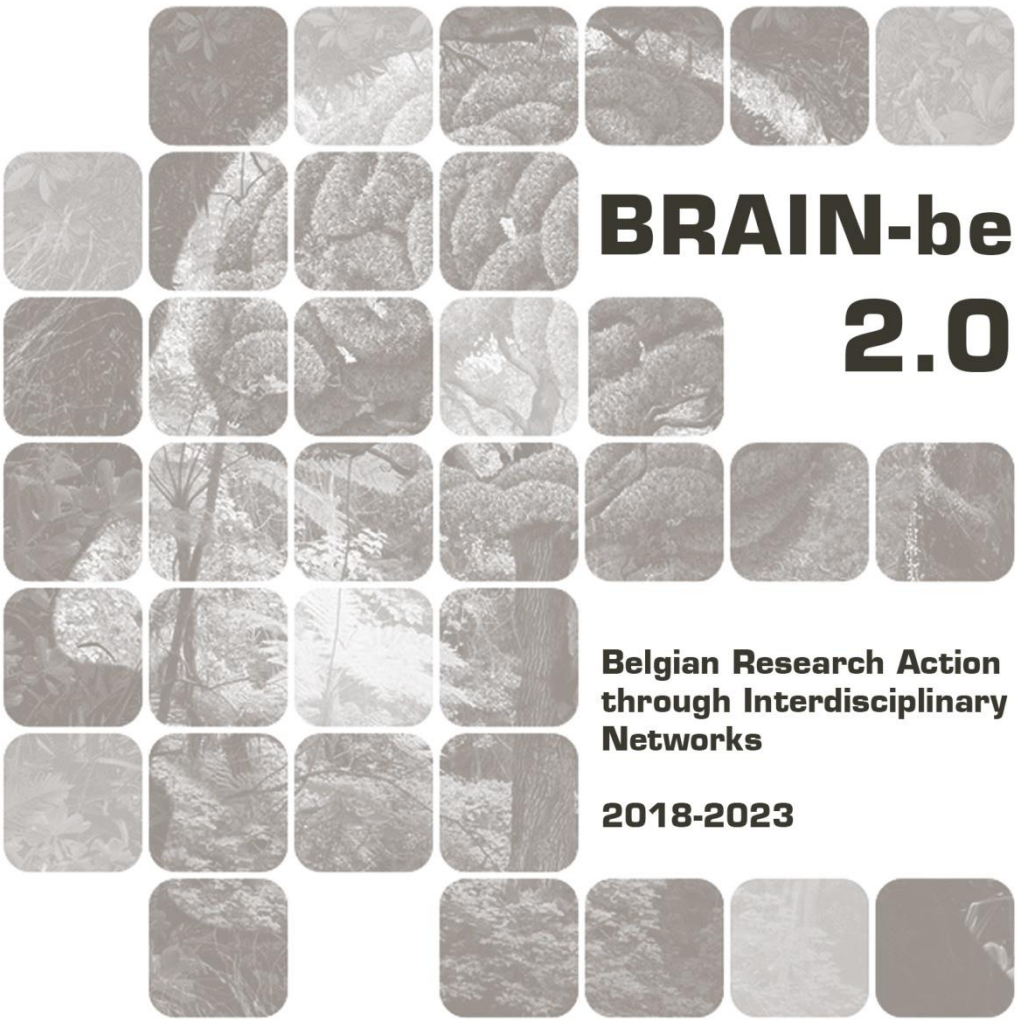


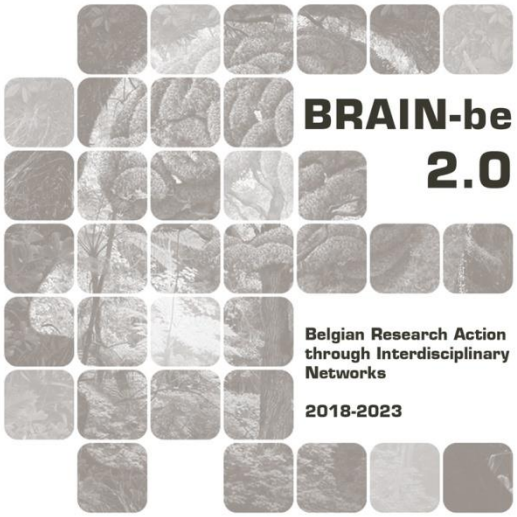
BEPIDS

The Belgian Economic Potential in the Industry of Defence and Security

Gregory Kegels (RMA) – Prof. dr. Cind Du Bois (RMA) – Prof. dr. Caroline Buts (VUB)

Pillar 3: Federal societal challenges

belspo .be



NETWORK PROJECT

BEPIDS

The Belgian Economic Potential in the Industry of Defence and Security

Contract - B2/223/P3/BEPIDS

FINAL REPORT

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ABSTRACT

The objective of the BEPIDS project is to give an overview of the different actors in the Belgian Defence Technological and Industrial Base (BE-DTIB), as well as the structure thereof, and to provide analysis concerning how the BE-DTIB can be supported in line with current European regulations on Competition Policy and State Aid. The project is funded by BELSPO.

More information on the project and its deliverables can be found on the project's website:

https://www.geoeconomicsgroup.be/bepids

1. INTRODUCTION

The Belgian Defence Industry and Research Strategy (DIRS) is a 1.8 billion EUR supporting measure for the Belgian Defence Technological and Industrial Base (BE-DTIB) for Research, Technology and Development. Among the key objectives of the DIRS are: supporting Belgian legal entities in multinational cooperation