs plus Norway has been abolished by a decision of the EDA Steering Board on 15/05/2014 together with the EDA Code of Conduct on Defence Procurement (CoDP) and the EDA Code of Conduct of Best Practice in the Supply Chain (CoBPSC). The decision came after the conduction in 2010 of a new EDA study on offsets abatement (EDA 2010). While there is no mention to offsets in the text of the DSD (EC 2007a:48; Heisenhut 2013:398-399; Trybus 2014:418,424), the EC has condemned their application in Europe issuing a Guidance Note (EC 2009c) integrating a previously reported set of EC Guidance Notes (see Ch.2 section 2.2.2).The Guidance Note on Offsets states that the Directive does not allow, regulate or tolerate offsets which are restrictive measures going against the basic principles and rules of the Treaty because they discriminate against economic operators, goods and services from other MSs and impede the free movement of goods and services [...] unless justified under art. 346 TFEU (EC 2009c:1, 5-6). Reputed legal academia has spelled out the illegality of offsets under EU law as constituting discrimination on the group of nationality (in breach of art. 18 TFEU) and contrary to TFEU provisions on free movement of goods, as measures having equivalent effect as quantitative restrictions on import and exports (in breach of arts. 56 to 62 TFEU) (Trybus 2014:411-418; Heuninckx 2011b:25; Heuninckx and Arrowsmith 2018:151). The contrariety of offsets to EU law as measures generating quantitative restrictions was previously recognised analysing EU case law in Georgopoulos (2004:348). The legality of offsets has been also addressed in the recalled Study by Eriksson et al. (2007:ch.4,71ss, 78) for EDA.

route[282]. By the same token, the uneven opening of defence markets to global competition forces, in the absence of an enforceable clause of reciprocity[283], will simply generate the effect of facilitating the penetration of stronger technological suppliers, namely the US and other emerging players such as China, India or Brasil, into strategic segments of national defence production in Europe (French Parliament/Senate 2011b:146, 163-166 Interviews 21,23,37,39,41,47). The risk of non-European economic operators accessing European markets by establishing secondary legal presence in Europe via the so-called '*faux nez'* (trad. sock puppets) or '*boites aux lettres'* (trad. sock puppets with a legal address) entities has been often recalled in the course of the national consultations in France and during the negotiation of the 2007 Defence Package, without ever managing to capitalize any political result in the final DSD's legislative text (Gabriel and Weiner 2010:1; French Parliament/Senate 2011b:146, 163-166; Weiner 2012:18; Fiott 2018:121; Interviews 21,23,39,41,47).

The section has offered a detailed reconstruction of the limits of EDEM. Building on the analysis of drivers which marked a political agreement over the need to liberalize defence markets in Europe (Ch.6), the present section has moved from documenting the residual practical impact generated by the regime a decade after it came into force, to elaborating on a set of crucial divergences characterizing the political and strategic visions accompanying the negotiation of the 2007 EC's Defence Package. In the framework of a fast expanding globalized defence economy under TEP-2, these divergences have, on the one hand, created the opportunity for the EC to adopt a low-risk strategy and implement the work initiated in the fortunate Green Paper season (Ch.6, section 6.3), while, on the other hand, they have heavily downsized the strategic ambition and regulatory capacity of the EDEM's regime contained in the 2009 DSD (Section 7.2) The second part of the chapter will concentrate on exploring the further socio-institutional adjustment in EDTIB, evidencing a transition from an intergovernmental to a supranational regime.

[282] Subcontracting provisions are contained in art. 21and arts. 50-53 DSD. The quoted 2015 Study by the EP observed that the hardly applied subcontracting provisions cannot be considered as a 'lawful alternative' to offsets; instead, a better understanding of the supply chain and the adoption of suitable models in support of defence-related SMEs in consortia structures where members of the cluster are incentivised to share R&D and technological outputs in new product development activities would surely represent a first step in the right direction (EP 2015:40). The EC's EDTIB regime commented in the second part of the Chapter embodies an application of such mind-set.

[283] See the very weak wording of the last sentence of Recital 18(2) DSD.

7.3 EDTIB

7.3.1 EDTIB by intergovernmental means

It has been evidenced in Chapter 6 how the passing of a piece of EU administrative law has marked the first successful institutional EC's attempt in years to frame a regulatory regime for EDEM and respond to the globalizing pressures over transforming defence industries. A demand-oriented EU rule-based measure has not represented, nevertheless, the only option institutions have considered in the past several decades to promote European cooperation in the defence armaments and industrial policy fields. As indirectly sketched in Chapter 6 (Sub-section 6.3.1) reconstructing the intergovernmental origins of EDEM, the goal of enhancing the technological and industrial capacity of Europeans within and outside NATO, has recorded a long-standing intergovernmental political tradition, under a constellation of joint R&D initiatives, developed prominently within, but also independently, of inter-State collaborative armaments projects.

It was back in 1976 that the Thirteen European Defence Ministers of NATO activated a structure, the recalled Independent European Programme Group (IEPG), whose objective was, beyond the harmonization of operational requirements (Panel I) and liberalization of defence markets (Panel III), the promotion of dedicated R&D programs in the field of advanced military technologies (Panel II- R&D or Research Cell) (WEU/Borderas 1994:8; WEU/Guirado and Dundee 1995:27; WEU/Lòpez Henares 1996:4; WEU/O'Hara 1999:10-11; Interviews 1,8,12)[284]. Compared to the objectives of promoting market liberalization under Panel III, the activities of the Western European Armaments Group (WEAG)'s Panel II (previously IEPG)

[284] Once the IEPG merged within the Western European Armaments Group (WEAG) with the reactivation of the WEU in 1985, the activities of the IEPG Panel II fast migrated within the WEAG Panel II. The Western European Armaments Organization (WEAO) was a legal structure created in 1996 to autonomously take up the development of R&D projects previously under the WEAG Panel II, including the European Cooperation for long Term (EUCLID). Further initiatives running under ad hoc Memoranda of Understanding (MoU) were the Technology Arrangement for Laboratories for Defence European Science (THALES) and the System of Cooperation for Research and Technology in Europe (SOCRATE). A European Undertaking for Research Organization, Programmes and Activities (EUROPA) The MoU should have had to regroup EUCLID, THALES, and SOCRATE under the same framework. Stand-alone intergovernmental collaborative R&D initiatives not included in the WEAG/WEAO institutional frameworks were the European Organisation for the Safety of Air Navigation (EUROCONTROL)- still active as of today- and the French supported Exceptional Unconventional Research Enabling Knowledge Acceleration Program (EUREKA).

traditionally reflected a much higher degree of political sensitivity due the strategic importance of R&T/R&D investments and activities in the sophistication of weapons' systems, and ultimately in the determination of countries' military superiority and power projection capacity (Matthews 1992:89; Gummett and Stein 1997; WEU/O'Hara: 6; Interviews 1,2,8,12,14,15). The politically overloaded nature of technological development and production activities leads to an appreciation of the emergence of a set of early European institutional frameworks, such as the European Cooperation for Long Term (EUCLID) programme, which already in 1990 brought to the definition of 11 (later expanded to 15) Common European Priority Areas (CEPA)[285] on a list of inter-State defined R&D and technological domains of crucial importance for the military (Zweerts and Campbell 1990:84; Cothier and Moravcsik 1991:956; WEU/Lòpez Henares 1996:12; WEU/Lenzer 1997:5; Air & Space 1999:8; Interviews 12,14,15).

In the reported framework, collaborative R&T projects were promoted within each CEPA in specific technological domains with the direct contribution[286] of defence industries of Europe (Chauvot de Beauchene 1991:117; Gummett and Stein 1997:7) submitting proposals to a CEPA's Steering Committee, which, in turn, would evaluate them against countries' future equipment needs (WEU/Guirado and Dundee 1995:32; Interviews 8,12,14,15)[287]. Despite the attempt to create an *ad hoc* Research Cell to coordinate, at an operational level the relation amongst WEAG's Panel II (later WEAO), the CEPAs, and the Technology and Management Committee (WEU/Borderas 1994:11; WEU/Guirado and Dundee 1995:32-33), the lack of an overall politico-strategic horizon guiding CEPAs' strategic activities, as well as of a central mechanism governing the funding of R&T programs, undermined the effectiveness of the WEAG/WEAO/EUCLID's model (Matthews 1992:93; Politi 1997:142; WEU/OHara 1999:11-12; Vlachos-Dengler 2015:88; Interviews

[285] The 15 CEPAs under WEAG were: CEPA 1 Modern Radar Technologies, CEPA 2 Silicon Microelectronics, CEPA 3 Composite Structures, CEPA 4 Modular Avionics, CEPA 5 Electric Gun, CEPA 6 Artificial Intelligence, CEPA 7 Signature Manipulation, CEPA 8 Optoelectronics Devices, CEPA 9 Satellite Surveillance Technologies, CEPA 10 Underwater Detection and Related Technologies, CEPA 11 Technology in the field of human factors including simulation for training purposes, CEPA 12 Aerothermodynamics and Air breathing propulsion -, CEPA 13 Chemical and Biological Defence Technology, CEPA 14 Energetic Materials, CEPA 15 Missile Guidance, Robots, and Control Technology (later including also UAVs technologies).

[286] A mechanism called *Eurofinder* was conceived to enable, via the organization of periodical symposia and data collection activities, multinational consortia to submit spontaneous proposals within the EUCLID framework. Participating industrial entities were requested to provide for a financial contribution at 50% of the R&T project, while MSs would cover the other 50%. Today the EU covers the 100% of the research window under the European Defence Fund (EDF).

[287] Although there was no clarity over what those common future needs might entail, nor there was a proper mechanism in place to support their identification.

8,12,14,16,17). It is reported that in 1999, almost a decade from its establishment, EUCLID disposed of a 70 million EUR annual budget while the EC independently managed a 14,7 billion EUR fund for a 4-year research framework, one third of which was occupied by dual-use research activities (WEU/O' Hara 1999:16). The same ad hoc WEU's Report '*WEAG the Course to be followed*' prepared by the Technological and Aerospace Committee recommended that the EUCLID cell would be granted an independent budget to work out an R&D plan on the basis of commonly defined military requirements, and extending beyond the *juste retour* principle to embrace a new approach based on the notion of global balance (WEU/Guirado and Dundee 1995:5; Interviews 12,18).

It was indeed to break the line with the past and respond to the lack of a capability-driven orientation in collaborative defence research and product development activities in Europe that a new institution, the European Defence Agency (EDA) was created in 2004 with the goal of delivering EDTIB by promoting defence research, cooperation in armaments and harmonization of military requirements (EUISS 2005a:50,60-61; EDA 2005b:3; UK Parliament/HoL 2005:42; Chagnaud et al 2015:213; Interviews 20,21,32,37,39,45). As reported by some of the most influential personalities composing the *ad hoc* created temporary structure, namely the Agency Establishment Team (AET)[288], tasked to set up the legal foundations of the emerging capability-driven European defence institution (CEU 2003j; OJEU 2004b), the underpinning Franco-British political vision inspiring EDA directly rested on the idea of strategically connecting the promotion of collaborative R&T/R&D activities to the development of a capability-driven defence and technological and industrial base in Europe (Interviews 20,21,28,39; Informant 1).

It has been documented in Chapter 6 how the Greek Presidency of the CEU played a crucial role in sheltering and channelling MSs' political convergence over the need for a European Agency to support the CSDP-capability segment, in line with the politico-strategic orientation of the European Security Strategy (ESS). There is a further player, nevertheless, which exercised in parallel political influence on the

[288] As analysed in Chapter 6, under the leadership of the 2003 Greek Presidency of the CEU, the General Affairs and External Relations Council in Thessaloniki approved the creation of a team tasked with the establishment of the Agency under the authority of the first high representative for CFSP, Mr. Ambassador Javier Solana. The delay accumulated by the Italian Presidency in delivering the political task formulated in the course of the 2003 Thessaloniki Council by MSs resulted in the long-term political project soon being taken up by a Franco-British leadership, which built on commitments made earlier in Saint Malo (1998) and reinforced in the defence summit at Le Touquet, France (2003).

strategic mandate received and the technical work carried out by the newly established AET. Originally created to coherently address the defence subject in the view of the perspective drafting of a Constitution of Europe, the Council Working Group (WG) VIII, under the leadership of Michel Barnier, conceived the establishment of a European Armaments and Strategic Research Agency (EASRA) endowed with a prominent collaborative R&D component (CEU 2002:22; EUISS/Schmitt 2003a: 40; Interviews 39,41). In the mind of the WG VIII Team, the new Agency would have supported the capability segment of the 2003 Headline Goal (HLG)[289], namely the autonomous deployment of Rapid Reaction Forces capable of responding to the full range of the 1992 Petersberg Tasks, and future potential expansions[290], to specifically address tech-dependent critical gaps affecting the coherency and efficiency of the CFSP/CSDP international operations (CEU 2002:5-6, 16; Interviews 11,12,17, 45).

According to this vision, the EDA was supposed to play a strong role inl linking the defence technological/industrial development dimension of the Union to the politico-strategic one, by means of promoting EDTIB-oriented joint R&T/R&D investments and cooperation, and overcome the lack of progress in CSDP-related capability development activities (UK Parliament/HoL 2005: ch.2 paragraph 6; 44; EP 2008:28; Meiriño/Spanish MoD 2010: 29,41; Koblen and Olenik 2011:112; Interviews 32,35,37,39,45). Important political instruments deputed to implement the 2003 HLG, such as the two EU Catalogues addressing Forces and Capabilities requirements[291] never really managed to unlock credible volumes of R&D investments to coherently support the functioning of the European Capability Action

[289] The 2003 HLG was defined in the Helsinki European Council of December 1999 as the objective to cooperate in EU-led operations to be able to deploy by 2003, within 60 days and for 1-year time, military forces capable of taking up the full range of the 1992 Petersberg Tasks. A further level of elaboration consisted in the development of possible scenarios to help in the identification of capability requirements and the definition of force packages, which in turn would lead to the drawing up of a generic list of capabilities (EUISS/Rutten 2001:102-107; EUISS/Lindrom 2005b; Riera Berenguer for Spanish MoD 2010:61; Interview 12).

[290] WG-VIII indicated new tasks for the future involving the use of military resources in situation linked to: - early warning, and the protection of humans and infrastructures security; - disarmament operations, including weapons destruction and arms control programs; - military advice and assistance, including outreach and cooperation with military forces of third countries; -post conflict stabilization; support to third countries' authorities in combatting terrorism.

[291] The two EU Catalogues have been elaborated as an output of the first EU Capability Commitment Conference (2000), by the newly established European Union Military Staff (EUMS) listing respectively capability needs (e.g. EUMS capability catalogue) and the MSs' commitments for the EU yearly operational demand (e.g. EUMS force catalogue). As from the second EU Capability Commitment Conference (2001) a progress catalogue is produced yearly, in which shortfalls are documented and monitored by a special EUMS' task force, directed by the by European Union Military Committee (EUMC) and overseen by MSs' representatives (Garden et al 2001;EUISS/Schmitt 2005d; EP 2016:9; Interview 53).

Plan[292] (CEU 2002:22; Shepherd 2015:68-70; Koutrakos 2013: 104; EP 2016:10; Interviews 32,35,45,46,53). The same new HLG, approved by the Council in 2004, not only connected the strategic development of EU military capabilities to a discretionary national/multinational '*future definition of the level of ambition for force packages*' but also it formally endorsed an *a-strategic bottom-up* approach for capability development to achieve CSDP-oriented goals, which builds fragmentarily on lessons learned from EU-led operations in the field of crisis management, humanitarian aid and peace keeping (EUISS 2005a:64; EUISS/Lindstrom 2005b; EP 2016:11,16; Interviews 34,45,53,55).

Despite the intention of positioning the new intergovernmental Agency at the heart of a CSDP-oriented capability development process, as well as to retain the positive legacy of past institutional schemes (WEAG/WEAO/EUCLID) in the evolving EU policy context, the capability driven-EDTIB goaled vocation has proven hard to advance in practical terms for a number of reasons. In the first place, the anticipated Franco-British long-term vision essentially stood on a major political misunderstanding over the nature of the new institution. The French pushed for a communitarised vision where joint R&D investments would be systematically allocated to effectively support the development of a capability-driven strategic autonomous European Defence Technological and Industrial Base, while the Britons interpreted the Agency effort as an opportunity to stimulate smaller countries to invest more in the development of national capabilities, so as to reach the 2% NATO GDP spending threshold, surely with no European strategic autonomy objectives of any kind (Giovachini 2004:185; UK Parliament/HoL 2005; Barrinha 2015:35; Mawdsley 2015:146-148; Interviews 21,39,45,47).

Secondly, it is argued that an element of incoherency characterized the relation between EDTIB development, under the EDA's auspices, and the achievement of its objectives, namely the support of CSDP-missions. EDTIB, whose acronym clearly unveils a defence technological component, should in principle support the development of CSDP-operations, which only subordinately display a hard military orientation. The practical consequence is that joint R&T activities

[292] The ECAP, launched in 2001, underpins MSs' progress in remedying identified shortfalls by rationalizing their respective efforts and increasing synergies between national and multinational projects. The ECAP sets up national experts groups under EUMC's guidance to track progress and elaborate a Capability improvement chart, and every 6 months a progress report is submitted to each EU Council presidency in the shape of an ECAP roadmap exercise (EUISS 2005a:71ss; Riera Berenguer for Spanish MoD 2010: 63ss).

normally initiated at the intergovernmental level within the EDA's Cap-Techs[293] cannot consistently connect technological generation activities to hard-core military capabilities functions, provided that CSDP-operations normally have a soft-military[294] capability component, integrated via hybrid planning cells into operational requirements, taking up conflict prevention, peace making/keeping, and crisis-management/humanitarian tasks (EUISS 2005a:43,46, 71-74; Interviews 20,21,55,57,60). Additionally, the substantive lack of an EU hard military planning capacity, to which the EDTIB development should be instead logically and structurally connected, turns most of the existing defence strategic initiatives into empty boxes: an example in this respect is provided by the latest EU Military Staff (EUMS) Requirements Catalogue (version 05) which was supposed to deliver, in cooperation with EDA, a Total Force Requirement (TFR)[295] projection under a new EU planning cycle. The initiative embodies, in the view of many, a wish list, as it contains elaborations for a series of illustrative scenarios[296] on capability shortfalls and operational functions, which Europeans might need to activate at some point with no realistic forward-looking expectation as to when, how, and for how long (Interviews 53,55, 60).

It is therefore reasonable to expect that, in the absence of European military headquarters entitled to define and synchronize strategic military objectives, operational requirements, role/capability planning and integration activities, the role of the EDA is destined to remain locked in-between the hybridity/low level of militarization characterizing the CSDP's capability development process and the constellation of hard-military determinations fragmentally expressed by national armaments institutions with no solution of multiannual continuity (Interviews

[293] With the establishment of the EDA, Capability Technology Activities (Cap-Techs) replaced the pre-existing CEPAs. Cap-Techs bring together groups of experts from MSs, industry, research and academic institutions to promote collaborative projects in technology areas intersecting high-level capability development areas. In their first incarnation, Cap-Techs comprised a interconnected matrix structure presenting under 3 capability domains (1-Knowledge, 2-Engagement, and 3-Manoeuver) articulated each in 2 subdomains (a-Command and Inform for 1, b-Engage and Protect for 2, c-Deploy and Sustain for 3) which in turn intersect 3 R&T areas (1- Information, Acquisition and Processing-IAP, 2- Guidance, energy and materials -GEM, 3- Environment, systems and modelling- ESM) (Dahlmann et al 2015:108; EDA 2016; Unpublished Handover Report for EDA 2013:12-13).

[294] While hard military capabilities remain with NATO and are shared under the 2002 Berlin Plus Agreement, and most recently the 2016 EU-NATO Partnership under the EU Global Strategy.

[295] The TFR exercise elaborated jointly by EUMS and EDA was meant to determine forces and capabilities needed, based on a multi-step process. These steps included scrutiny, assessment and evaluation of capabilities and force shortages as emerging from a HLG periodical questionnaire and the EU Catalogues progress report.

[296] The five illustrative scenarios selected were: 1) Separation of Parties by Force; 2) Stabilisation, Reconstruction and Military Advice to Third countries; 3) Conflict Prevention; 4) Evacuation Operations; 5) Assistance to Humanitarian Operations.

53,55,60). The set of EDA's institutional initiatives [297] to substantiate EDTIB, in tandem with the technical analyses and models elaborated to best accommodate capability-driven R&T/R&D activities, remain at the level of theoretical exercises in the lack of a systematic integrated strategic military planning capacity, boosted by solid financial mechanisms supporting EDA's portfolio of policy activities and projects. This easily explains why EDA had to endorse, since its establishment, a bottom-up approach [298] towards EDTIB (UK Parliament/HoL 2005:43), clearly maintaining a low-strategic footage in brokering cooperative endeavours via the promotion of collaborative R&T schemes (Interviews 53,55,57), as well as advancing road mapping regimes, such as the Overarching Strategic Research Agendas (OSRA) [299].