programs so they can more effectively enter existing and emerging value chains, as well as participate in future capability development; ensuring security of supply; maintaining a national edge in key domains and specialties where deemed necessary; ensuring Belgian legal entities in the BE-DTIB contribute to the broader knowledge base and R&D.

The need for a BE-DIRS stems from a lack of Defence-related R&T&D (Research, Technology and Development) funding. As indicated in ***Figure 1*** below, Belgium lags under the EU average for Defence R&D funding as a percentage of GDP (2021 figures). While this increased slightly in 2022, the year of the initiation of the DIRS, it remains below neighbouring EU member states and key comparable units (see: ***Figure 2***). Furthermore, the lack of a prior long-term strategy from Belgian Defence outlining capacity needs and priority niches complicates resource allocation and investment decision making from the industry, research organizations, as well as from involved public institutions (See: STAR-plan, p. 136). The DIRS aims to provide clarity so these actors can plan for the longer-term.

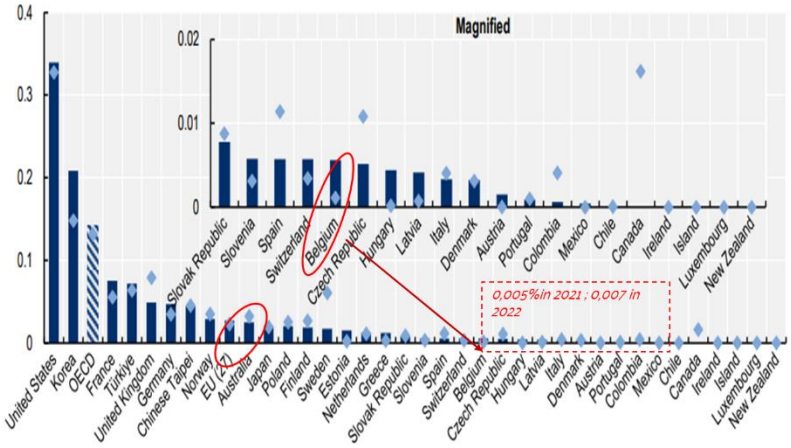

Figure 1. *R&D Budgets for R&D Defence (GBARD in Defence) as a* ***%*** *of GDP for 2021 statistics.*
Source: OECD (2023) STI Report. [LINK]