Even the largest, and possibly one of the most successful joint R&T programmes in the history of EDA, the Force Protection Programme (FPP) adopted a low-strategic profile and a pragmatic lessons-learned approach, gathering political consensus at the very peripheral areas of MSs' core strategic military capability functions (Interviews 53,55). The FPP was a Category A (Cat A)[300] EDA joint R&T project with contributions of over 55 million EUR allocated by 19 MSs plus Norway between 2006-2008 for the development of technological solutions up to prototypes (TRL 4-6) to meet a number of politically identified capability requirements. Tasked by the high-politics to table a high-visibility capability-driven programme, the EDA operated in synergy via integrated teams in support of the political definition of common operational requirement needs. In the absence of an institutional reference

[297] Most prominently on the EDTIB side, the Long Term Vision for European Defence Capability and Capacity Needs (EDA 2006), the Strategy for the European Defence Technological and Industrial Base (EDA 2007a); the Capability Development Plan (EDA 2008b); the Defence Research and Technology Strategy (EDA 2008c); the European Armaments Cooperation Strategy (EDA 2008d).

[298] Operating, in the words of its first Chief Executive, Mr. Nick Witney interviewed by his co-nationals in the UK House of Lords on 17/01/2005 as a 'big tent' gathering, under a flexible cooperative motive, efforts and contributions from the European MSs, minus Denmark.

[299] Drawing on the experience of the Strategic Research Agendas (SRA) idealized in the late 1980s by the EC to provide for a strategic accommodation to the early Aeronautical research efforts (see Ch. 4), the EDA's OSRAs seek to provide for a strategic framework under which to connect technological generation initiatives to a coherent multiannual planning process. In a first phase, their elaboration accompanied the restructuring of the Cap-Techs architecture, which in 2008 was connected through the creation of a system of platforms and networks to OSRAs following a forward-looking road mapping approach. Such a decision led to the dismantling of the ' Cap-Tech pillar connectivity' logic, which linked each R&T area to the respective capability domain, impacting on the coherency of the overall capability generation system (Unpublished Handover Report for EDA 2013:16,18ss; Interview 53). In a subsequent phase, OSRAs' conceptualization was potentiated in an attempt to reinforce the legitimization of EDA's political role in a season where the EC's projection power has been growing exponentially with the defence initiatives commented on in the next section.

[300] According to art 20.2 of the 2004/Joint Action, Category A projects involve all MSs unless they explicitly decide to opt out (e.g. opt-out projects). Conversely, according to art. 21 of the 2004 Joint Action, Category B projects involve only requesting MSs while others can opt in (e.g. opt-in projects).

for military planning activities, the choice to develop a programme to protect military forces during operations abroad[301], reflecting on past military experiences in Afghanistan and the Balkans, capitalized a strong political support as the topic, CSDP-friendly, allowed to reach out via joint R&T activities a broader spectrum of military specificities[302] without necessarily digging into active engagement functions[303], where traditionally MSs are non-keen to cooperate[304] (Unpublished Report for EDA 2013:55ss; Interviews 53,55).

The FPP experience taught two lessons. The first lesson is being mirrored in the positive legacy this important example of successful EDTIB-oriented intergovernmental cooperation left on the future evolution of governance structures deputed to host this policy regime. With R&T projects running for a time-line of 7/8 years after contract award and presenting solid financial premises, the FPP set, for the very first time, a governance architecture which comprised the inter-governmental negotiation of an administrative framework, the Programme Agreement (PRAG), setting the rules of the programme, as well as the establishment of a Programme Committee (PC) delegated to make decisions by qualified majority voting (QMV) concerning the FPP's life. Other cornerstone attributes concerned the creation of Evaluation Groups (EGs) composed of PC-validated clusters of MoD national experts in charge of selecting successful R&T consortia, and reflecting a global balance distributive approach. Finally, a Management Committee (MC), also operating on a QMV rule, ensured the monitoring of consortia activities after the contract conclusion (EDA 2007b: 5-6; EDA 2008e: 14; Interviews 58,59). As will be offered in the next section, the novelty of the FPP's governance structure significantly translated in the architecture of the EC-guided EU Preparatory Action for a Defence Research Programme (PADR).

The second lesson, instead, unveils the lack political sustainability that the EDTIB's construction process on IG basis has displayed over the years. Indeed, in the

[301] The notion of force protection encompasses the protection of personnel, facilities, infrastructures, as well as lines of communication and movement during military operations.
[302] Such as tactical defence and ISTAR (Intelligence, Surveillance, Target Acquisition, Reconnaissance).
[303] The essence of the operational concept indeed presents a passive engagement coefficient with capability needs which range from early identification of snipers to early detection of improvised explosive devises over asymmetric or uneven operational terrains.
[304] MSs have traditionally displayed reluctance in cooperating over large R&T programs serving active engagement combat capabilities development. For example, firepower of weapons systems is an important indicator of MSs technological superiority in the battlefield. Clearly, they tend to avoid being confronted on the strength of their military capabilities outside high-intensity warfare terrains, as they would in any of the cases (superiority or inferiority) expose the level of military performance for purposes other than the projection of military power over enemies, which the development of military technologies is supposed to ensure.

light of the copious amount of investment gathered and the successful results capitalized, one would expect programs such as the FPP to have received a further degree of articulation to support broader R&D frameworks within EDA. Nevertheless, this was not the case as the FPP, and a few other flagship initiatives remained stand-alone examples of large-scale military R&T/R&D cooperation with, no possibility of placing them in a broader and politically structured strategic horizon of sense. The lack of political continuity affecting the future prospect of EDA's R&D activities remains, in any case, intrinsically linked to an important element of weakness in the IG-approach towards EDTIB, namely the absence of independent budgetary resources to support the development of a common political vision within which to unfold a portfolio of coherent and strategically-oriented military R&D efforts. The next section will evidence the final adjustment in the EU socio-institutional structure with the inauguration under TEP-2 of a new order of politico-economic relations in EDTIB.

7.3.2 Understanding SIA in EDTIB

The previous section has evidenced the significance of, but also the limits characterizing EDTIB as an intergovernmental regime. Such analysis is in line with the theory, which throughout the empirical chapters tested the transformation in the defence socio-institutional structure, under a change in TEP. As discussed in Chapter 6, the first important shift in the TEP governing military production after 1999 had marked the progressive emergence of MNEs as models of defence organization with the termination of the State-industry symbiotic relationship and the other traditional productive schemes. The limitations of the intergovernmental model have been evidenced with respect to the process of defence industrial consolidation in Europe (Ch.6 section 6.2), as well as of European integration of defence markets (Ch.6 section 6.3). The deep transformation brought forward by the shift in TEP-2 did not only impact on the adjustment in supranational direction of the EDEM's regulatory construct, but it furthermore activated another adjustment in the defence socio-institutional structure, namely the evolution of EDTIB in a supranational direction,

which initiated even before the rise of the new TEP, namely TEP-3, destined to host the accomplished articulation of this regime (see Ch.3 Fig.3 SIA in EDTIB).

It is argued that, given the presence of shorter TEP-cycles postulated in Chapter 3, an overlap in SIAs can clearly occur under economic waves of reduced length. As a consequence, it might be possible to trace basic features of a new regime embedded in the architecture of its institutional ancestor. This is exactly what happened in correspondence of the EDTIB's evolution under the first major shift in TEP, as the seeds of EDTIB's supranationalism can be already found in the details of the intergovernmental regulatory architecture originally set up to support its functioning, namely the 2004 CEU's Joint Action (JA) (OJEU 2004b). The reported document, setting the EDA's legal foundations, expressly recognizes to the EC, an institutional space and role within the set of functions and tasks reserved to the EDA's Steering Board (SB). Under the 2004 JA, the EC would not only integrate budgetary and administrative committees[305] but it would, furthermore, be recognized as having a decision-making role in any, namely Category A plus Category B, R&T projects governing bodies, should it financially contribute to them[306] in full respect of the decision-making procedures applicable to the budget of the EU[307]. In a visionary fashion, the attempt to connect the financing architecture of the newly established intergovernmental Agency to the EU R&D financing structure emerges from the provisions which expressly recognize that contributions from the general budget of the Union may be made to the EDA's budget established for R&T/R&D projects and programmes[308].

Along these line, as early as 2011, the EDA's SB, gathering Defence Ministers and National Research Directors, agreed on having the item of defence research integrated into the upcoming EU multiannual financial framework (MFF) for the 8th EC's Research Framework Programme (FP) Horizon 2020 (H2020), and tasked the same EDA to produce a reflection paper to be part of the EC's Green Paper (GP) on H2020 (Interview 53). Once the EU High Representative (HR) and Head of EDA Baroness Catherine Ashton agreed to insert the topic on the agenda for the next EDA's SB meeting, and the EC formally endorsed the proposal to have defence research into the upcoming MFF, the prospects for expansion of EU competence in

[305] art. 9(4) JA
[306] arts. 20(4), 20(5), 21(6) JA
[307] art. 21(6) JA
[308] art. 22 JA

EDTIB direction seemed only half a step away from being achieved (Interview 53). But that half-step was not taken, as in the 2011 Foreign Affairs Council (FAC) meeting in Luxembourg, the EU Commissioner for Humanitarian Aid and Civil Protection, in representation of the EU Commissioner for Research, Technology and Innovation, rejected a unanimous MSs' proposal, tabled via EDA, to have defence research included in the next MFF, opposing on legal grounds the restriction contained in the H2020 regulation (OJEU 2013)[309] (Interviews 53, 55). The paradox of the 2011 EC's choice, shutting down a collective MSs' instance, imposed de facto another seven-year time window, namely the cycle of the 8th FP, before a new attempt could be politically framed, while the EU defence technological and industrial competitive performance was deteriorating year after year. Not only did another entry door have to be found, but, most significantly, a new political vision had to support the future of the EU militarization plans.

The post-2011 phase has been characterized by the involvement of a thick web of actors advancing, via complementary and intersecting routes, different EDTIB's components in a supranational direction. As anticipated in theoretical terms in Chapter 3, under the macro-premise of a completed shift in TEP, policy entrepreneurialism articulates differently in determining various types of SIAs. Depending on the degree of political opportunity manifested under each change in TEP, policy entrepreneurs can purposely decide to either lower risks and play safely when the politico-economic contingency provides for fewer options, or take higher risks and elaborate more ambitious political initiatives when greater opportunities arise. In contrast to the previous supranational SIA in EDEM, where the political convergence remained uneven in Europe on a set of sensitive topics, covering, *inter alia,* the legal scope of application, the European purchasing preference clause, and the offsets regime, the recognition of the need for a stronger role for Europe in protecting the inexorable deterioration in DTIBs led to the articulation, on politically sounder grounds, of institutional policy coalitions advancing the purpose. The EDTIB supranational accommodation witnessed the rise of a new politico-economic configuration, and new systems of governance reflecting the complexity of roles and tasks characterizing the advancement of such a new regulatory regime.

[309] According to art 19(2) Reg. 2013/1291: ' Research and Innovation activities carried out under H2020 shall have an exclusive focus on civil application'.

After the 2011 Luxembourg Council, the reactivation of the defence political project recorded an interesting triangulation via multiple channels, which progressively came to synergise and converge under a unified political vision. The first input came once a top-down political reference was made by President Barroso in the 2011 Speech addressing the State of the Union [310] to the role to be played by the EC in completing the single defence market, and in activating competences sustaining the defence industrial sector contribution to the 2020 EU Growth Strategy (EC 2011; Interviews 48, 53). To reach that objective, an ad hoc Task Force was created in 2012 between DG-ENT and DG-MARKT, which initiated a reflection, via a road-mapping exercise, to explore new ways to energise a EU-wide engagement in the defence research and industrial policy domains (EC 2012a: 3; EC 2012b; Interviews 48, 50, 51,52). DG-ENT was the institutional descendent of the restless DG-III, which led the first bottom-up EC's institutional attempt to pass EDEM in post Cold-war period with the two 1996-1997 policy initiatives (see Ch.5 section 5.4). The same DG was also previously responsible for drafting the EC's industrial strategy part of the 2007 Defence Package, without having managed to capitalize on any tangible political result, other than general coordination policies on R&D investments, since the core of the political attention revolved around the two administrative legal regimes for EDEM (EC 2007c:8; Interview n.50).

DG-MARKT acted as a crucial ally for DG-ENT, due to the legal competence of this directorate, during political negotiations held on the defence and security procurement directive (DSD) in the accomplishment of the EDEM's regulatory regime (see Ch.6). Both individually, and in Defence Industries Task Force composition, DG-MARKT worked under the direct guidance of the Commissioner for Internal Market and Services, Mr. Michel Barnier, who also deputised the Cabinet on Industry and Entrepreneurship, formally under the responsibility of Mr. Antonio Tajani (Interviews 47,53). The French-led leadership proved essential not only in positioning the EDTIB topic at the top of the EC's Presidency political agenda, but also in recomposing the previously recalled two-track approach in dealing with defence market vs. industrial policy affairs (Interviews 35,47,50). Despite the

[310] In the context of the reported Speech Mr.Barroso stressed that 'The EC is playing its part: we are working towards a single defence market. We are using our competences provided under the Treaty with a view to developing a European Defence Industrial Base'. An EC's competence in the military R&D field has been defended on the argument that defence research activities are not explicitly banned nor in the primary law (see jointly art.173 TFEU title XVII covering industry and articles 178ss TFEU title XIX covering research and innovation) or in the secondary law (art. 19.2 Dir. 2013/1291/EC H2020 Regulation).

promising top-down political premises, the 2012-created DG-ENT/MARKT Defence Industries Task Force did not initially manage to find a space of political manoeuvre, being locked in-between the missed opportunity of seeing defence research included in the MFF as part of the FP8, in light of the political opposition coming internally on the side of RTD Services, and the unlikely prospect of promoting cooperation with EDA without being able to directly contribute to its R&T/R&D budget.

The game changer came from the second strand of policy entrepreneurial forces, and from an unusual angle, considering the EU policy-making machine. In an attempt to provide new impetus to the discussion around defence, the European Parliament Services, under the input of a German MEP who was also an active member of the Security and Defence (SEDE) sub-committee in the European Parliament (EP), Mr. Michel Gahler, gave birth to the idea of overcoming political blockages by proposing a first collaboration between the EDA and the EC in the context of a Pilot Project (PP)[311] dedicated to testing the feasibility, namely the conditions, for defence research to be integrated into the future EU post-2020 FP funded by the budget of the Union (Interviews 49,52,53). The idea of unlocking a reasonable amount of EU financial resources by activating an agile policy instrument, such as the PP, was welcomed in an historical phase characterized by economic uncertainties, and a reduced MSs' willingness to contribute beyond EU ordinary budgetary obligations. Indeed, according to art. 54(2) of the EU Financial Regulation 966/2012 (OJEU 2012), financial appropriations can be made on PPs, as well as other exceptional measures such as Preparatory Actions (PA)[312], from the draft budget of the Union without the need to approve a legal act via the ordinary legislative procedure[313]. The launch a EU defence PP gave the opportunity, for the first time, for elaborating on an institutionalized practice of cooperation between the EDA and the EC on a sensitive subject, defence research, to which the contribution of both institutions could constructively converge in defining new rules, processes, and governance structures (Interviews 58,59). This initiative comprised a small budget of 1.4 million EUR for the preparation of three competitive calls in selected R&T project

[311] A Pilot Project (PP) is an initiative of experimental nature designed to test the feasibility of an action and its usefulness and it lasts not more than two years.
[312] A Preparatory Action (PA) - normally the successor of a successful pilot project on the same matter - is designed to prepare new actions like EU policies, legislation, programmes etc. with funding for not more than three years.
[313] Art. 54(2) of the EU Financial Regulation sets an exception for PP and PA to the general rule which requires that no appropriations may be entered in the budget for any action without the prior adoption of a basic act.

areas[314], reflecting EDA portfolio of activities, to be assigned to three multinational consortia according to principles and procedures contractually negotiated by the two institutions directly drawing on the respective expertise and institutional legacies, under a Delegation Agreement (DA) (Interviews 49, 56)[315].

The important step taken with the political agreement reached on the EU PP paved the way to a PA on defence research announced in the conclusions to the Council of the European Union in December 2013[316] (CEU 2013: 8; Interview 48). Once the institutional paralysis created by the RTD's Cabinet and DG services was unblocked, a new equilibrium amongst political forces could emerge. This new equilibrium witnessed the EC, in the shape of the DG-GROW services, at the operational forefront of an advancement in technical and policy initiatives substantiating a progressively-converging political vision In fast resuming the 2013 CEU's determinations, the EC announced in a 2014 Communication '*A new deal for European Defence*' the launch of a EU PA on Defence Research (PADR) (EC 2014a:2) with the contextual indication that, if successful, it would lead directly to the inclusion of CSDP-related research under the EU next MFF (2021-2027) (EC 2014a:10).

The political relevance and degree of sensitivity characterizing the activities in the pipeline required injecting a further top-down supranational political dimension, and for this reason, the defence file was uploaded in an early stage to the level of the new EU Commissioner for Internal Market, Entrepreneurship and SMEs (2014-2019), Mrs Elżbieta Bienkovska, and her cabinet team (Interviews 49,51). Under the input of the DG-GROW services promoting the intra-institutional liaison, the political strategy comprised a replication of the successful model, which came to characterize the history of the European Security Research Programme (ESRP)[317] (Interviews 2, 11,

[314] Namely: 1) Inside Building Awareness and Navigation for Urban Warfare; 2) Standardisation of Remotely Piloted Aircraft System (RPAS) Detect and Avoid (TRAWA); 3) Unmanned Heterogeneous Swarm of Sensor Platforms (EuroSWARM). The description of the three calls is contained at the following page https://eda.europa.eu/docs/default-source/brochures/call-for-proposal-(specifications)---pilot-project-in-the-field-of-defence-research.pdf

[315] Signed on 28/10/2016 the DA between the EU, legally represented by the EC, and the EDA, on the implementation of a PP in the field of CSDP comprised a body of 39 articles setting the basic terms and conditions, and 6 annexes, forming integral part of the DA, covering description of tasks, tasks management, estimated budget for the entrusted tasks, model transfer of funds agreement, rules of participation, and model management declaration. The document is not publicly available.

[316] It is indicated in Paragraph 18 of the 2013 CEU Conclusions that 'A preparatory Action on CSDP related research will be set up while seeking synergies with national research programs whenever possible'.

[317] The EU Security Research model in itself drew on the successful experience of the EU aeronautical research analysed in Chapter 4 which, as illustrated, provided for the creation of a Senior Advisory Panel of Wise men, and

34, 37) with the establishment of an Independent Advisory Body, the so called Group of Personalities (GoP), consisting of a number of high-level representatives from MSs, the European institutions, the industrial sector, and academia. The GoP for defence research [318] presented some peculiarities compared to the previous aeronautical and security research[319] ones. In the first place, formally created top-down by the EU Commissioner for IM, Entrepreneurship and SMEs, it included, for every personality convened, a respective Sherpa, namely a person who would directly deal with the technical details of the reflection and negotiation, by ensuring a strategic two-level coordination game (high-politics/low-policy making), balancing the macro-vision and the micro-mechanisms. Secondly, beyond the direct presence of EC's representatives, the GoP also comprised a very special personality, namely the HR of the Union, Mrs. Federica Mogherini, who ensured the right level of political coordination via her Sherpa, Mrs Laure Frier, with the CFSP/CSDP dimension.

The inclusion of the Head of the European External Action Service (EEAS) and her Cabinet in the activities of the GoPs on defence research represented a crucial step, adding an essential strategic component to the articulation a EU policy entrepreneurial coalition towards EDTIB. Such a step is to be interpreted in the context of the broader political coordination between EC[320] and EEAS framed under the EU Global Strategy (EUGS)[321] framework (EEAS 2016a), on which Mrs. Mogherini started working right after taking up the HR for CFSP/CSDP role in 2014, with intention of updating the vision contained in the 2003 Solana EU Security Strategy. It is reasonable to surmise that, having occurred in the late months of incubation of the EUGS, the EEAS' engagement in the GoP on defence research

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which, in a later stage, envisaged the creation of an Advisory Council for Aeronautics Research (ACARE) to continuously monitor technological opportunities and development.

[318] The GoP for security research counted on 27 personalities plus a rapporteur from EUISS. The final Report (EC 2014b*) Research for a Secure Europe. Report of the Group of Personalities in the Field of Security Research* is available here https://ec.europa.eu/homeaffairs/sites/homeaffairs/files/elibrary/documents/policies/security/pdf/gop_en.pdf

[319] The GoP for defence research counted on 16 personalities, including the EU HR for CFSP/CSDP, each of them represented by a Sherpa, plus 2 member of the EC. The Final Report (EC 2016d) *European Defence Research. The case of a EU-funded defence R&T programme. Catalysing Cooperation. Enabling Capabilities and Sustaining Competitiveness* is available here https://www.iss.europa.eu/sites/default/files/EUISSFiles/GoP_report.pdf

[320] It has been reported that the more the file grew of importance on the EC's political agenda, the more another Cabinet guided by the EC Commissioner for Jobs, Growth, Investment and Competitiveness, Mr Jyrki Katainen, was also involved in first line. In a more mature political phase the two EC's Cabinets guided by Bienkovska and Katainen worked in synergy, relying on the EEAS as third institutional ally beyond the support received by the EP, MSs in CEU and EDA compositions and the Association of the Aerospace and Defence Industries of Europe (ASD).