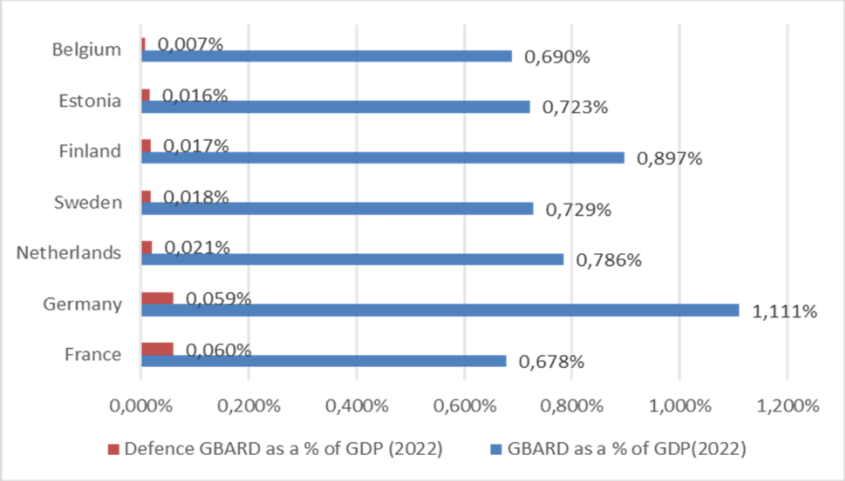

Figure 2. *GBARD for Defence as a* ***%*** *of GDP for the 2022 statistics (latest available figures). Source: Own composition based on - OECD (2023) STI Dataset [LINK]*

As noted in the STAR-plan of Belgian Defence, several informational gaps remain to properly implement the Belgian DIRS (See: STAR-plan, pp. 134-138). The BEPIDS project focuses on providing inputs for some key open points of the DIRS, namely: What is the BE-DTIB; and how can it be supported? To answer these questions, the key objectives of the project are to:

1. Define the BE-DTIB, develop a database mapping the BE-DTIB and high-level analysis.
2. Develop a policy toolkit for support to research for the BE-DTIB in compliance with EU law.

2. STATE OF THE ART AND OBJECTIVES

The aim of this research project is to give a complete overview of the different actors in the Belgian DTIB as well as to provide analysis on how it can be supported in line with current European regulation on Competition Policy and State Aid. Supporting our national companies not only directly impacts our economy but also indirectly as we decrease our strategic dependency on other nations (Fondation Concorde, 2022). To arrive at this goal, we identified the following research objectives:

1. Definition, mapping and analysis of the Belgian DTIB.
   The first research objective is a necessary building stone for our entire study. Which companies and research institutions do we include? Which entities are crucial for the development of the Ministry of Defense (MoD)'s Long Term Capability goals? Which Belgian actors can play a vital role in the framework of the European capability gaps? After identification of the different key players (companies, research institutions, lobbyists, governments at different levels) we also analyse the positioning within emerging value chains through analysing the cooperative yet competitive portion of the European Defence Fund (EDF) and its precursor programs.

2. Belgian DTIB database
   Development of a database on the different actors in the BE-DTIB.

3. Development of a policy toolkit to support the sector. While the proposal indicated that a manual would be developed for industry and research industry, in accordance with project demands and feedback from the steering committee, the project focused on inputs the government(s) could use to sculpt R&D support mechanisms or funding allocation in accordance with EU law.

While there is a clear lack of knowledge on the Belgian DTIB, most other countries do have a clear view of (at least) the industry. In fact, the edited volume by Harley and Belin published in 2020 covers detailed descriptions of the Defence industry and/or the DTIB in a whole range of countries. Hence, in order to arrive at our definition, we can draw on the definitions used by these other nations as well as international actors in the field (e.g. European Defence Agency EDA, Stockholm International Peace Research Institute SIPRI, …). Another useful source is provided by the documentation on the European Defence Technological and Industrial Base (EDTIB). Given the specificities of the Belgian sector, these definitions cannot just be copy-pasted. Comparing the definitions and criteria used in a broad range of countries, we can however find the best suited definition to be used in our country (given for example the focus of the Strategic Vision of our MoD).