[321] The EU Global Strategy (EEAS 2016a) *Shared Vision, Common Action: A Stronger Europe A Global Strategy for the European Union's Foreign And Security Policy* represents the outcome of a two-year process developed by EEAS' services under the aegis of the HR representative, Mrs Federica Mogherini.

activities made a certain impact in decanting the articulation of a new political vision, which places the Security and Defence of the Union at the forefront of the strategic priorities guiding the EEAS' action (EEAS 2016a:19; Tocci 2016:463; Interviews 60,64). Since the EUGS shaped an overarching political vision, *inter alia*, placing strategic autonomy, hence EDTIB, as a vehicular condition for the protection and empowerment of the Union (EEAS 2016a:20[322]), it is logical that a set of policy initiatives originated to implement the new level of ambition. In articulating the vision, the EUGS' first-year implementation plan recalled the need to ensure a sound EDTIB, unveiling a new strategic composition of policy forces, and announcing a forthcoming EC's tailored action. This policy action is part of the same package the recalled implementation plan belongs to, and it is aimed at supporting Europe's defence industry and capability development (EEAS 2016b:7,21), which should progress in line with the other CSDP-oriented capacity building activities implementing the EUGS in the areas of security and defence.

It is in the framework of a new powerful policy entrepreneurial coalition, top-down supported and endorsed in this political season by the EEAS, that one has to interpret the intense activity of preparation and negotiation of policy initiatives by the EC DG-GROW services, as from the presentation in fall 2016 of a European Defence Action Plan (EDAP)[323] to design a politico-strategy institutional framework under which to place the entirety of the EU defence industrial policy architecture and governance structure (EC 2016b). Observed internally, the EDAP presents a two-fold structure comprising a European Defence Fund (EDF) supporting multinational collaborative research projects (research window) and the development of joint defence capabilities (capability window) (EC 2016b:5-11). These research and capability windows stand on a governance framework foreseeing the development of a supranational EDTIB. On the one hand, the research window paves the way for a European Defence Research Programme (EDRP) to be initiated in the next multiannual financial framework (post 2020) with a provisional budget of 500 million EUR per year. The means to that end has been a three-year (2017-2019) PADR, which, building on the successful experience of the EU defence PP, allocated a total budget of 90 million EUR to fund pre-competitive research projects run by

[322] In the text of the EUGS it is indicated that: 'MSs are requested to sustain the development of those technological and industrial capabilities, which underpin their ability to act autonomously'.
[323] As anticipated the EDAP is part of a 2016 EC's Defence Package also comprising the two EC Reports on the state of the Implementation of the EDEM Directives, and the mentioned EUGS' Implementation Plan for year 1.

multinational consortia, selected for the purpose, according to criteria and rules commonly agreed by MSs under the negotiation of ad hoc rules for participation[324] (EC 2017a: 4, 6). On the other hand, the capability window is aimed at pooling and synchronizing national contributions to dedicated capability-oriented projects (EC 2016d: 10). It has been coherently attached to the development of a European Defence Industrial Development Programme (EDIDP) comprising a provisional EU budget of 500 million EUR for the period 2018-2020 (EC 2017a: 4, 9) to be bolstered by expected financial contributions from MSs on the capability development segment. A more substantial programme will be prepared under the EDF for the post-2020 phase with an annual budget of 1 billion EUR, which is intended to add to MSs' voluntary contributions under the Permanent Structured Cooperation (PESCO) framework within the CEU. Cumulatively the EDF is expected to allocate 12 billion EUR in the 2021-2027 phase, with an estimated multiplication factor of 5, raising the investment to 56 billion EUR (e.g. 5.5 billion EUR per year) over 8 years (elaborations on EC 2017a:4; EC 2017b: 2). With an extraordinary timely evolution, the EDF legislative proposal (EC 2018) has been already tabled in the 2018 Defence Package, while trilogue negotiations might bring it to approval by the end of this year. It is quite an impressive advancement if one is to consider that it took more than 30 years to go from the 1985 IEPG's Vredeling Report to the approval of the first regulatory regime for EDEM in 2007. Less than 3 years instead passed between the presentation of EDAP in 2016 and the presentation of the last Defence package in 2018, containing a regulatory regime for EDF possibly completing the EDTIB's regulatory architecture by the end of 2019.

7.4 Conclusion

The present chapter concluded the case study analyses having come to trace an imaginary line from the first bottom-up attempt in the early 1980s with the European Aeronautical Research Programme (EARP) experience, to gather a core of R&D and industrial capacity in technological areas of strategic importance for Europe and its

[324] Rules for Participation to the PADR calls have been discussed and agreed in the course of 2016 amongst MSs under the EC political guidance in the 'As-If' Programme Committee established for the purpose, in parallel with the preparation of the PADR Work Programme for 2017. These documents are not publicly accessible.

military projection, until the present day, where a top-down, politically structured EDTIB supranational model is expanding, under the thrust of TEP-2 illustrated motives. The first part of the chapter has evidenced the limits of the EC regulatory EDEM to provide for an effective solution to the inefficient condition characterizing defence markets and their strategic industries. In an attempt to go beyond a self-referential doctrinal analysis, the review of statistical data collected in the EDEM implementation phase motivated a more attentive and articulated analytical effort in reconstructing politico-economic drivers/factors having marked a shift away from the original vision supporting the activation of a regulatory regime for EDEM.

The second part of the chapter has gone beyond EDEM to provide for a further degree of theory testing via the experience of the socio-institutional adjustment (SIA) in EDTIB. Adopting the analytical structure reproduced in Chapter 6 to document dynamics of socio-institutional adaptation in EDEM under a changing TEP, section 7.3 has been split into 2 subsections. The first subsection (7.3.1) has illustrated the origins of EDTIB, and scrutinized the limitations characterizing inter-governmental governance structures in the defence R&D and industry-related policy domain. The second subsection (7.3.2) has reconstructed the progressive shift in the development of an EDTIB supranational regime. More specifically, and in adherence to theoretical anticipations contained in Chapter 3, the analysis has contained empirical evidence of the blossoming of a more elaborated policy entrepreneurial coalition, which under the combined thrust of EC, EP, and EEAS, has progressively marked the supranational emergence of the EDTIB's foundations.

While it remains clear that the creation of an EU supranational financing scheme, such as EDF, serves the purpose of generating incentives for companies to cooperate via consortia and to retain a core of advanced skills, technological know-how and capabilities in the European continent, it proves less evident the connection with the broader EU politico-military strategic framework. The 2016 EUGS and its implementation plans do not seem to have significantly transformed the political architecture elaborated by Javier Solana in the 2003 ESS, which connected the development of defence industrial capabilities to the deployment of CSDP missions/operations, presenting, as observed, only a soft-military component. There is a risk that the financing of EU military consortia under the EDF will either support the development of CSDP-oriented non-hard military technologies or, alternatively, that the development of hard military R&D and defence capabilities will remain

isolated from the implementation of a real politico-military ambition, as the EUGS in principle would want to see.

CHAPTER 8

Conclusion

This thesis has addressed a sensitive topic in the political agendas of Europe, namely the emergence of a supranational EU rule-based regime for European defence equipment markets. As evidenced in the Introduction, defence markets are highly political markets, as they embody the bedrock of States' sovereignty and power projection capacity over a physical and political territory. Military markets are also economically fragmented, as every defence industry has been traditionally tied to the hand of the national government, whose security of supply they were meant to guarantee. Additionally, the defence productive force of Europe has also been highly segmented between a small number of arms-producing countries providing more than 90% of defence equipment, and the rest composed of a constellation of arms-importing countries with limited autonomous defence production and export capabilities. In light of their politico-economic strategic nature, defence markets are not prone to be regulated by non-national authorities. For this reason, an EU regulatory outcome in this policy domain has emerged as a puzzling development worth further study and explanation.

The point of departure in the analysis has been the review of the legal and politics debate on the subject matter of European defence equipment markets (EDEM). The decision to address two different disciplinary fields has reflected not only the formal structure of the present PhD programme in Law and Politics but also the universe of existing scholarly contributions on the topic under investigation. On the legal side the analytical effort on EDEM has remained under the intellectual monopoly of a niche of legal scholars in the public procurement law tradition, whose contribution over the past several decades has addressed and disentangled a set of doctrinal and jurisprudential legal questions. This literature has had the merit to

extend for the first time the perimeters of the legal analysis over a subject which has traditionally remained under the control of national governments and out of the regulatory reach of international institutions, such as the European Union. Nevertheless, a purely doctrinal legal approach has also manifested its own limited capability to account empirically for the changing configuration of politico and economic drivers in the evolution of EU-ruled vs. non-ruled based regulatory constructs. The legal analysis of the CJEU's case law on art 346 TFEU and of the invalidating list of exemptions and exclusions from the application of the Defence and Security Directive, contained in Chapter 2, have served as eloquent examples in this respect.

On the politics side, the literature review has traced a divide between contributions having been offered under the lens of International Relations theory and those ones having blossomed in European Integration studies tradition. These efforts have provided evidence of a growing intellectual scholarship demonstrating scholarly autonomy from the CFSP/CSDP debate. They have furthermore integrated the legal reflection having accounted for an analysis of mechanisms, activities, and outcomes beyond the study of defence equipment markets. The review of both the available legal and politics literature has generated a comprehensive cross-disciplinary inventory of EDEM-related explanations. The review has pointed at a missing element in all existing contributions, namely a theoretically structured account of the role that technology and innovation dynamics play in determining patterns of institutional change

This thesis has addressed this omission by presenting a theoretical elaboration which reserves prominence to politico-economic determinants and causes of institutional change in the study of EDEM. Such effort has led to a multi-disciplinary structured and technologically guided interpretation of the EC's policy entrepreneurialism in EDEM. Prior to the illustration of the analytical model, a multi-disciplinary conceptualization of the notion of EDEM has been elaborated on an integrated political, legal and economic dimension. This conceptualization fills a gap in the articulation of the policy regime, which European institutions have generically referred to by the acronym of 'EDEM' over the course of the past 30 years. The theoretical framework supporting EDEM explanation has combined for the first time a body of evolutionary economics with EU public policy-making literature. The analysis of EDEM's politico-economic determinants has been generated under a (two-

layer) integrated model bridging changes in techno-economic paradigms (TEPs) with adjustments in socio-institutional structures (layer n. 1), and specifying conditions connecting different socio-institutional adjustments (SIAs) to different forms of policy entrepreneurialism (layer n. 2) under the main/underlying condition of a shift in TEP. A technologically driven explanation of EDEM has introduced a new scholarly contribution to the subject of European defence equipment markets.

The rich volume of empirical materials collected for the thesis has been organized in four case studies to provide verification to both layers of the theory across a timeframe, namely the 5th economic wave (1980s-2020), having unlocked a first important shift in TEP, around which the present theoretical explanation revolves around. A first layer broadly connected changes in techno-economic paradigms (TEPs) to socio-institutional adjustments (SIAs), while a second layer, which is dependent on the first one, specified conditions for the EC's institutional entrepreneurialism to accompany socio-institutional change under shifts in TEPs. Following this verification logic, the first case study analysis, contained in Chapter 4, has provided evidence, via the reconstruction of the European Aeronautical Research Programme (EARP) case, of the first unsuccessful SIA, namely a non-military policy outcome, under an expanding TEP-1. In the presence of a running TEP-1, not having expired its expansive potential, the defence socio-institutional structure proved insensitive to the level of elaboration in the EC's policy entrepreneurial activity.

Providing for a further degree of verification of the theory against the experience of a non-outcome, the second case study analysis contained in Chapter 5, has reconstructed the EC's entrepreneurial attempt to pass a regulatory EDEM in the post Cold-War period. The analysis has built on considerations contained in Chapter 4 illustrating features of TEP-1, to further stress the central role played by ITC-related technological advancements in driving the political agenda of governments of major defence economies, which chose to support the integration of strategic technological capacities via mergers and acquisitions (M&As) and form national industrial champions in the fields of aeronautics and defence electronics. Since major arms-producing countries were still involved in national defence industrial consolidation activities, as has been documented via the French and German studied experiences, there was clearly no space of legitimation or political manoeuvre for a supranational entity, such as the EC, to step into the defence market and policy field. Having offered a thorough reconstruction of technological motives beyond defence industrial

consolidation dynamics and their political significance, the second case study analysis has once more tested the two-fold theoretical assumption, which argues for the insensitivity of the socio-institutional structure in the face of policy entrepreneurial activities perpetrated under a TEP not having expired its course.

The second two case study analyses contained in Chapters 6 and 7 have instead tested the theory in positive terms via the experience of two successful policy outcomes (e.g. SIAs) under the first accomplished shift in TEP. More specifically, the third case study contained in Chapter 6 has reconstructed main features of the emerging TEP-2, which progressively wiped out the previous model for military production and organization, based on the linearity in military R&D processes and national defence industrial champions. The analysis has documented the continuous significance of ICT-related developments under the thrust of internationalization and privatization processes in determining a substantive transformation in the functioning of defence corporations, resembling more and more to Multinational Enterprises (MNEs). The change in the configuration of policy entrepreneurial forces under TEP-2 has been interpreted, in line with the theory, as a response to global industrial consolidating dynamics, resulting in MSs no longer being capable of addressing this situation either individually or on an intergovernmental basis. The successful passing of an EU regulatory regime for EDEM has embodied the first and best possible output the system could generate under the EC's policy entrepreneurial input, activated in the aftermath of the major TEP-change in the beginning of the 2000s. Confirming theoretical premises formulated in Chapter 3, the EC's decision to opt for a low-risk policy entrepreneurial strategy to address a still highly sensitive topic for MSs ensured a circumscribed, yet positive, result by expanding regulatory competence via the safe EU internal market route.

Chapter 7's fourth case study has projected over the trajectory of the dependent variable EDEM, by testing once again both layers of the theory in the materialization of a further policy outcome, namely a SIA in EDTIB. The analysis critically re-joined with considerations advanced in Chapter 2 to elaborate on the structural limits of EDEM in an evolving techno-economic context affecting the situation of the arms industry worldwide. After having documented in statistical terms the residual practical impact of the EDEM regulatory construct, a decade after its entry into force, the first part of the case study has reconnected with Chapter 6 to complement the analysis of politico-economic determinants, which proved to have

significantly downsized the original strategic ambition to open defence markets, with a view to ensuring the preservation of the European Defence Technological and Industrial Base. The reconstruction of the SIA in EDTIB, whose building blocks are set under the same TEP hosting EDEM, moved from the theoretically supported consideration that, in a fast changing and non-militarily controlled innovation economy, characterized by more rapidly expiring TEPs, SIAs also become faster, sometimes overlapping one another, and the forms of policy entrepreneurialism accompanying them become more purposive and elaborated. Bringing theory to verification, it has been documented that the accelerated transition from a traditional inter-governmental scheme to the emergence of a new supranational regime for EDTIB has added elements of complexity and hybridity to the EC's policy entrepreneurial strategy, seeking for broader supporting institutional coalitions. Clearly, a much wider and sophisticated level of elaboration in the policy entrepreneurial strategy was needed in correspondence with a policy item reflecting a top-level strategic importance for EU MSs, namely security and defence R&D activities oriented to EDTIB's consolidation. At the same time, the adoption by the EC of a high-risk strategy towards EDTIB reflects the large political convergence and high-politics engagement in policy framing activities within the formation of an EU defence institutional coalition.

By closing a trajectory opened in Chapter 4 with the analysis of the first EC's attempt to frame a EU mechanism to support dual use aeronautical R&D activities, Chapter 7 has come to embody the final component of an overall mechanism, which under the same theoretical premises that hosted and tested EDEM, allowed the explanation of a broader SIA in EDTIB. This mechanism, having connected SIAs to changes in TEPs, allowed the observation across the thesis of different institutional variations from an attempted EDTIB (Ch.4) via an attempted (Ch.5) and a successful (Ch.6) EDEM, to an accomplished EDTIB (Ch.7). The completed analysis proves empirically and intellectually enriching, as it suggests not only that EDEM is an output of a trajectory ultimately culminating in EDTIB, but also that the theory proposed is suitable for further generalizations (beyond the dependent variable EDEM).

Additionally, the analysis has shown an evolution in the forms of EC's policy entrepreneurialism, from the non-significant attempts performed under the still on-going evolution of TEP-1, to the significant regulatory initiatives framed under the

first shift to TEP-2 with the 2007 EC Defence Package for EDEM, and the 2016-2018 EC Defence Packages for EDTIB. These last successful initiatives have marked a transition from an EC low-risk strategic posture to a high-risk concerted entrepreneurial strategy comprising a set of activities within a EU policy institutional coalition, as the one formed in the post-2011 phase. As anticipated in the theory (Ch.3 Fig.4 SIAs pp.95-100), the evolution of complex forms of policy entrepreneurialism in the defence market and policy sector will not expire under TEP-2 with the entry into force of the 2018 EC Defence Package, comprising a regulation for a European Defence Fund (EDF). Indeed, although the foundations of a supranational EDTIB have been already set in the closing phase of the 5th wave, with the presentation of three EC Defence Packages in three years (2016-2018), its full implementation will take place in the post-2020s phase under the rise of a new TEP and the activation of a European Defence Research Programme (EDRP).

As indicated in Chapter 3 (Fig.3 TEP-3 pp. 86-87), a second shift in TEP towards TEP-3 is likely to accompany a new configuration in the form of military production and organization. Discussions held with strategists and innovation consultants inside the military industry or in business with the national defence administration suggested that, under the continuing tech-driven thrust of commercial globalizing pressures, and in the absence of credible financial commitments to support the defence innovation machine, the classic military drive in R&D activities will be soon almost reversed, with civil innovations already outrunning the military technological development capacity in many economic sectors. In many R&D domains, including some emerging and enabling technology clusters, the civil sector already determines the pace and direction of technological change/advancements due to the almost 20 times larger volume of capitals injected on commercial markets.

In reconstructing TEP-1, it was documented how the position of merchant and captive manufacturers grew exponentially as a consequence of the expansion of ICT economies and R&D investments thereto (Ch.5 p. 148 and footnote 167). The relation between the civil and the military sector is further evolving under TEP-3. As of today, defence corporations find ICT contents and capabilities are increasingly provided by civil operators, which normally offer plug & play service solutions to integrate into open innovation architectural systems[325]. Such circumstances have marked the

[325] Open innovation architectures make use of commercial standards to develop systems that can store information,

unfolding of parallel processes in the defence sector, not without incoherencies. A first development shows that, unlike TEP-2, defence firms are today increasingly supporting ICT capabilities generation through the creation of civil-military clusters and partnerships, as opposed to the traditional M&A model[326]. A second headway concerns the controversial US-led tendency, partially spread in Europe, to rely on commercial off-the shelf technologies (COTS) to support certain military operational functions. A third advancement, linked to the first and the second, relates to the rise of disruptive innovation as an ordinary business model for the military.

As to the first development, the promotion of an open innovation model under TEP-3 has recently been initiated in Europe at the industrial level, with no public policy of any kind attached. This model clearly offers an opportunity for defence companies to keep up with the pace of civil innovation. Its effective functioning requires that a civil-military intersection is found at an early R&T/R&D stage by promoting cross-fertilizations in applied research activities. An illustrative example of such advancement is offered by the A³ defence incubator[327], which is an industrially supported innovation cell or hub, structurally part of the Airbus Group and physically located in Silicon Valley to promote a dynamic civil-military innovation ecosystem. Due to the reversed balance nowadays in the civil vs. military innovation capacity, the process of defence technological innovation needs to undergo an accelerative drive, with defence primes intensely interacting with start-up companies in supporting strategic technological incubation activities. In the absence of an acceleration step on military technologies, the civil and military innovation activities will normally proceed on two separate tracks, to the clear detriment of the advancement of the slower defence sector. Public policy support at the national and the supranational level will become key in promoting an integrated innovation environment.

The second aspect, intrinsically connected with the first development, concerns the difficulty of combining the spread of COTS with a strategically guided innovation model for the military. Over the past decade and over the complete duration of TEP-2, there has been a continuing and increasing need for advanced ICT

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process them, and operations. Recent acquisitions in the US have encouraged the use of a Modular Open Systems Approach (MOSA). For an explanation of this model with reference to the US see Gholtz (2007).

[326] The acquisition of ICT capabilities with traditional M&As embodies a *una tantum* operation, which is incompatible with the continuous technological re-generation objectives of modern innovation ecosystems. Indeed, the most strategic segments of the innovation environment nowadays originate on start-up and scale-up activities, which need to preserve a dynamic and forward-looking nature.

[327] Additional information can be found at https://www.airbus.com/innovation/open-innovation/a3.html

technologies supporting the integration of the latest ICT capabilities on military weapons, drones or simply IT office systems. Digital ICT have exponentially increased the accuracy, power and reliability of key military functions, such as reconnaissance and precision strike capabilities, ensuring intense power projection capacity in asymmetrical warfare scenarios[328]. They have been extensively employed by the US Department of Defence (DoD) to support network centric or network-enabled warfare (NCW) capabilities and operations[329] and achieve war-fighting advantage[330]. Despite their wide use by the US government to support military campaigns in Iraq, Afghanistan and most recently Libya, some clusters of interviewees in Europe have stressed that COTS have failed, and currently fail, to guarantee sufficient levels of protection during high-intensity warfare scenarios and operations. COTS have been lamented for their present minimal compatibility with existing military standards and reduced reliability rates as opposed to autonomous defence systems. Specifically, their most critical aspect would appertain, in the reading of European interviewees (Interviews 9,19,31,35,39), to their reliance on internet-based solutions, which would, in turn, expose military operations to cyber attacks, with risks for human security often outrunning the benefits of an increased technological performance in the battlefield[331].

As an example, one could observe that modern ICT software systems for data transmission and processing based on i-clouding technologies, which are made available by merchant firms, are unsuitable for guaranteeing the secrecy of information exchanged by military forces or law enforcement authorities, and for this reason they can most likely expose the security of personnel engaged in operations

[328] A reflection on enhanced power projection via digital warfare functions has been elaborated by Prof. Stephen Rosen, Harvard University (US) during a lecture on military innovation and power projection at the Modern War Institute & International Affairs Forum in Washington DC on 18/09/2017 Video available at https://www.youtube.com/watch?v=did1GvbSJBs

[329] According to a definition provided by the US DOD (2004a:3) NCW combines information superiority to achieve combat power by networking sensors, decision-makers and shooters to achieve shared awareness, increased speed of command, high tempo of operations, greater lethality, increased survivability and a degree of self-synchronization. To deepen on the notion of NCW see: Alberts et al for DoD (2000); US DoD (2001; 2004a), Porter and Waddell for US DoD (2004b) US DoD (2005); Dombrowski et al (2002) Dombrowski and Gholtz (2006); Bitzinger (2009).

[330] Network-centric technologies gather and link digitised data across nodes to achieve information superiority and convert such knowledge advantage into enhanced combat awareness and power. In the words of Dombowski and Gholtz (2006:9) networks harness the power of geographically dispersed nodes by linking them together into self-synchronizing networks that allow for the extremely rapid, high volume transmission of multimedia digitized data amongst individual nodes, which in turn gain access to capabilities distributed across the network.

[331] As a matter of fact, losing a node of the network during intense warfare military operations possibly does not deteriorate the war-fighting advantage reached, yet it can represent a risk and a cost in terms of human lives. A US DoD study from 1994 explicitly reported that an assessment of risks connected with the use of commercial software in military operations is difficult to substantiate due to a lack of credible quantitative data.

and missions. Rarely, under earlier TEPs, has the defence industry in Europe worked in close cooperation with the civil sector to adapt commercial software to the military standards. In the late 1990s for example, IBM cooperated with Airbus Military to convert the commercially available software for online banking services[332] into a military programme[333]. Industry-led initiatives, such as the recalled Airbus A³ defence incubator, today turn the vision around, advancing under the emerging TEP-3, a new defence model that promotes strategic R&T/R&D military-civil intersections, promoting standardization activities from an early phase and significantly downsizing ex-post adaptation through retrofitting processes of COTS to military markets. As of today, COTS employment remains a highly controversial topic on both sides of the Atlantic, with little research having been conducted so far outside the pioneering works initiated as a spin out of the RMA literature by a small number of US experts[334].

Problems associated with a potential reversion under TEP-3 in the innovation dynamics and its consequences on DTIBs are being faced on a third complementary front by the defence industry, which is called to confront, as of today, disruptive innovation as an ordinary business model at the level of productive and strategic planning organization. Technological changes occurring by disruption are faster, present no line of continuity with previous solutions, and deeply transform markets structures. The commercial model that makes disruption the business rule, and technological upgrades the exception to that rule, is difficult to implement in the defence sector. As illustrated in Chapters 5 and 6, major defence primes under previous TEPs have normally manufactured and integrated technological systems and components on big platforms, which followed an evolutionary long-lead development scheme. In product-dependent technological development activities, as those connected to the manufacture of major military combat aircrafts, such as the Tornado Panavia or the Eurofighter Typhoon, an iterative model could ensure continuity via modular upgrades to existing systems over long-life production cycles. It furthermore facilitated the repartition of R&D and industrial work-share, as these programs were normally developed cooperatively on an intergovernmental basis following the

[332] The online banking software collects and stores account information, allowing clients to perform banking operations, namely transfer of money or other financial operations, by following encrypted authentication procedures.
[333] The programme required the achievement of more stringent standards for encryption activities and procedures, and the support of non-internet based digital platforms.
[334] such as Bitzinger, Dombrowski ,Gholtz, Sapolsky.

principle of *juste retour* amongst participating countries to reduce costs, capitalize R&T investments and achieve economies of scale. In this context, systems integration capabilities played an essential role in strengthening the technological and business output of productive and organization processes.

These features, which persisted in the transition from TEP-1 to TEP-2, are now being challenged in TEP-3 under the corroding impact of fast technological and innovation advancements generated in the commercial sector and the spread of COTS. The early creation of the aforementioned defence industrial incubators promoting a stronger element of civil-military intersection in R&D activities also responded to the need to deal with disruption as an emerging business reference for the military, providing further verification of the theoretical assumption, which predicts industrial organizational restructuring occurring under shifts in TEPs. Organizational innovation at the corporate level is the first, yet not the only consequence of the rise of a new TEP. Under TEP-3 challenges posed, most prominently, by the rise of disruptive innovation and new innovation ecosystems, have progressively incentivized major adjustments in socio-institutional structures. In the past, under a still militarily controlled economy, even small revolutionary discoveries generated a significant impact on a very static commercial marketplace, as the one preceding the information age. The need to reserve a primary role for military innovation in strategically supporting power projection capacity, justified the fact that disruptive innovations have been traditionally financed, circumscribed and controlled within ad hoc research governmental institutions, with different levels of capacity depending on respective budgets and bureaucratic/administrative constraints.

In the United States for example a national Defence Advanced Project Agency (DARPA)[335] has, since 1958, supported technological innovation, also encouraging funds and managing research carried out in synergy amongst the military, private industry and academia, demonstrating a prominent focus on deeply transformative innovation as opposed to gradual improvements in existing technologies. In Europe, also in light of the lower budgets and higher politico-strategic fragmentation, defence research efforts have capitalized on sectors which have traditionally embodied the very strategic expression of States' power puissance, namely the aeronautics and later aerospace domains. Such a claim is confirmed by the numerous trail of radical

[335] Previously Advanced Research Project Agency (ARPA).

innovations [336] generated in the context of defence aeronautical cooperative programmes, as well as by the early establishment of ad hoc research institutions for the purpose, as the experiences of the *Office National d'Etudes et de Recherches Aérospatiales* (ONERA)[337] in France, the *Deutsche Forschungsanstalt für Luft und Raumfahrt* (DLR)[338] in Germany, and of the UK Defence Research Agency (DRA)[339] documented.

As of today, as a consequence of the reported, the scenario is changing deeply and quickly in Europe. National bodies deputed to conduct and coordinate defence research activities are most recently undertaking significant structural transformations in a new direction, trying to capitalize on the experience of the industry-led defence accelerators, namely the importance of civil-military integration in supporting defence innovation reform. First in line seeking adaptation to a changing environment, has been the UK Government. The UK MoD has indeed launched a Defence and Security Accelerator Initiative (DSAI). DSAI, replacing the Centre for Defence Enterprise, led by an ad hoc created new MoD unit, the Innovation Research Insight Unit, to promote innovation for collective security purposes. The initiative has established an innovation fund of around £ 800 million over 10 years to take forward the best ideas, from inside and outside defence, in an open innovation ecosystem which accelerates innovation via the promotion of synergies and intersection between the public and the private sector (UK MoD 2016:4; Interview 65) and committing 20%, (namely 1/5) of total investments allocated to the development of Disruptive Capabilities (DisCap) (UK MoD 2016; 2018; Interview n.65).

A similar objective in France also animated a DGA-supported initiative to attract civilian innovation, with the creation of a *Système d'Information des Armées* (SIA)-Lab, which built on the experience of an ad hoc project to modernize the command and control system information of the national armed forces (CEIS 2015; Interviews 62, 63). The SIA-lab, institutionalized into a DGA-Lab, has been explicitly set up with the goal of identifing, testing and demonstrating the latest technological advancements, stemming from the innovative private sector and SMEs ecosystem to

[336] See for example the mentioned X-31 programme in the context of Eurofighter development activities, and other examples illustrated in the thesis.
[337] National Office for Aerospace Studies and Research.
[338] German Research Institute for Aerospace.
[339] The UK has relied less on the cooperative element and tried to maintain a degree of autonomy in basic defence research activities carried out by the Defence Research Agency (DRA), then transformed into the Defence Evaluation and Research Agency (DERA).

provide new ICT solutions for the French MoD, which could be quickly implemented. The initiative has not only offered an institutional bridge between the public and the private sector, but has furthermore favoured the good match between transforming operational needs of the military and the finest state of technological supply available on the market, seeking a stronger civil involvement in the military innovation process and early compliance with defence standards already in the course of R&D operations (CEIS 2015; FR MoD 2018a; Interviews 62, 63).

The mechanism, which endorses the idea of providing institutional and financial support to a national defence accelerator, is similar to the one earlier envisaged by the UK-DSAI initiative. Such an idea consists in placing the MOD at the centre of a hub and spoke structure, namely a network, which gathers, develops, and tests the knowledge, skills, and capabilities of partner research institutes and the civil sector organized in clusters to accelerate ideas from conception through application, via demonstration, and working hand in hand with government procurement bodies and the defence industry (Interviews 62,63,65). Based on the successful application of this model, France has most recently announced the creation of a national defence innovation agency, the *Agence de l'Innovation de Défense* (AID) [340] (FR MoD 2018b; 2019). The French Defence Innovation Agency has been created on 01/09/2018 within the National Ministry of the Armed Forces, as linked to the French Defence Procurement Agency (DGA), with the objective of attracting all players involved in the military and security innovation environment and coordinating existing initiatives, and broadly directing the French MoD R&T/R&D and innovation policy (FR MoD 2018b; Interviews 37, 63). Similarly to the UK initiative, it will be managing a dedicated budget of 1 billion EUR per year until 2022, and it will foster a strong orientation towards the development of disruptive capabilities (FR MoD 2019; Interview 37). Last but not least, Germany is overcoming militarization resistances[341] with the prospective creation by the end of 2019 of an *Agentur für Disruptive*

[340] Defence Innovation Agency.

[341] Since WWII defence research has remained a very sensitive topic in the national political agenda of Germany, and for this reason much of the defence-related/dual use efforts have been carried within the framework of the aeronautical research agency DLR. It is worth noting that besides the DLR, a significant share of strategic R&D activities have been performed in Germany within the Fraunhofer Society, which counts as of today of 72 institutes spread across Germany, each focusing on different fields of applied science, while basic research activities are conducted across the Max Planck Society and its institutes. The Federal and State Governments of Germany fund both the Fraunhofer and the Max Planck societies.

Innovationen in der Cybersicherheit und Schlüsseltechnologien (ADIC)[342] (German MoD 2018; Sprenger for Defence News 2018).

The reported national socio-institutional adaptations will integrate the EU governance system accompanying a new socio-institutional adjustment (SIA) under TEP-3 with the adoption of a multibillion European Defence Research Programme (EDRP), bringing the EDTIB regime to a greater degree of implementation. From this perspective, national investments allocated to R&D defence activities will register an important economic multiplication effect (see Ch.7), not only as a consequence of the creation of new civil-military national innovation ecosystems previously inexistent, but also because they will capitalize on the experience of the future participation to supra nationally-financed EU defence-related R&D and industrial consortia. As was confirmed in a number of public institutional statements, the *Brexit* process will not affect the possibility for UK's entities to seek participation in defence-related consortia formed under the different EDTIB's components, and most prominently the EDRP in post-2020 phase.

If national defence research structures of major arms-producing countries are quickly adapting to the challenges anticipated by the rise of TEP-3, it is unclear, as of today, if and to what extent the current elaborated EU politico-strategic vision, reflected in the defence institutional architecture of Europe, will be able to support a coherent implementation of the EDTIB's component. As anticipated in Chapter 6, the Solana's political vision expressed in the text of the 2003 European Security Strategy (ESS), following a path opened by the 1998 Franco-British Declaration in Saint Malo, strategically connected the strengthening of military capabilities in Europe to the support of a CSDP's dimension, and in general to the CFSP's projection of a Union role on the international field. Such political vision was strategically attached, in 2004, to the creation of an ad hoc European Defence Agency (EDA) to foster EDTIB-oriented cooperation in R&T/R&D military capability generation activities. At the same time, the analysis contained in Chapter 7 has evidenced limitations inherent in an inter-governmental organization of R&D and technological development activities in the Union.

As documented in section 7.3.1, indeed, beside the political resonance of the strategic choice to institutionalize defence R&D and industrial cooperation activities

[342] Agency for Disruptive Innovations in Cybersecurity and Key Technologies

in EDA to overcome substantive lack of progress in the CSDP-oriented capability development activities, the ad hoc created Agency found itself locked in-between the hybridity and low-level of militarization characterizing the CSDP's component and the constellation of hard military determinations, expressed by national defence institutions with no solution of multiannual continuity, as the example of the Force Protection Programme (FPP) documented. While, as opposed to the CEPAS/EUCLID step, this mature intergovernmental phase formally embodied a top-down political vision under the 2003 ESS, a detected element of incoherency in the relation between EDTIB and CSDP heavily compromised the coherent advancement and implementation of this policy construct. As a matter of fact, while, on the one hand, the two EUMS' Capability and Force Requirement Catalogues remained theoretical exercises in the absence of commonly defined EU military-strategic objectives, the incompatibility of a soft-military approach (e.g. CSDP) supporting the development of hard-military capabilities (e.g. EDA) and the lack of independent financial resources drastically downsized options to see EDTIB deploying.

The transition towards a supranational EDTIB policy regime under the thrust of a new EU policy entrepreneurial coalition finally unlocked the problematic issue of the independence in the budget component to coherently support EDTIB-driven R&D and industrial cooperation activities. As evidenced in chapter 7 (Section 7.3.2) the EDTIB's supranational construct comprises the establishment of a supranational European Defence Fund (EDF) to promote, via the selection of defence-related R&T/R&D consortia formed on EU basis, the financing of collaborative research activities amongst defence primes and SMEs/starts up, eventually leading to the creation of a new supranational research and pre-commercial procurement structures. As explained, the integration of an ad hoc EDRP within the 9th EC Framework Programme (FP) (2021-2027) followed the positive experience of the 2017-2019 EC Preparatory Action for Defence Research (PADR), which in turn built on the EP Pilot Project input. At the same time, the 2018 EDF regulation reserves the possibility for further bolstering the EDAP's capability window beyond the 2018-2019 EDIDP experience, reserving preference to cooperative industrial projects involving defence-related SMEs and run under the Permanent Structured Cooperation Framework (PESCO) provided for by the 2009 Lisbon Treaty.

The negotiation around the 2018 EDF and its programs, namely the EDRP and the EDIDP, has clearly unveiled a number of challenges. They cover a set of topics,

such as, *inter alia*, the setting of objective criteria for the identification of European entities suitable for taking part in EU consortia, and consequently the protection of IPRs of joint R&T/R&D activities, eventually imposing technological-diffusion restrictions to members of the consortia. Furthermore, the regulation has valued the participation of defence-related SMEs and start-up innovative entities from the civil environment, by introducing a system of credits for consortia formation purposes. This choice reflects a forward-looking vision, which directs political attention towards the support of disruptive innovation capabilities in a dynamic EU defence innovation environment characterized, by intense civil-military synergies. In this sense, a disruptive cluster of innovations under the rise of artificial intelligence has just opened a brand new chapter in the evolution of TEP-3, which, besides evidencing the gap accumulated by the military, has already piled up a long list of delicate legal and ethical questions concerning the limits for the development of autonomous weapons systems.

While the emerging EU defence industrial governance system has negotiated, over the past year, a regulatory framework to respond to the several challenges activated by the rise of TEP-3, it is interpreted here that the very problematic aspect compromising the coherent EDTIB's implementation in post-2020 phase resides at the level of the broad politico-strategic architecture incorporating the EDTIB project. As a matter of fact, there is an underlying ambiguity in the 2016 EUGS' political message, which formally elevates the Defence and Security of the Union to top strategic priority, without ever tackling the definition of common military-strategic objectives supporting the implementation of that political vision. In the absence of European military headquarters entitled to define and synchronize strategic military objectives, operational requirements, role/capability planning and integration activities, the EUGS' political vision on a Defence Union risks remaining fragmented within the compilatory activity of CEU's Military Committees structures, working bottom-up at the abstract definition of CSDP-oriented soft-military capabilities and force requirements.

Of the two one is valid: either the strategic ambition of the Union is a fully-fledged CFSP which, via crisis management and humanitarian intervention activities, projects a stronger EU role internationally, or the European strategic ambition is a true CSDP which encompasses hard-military and warfare operations to build and project a defence actor. In the former case, an EDTIB dimension will not be needed as

many of the capabilities required, not presenting a hard-military dimension, could already be developed on the existing European Security Research Programme (ESRP). In the latter case, a structured EU military-strategic vision should integrate the EUGS' political ambition and drive current EC R&D militarization activities. On the reported grounds, a new element of coordination should come, other than by the EUMC's cataloguing activity within the Council, and most possibly exploiting the existing EEAS-EC axis, with a view to connect EU foresight and strategic planning activities to the specific set of R&D and technological areas being EC-funded under the EDRP. Without this step, there is a concrete risk that the EC multi-billionaire investments allocated to support defence R&D and capabilities, and ultimately an EU strategic autonomy dimension, will remain isolated and disconnected from the coherent implementation of a strategically supported EU politico-military ambition.

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Case C 246/2012 Ellinika Nafpigeia v. European Commission EU:C 2013:133 [2013] ECR I-133.

List of Interviews

Interviewees (who signed the consent form):

n. 1 (Ex) Senior representative from industry (previously industry)
n. 2 (Ex) Senior EC scientific official (prev. industry)
n. 3 Senior EC official (prev. national representative)
n. 4 Senior EC official (prev. industry)
n. 5 (Ex) Senior EC official (prev. industry)
n. 6 Senior EC scientific official (prev. industry)
n. 7 Senior Air Force official (prev. national representative)
n. 8 (Ex) Senior Air Force official (prev. national representative, WEAG official)
n. 9 Senior representative from industry
n.10 Senior representative from industry
n.11 EU Commissioner (prev. national politician)
n.12 (Ex) Senior Air Force official (prev. national representative, WEAG official)
n.13 Senior national representative
n.14 Senior national scientific official (prev. industry)
n.15 Senior representative from industry
n.16 (Ex) Senior national representative (prev. diplomat)
n.17 (Ex) Senior industrial representative (prev. industry, today business man)
n.18 (Ex) Senior national representative and professor (today retired)
n.19 (Ex) Senior representative from industry (prev. industry)
n.20 (Ex) Senior national representative (prev. EU Senior official)
n.21 (Ex) Senior national representative (prev. EU Senior official, prev. industry)
n.22 (Ex) Senior EC official (prev. industry, today innovation consultant)
n.23 Senior representative from national industry
n.24 (Ex) Senior national representative (today professor)
n.25 (Ex) Senior representative from national industry (prev. industry)
n.26 Senior representative from industry and research fellow
n.27 (Ex) Senior representative from national industry (prev. industry)
n.28 Senior national representative and professor
n.29 Senior national representative from industry (prev. industry)
n.30 Senior representative from industry (prev. national representative)
n.31 (Ex) Senior national representative (prev. industry, today business man)
n.32 Senior representative from industry (prev. national scientific and EU official)
n.33 Senior representative from industry (prev. industry)

n.34 (Ex) Senior EC Scientific official (prev. industry)
n.35 (Ex) Senior Scientific official and national representative
n.36 (Ex) Senior National representative (prev. international official)
n.37 (Ex) Senior national scientific official (prev. national official, today innovation consultant and professor)
n.38 (Ex) Senior national representative (prev. armed forces)
n.39 (Ex) Senior national representative (prev. national official, today innovation consultant and professor)
n.40 (Ex) Senior national representative from industry
n.41 Senior representative from industry and business sector
n.42 (Ex) Senior representative from national industry
n.43 Senior representative from industry (prev. research fellow, prev. EU official)
n.44 (Ex) Senior EC official (prev. EU official, today strategic consultant)
n.45 (Ex) national representative (prev. WEAG/WEAO official, prev. EU official)
n.46 (Ex) national representative (prev. EU official, today EU official)
n.47 Independent lawyer and consultant (prev. national research institution)
n.48 Senior EC official
n.49 EC official
n.50 Senior EC official
n.51 Senior EC official
n.52 EC official
n.53 (Ex) national representative (prev. EU official, today EP official)
n.54 Senior EU scientific officer (prev. national representative and EU official)
n.55 (Ex) national representative (prev. EU official, today EU official)
n.56 EC official (prev. EU official)
n.57 Senior national representative (prev. EU official)
n.58 Senior EU official
n.59 Senior EU official
n.60 Senior EU official
n.61 Senior NATO official
n.62 EU defence innovation consultant
n.63(Ex)Senior national representative (today EU defence innovation consultant)
n.64 Senior EC official (prev. EU official)
n.65 Senior defence innovation and industry consultant

Informants (who did not sign the consent form):

n.1 (Ex) Senior representative from industry (prev. industry)