Subsequently, in accordance with this novel definition of the DTIB in the Belgian context, a database of actors operating in this domain is composed. First, the database will include actors from all parts of the triple helix (Leydesdorff & Etzkowitz, 1998), that means government, private industry, and academic research institutions. Closer collaboration between the triple helix is primordial to create a true ecosystem, also seeing the increased strategic importance of dual-use product or services (Evans, 2020; Thiele, 2021). For example, with an eye on fostering technology transfer between technology companies/ academia and more military focused actors (MoD or pure-play military suppliers), it is

imperative that relevant actors can find each other in an efficient manner. In essence, the aim of the database is to be a building block on which a strong Belgian Defense Industry and Research Strategy (DIRS) can be forged (including a strategic coordination platform), and which can eventually contribute to EU strategic defence autonomy. In doing so we follow partner countries such as France which, although it has a preexisting doctrine to support their defence and security sector, is re-updating their strategies according to the changing threat environment. France's last in-depth update on their doctrine to support the domestic industry still stems from 2004, while geostrategic, technological and industrial needs and capacities have shifted substantially since then (Fondation Concorde, 2022).

Based on an overview of support mechanisms used in this sector but also in other sectors (art 107-108 and/or art 346 of the Treaty on the Functioning of the European Union (TFEU)), the third key objective of the study is to develop a practical policy toolkit.

3. ACTIVITIES, METHODOLOGY & KEY RESULTS

In this section, we shortly indicate key points concerning the activity/purpose, employed methodology and results of the research. For recommendations and impact (societal, scientific), see Section 4 below.

RESEARCH OBJECTIVE 1: DEFINITION, MAPPING AND ANALYSIS OF THE BE-DTIB

Defining the BE-DTIB

Activity and methodology - To arrive at a clear-cut definition of the Belgian DTIB, we performed a multiple case study approach examining several existing mappings of selected countries and institutions to derive at common generalizations for the DTIB definition and its inclusion criteria. While the methodology in and of itself is not original, there is a lack of research on the use of terms and their delimitations to refer the Defence Technological and Industrial Base. Hence, the research contributes to filling a knowledge gap on the use of different concepts and its delimitations.

> *"The case study approach is most suited here for several reasons. First, a quantitative approach lacks the ability to provide the needed insights to derive generalizations. Second, even when papers discuss the DTIB, defence industry or sector, they often do not contain a definition on what it entails. As a result, finding the definition they implicitly use requires further analysis, often through a common snowballing approach by looking at the literature the author(s) employed. Third, and following from the former point, a large-scale systemic literature review is not a suitable approach. Fourth, common industry classification framework or market structure frameworks cannot be employed sufficiently. It is well-known in the field of Defence Economics that classification frameworks cannot be employed sufficiently, as there are only a few codes specifically for Defence products. On the other hand, market structure frameworks are too narrow as these focus on similar goods or services. Hence, the market structure framework cannot be employed for the DTIB in itself, as it consists of non-interchangeable goods or services and different industry types, but only to further compartmentalize it. Lastly, the case study approach offers an edge for theory building as cross-case analysis between cases facilitates revealing commonalities, while accounting for the contextual differences between the cases (See: Hunziker and Blankenagel 2021; Burns 2009, pp. 264-265). The latter is also outlined in the multiple case study analysis protocol in Cresswell (2013), which we employ as the framework for this paper (Table 1)."*
>
> - Extract "methodology" from *Defining the BE-DTIB through Multiple Case Study Analysis* –

For the analysis we employ Hartley and Belin's book (2020) as the main source for case studies due to the consistency across the chapters and due to it being the most recent 'work of reference' on the topic. Further desk research and content analysis further unpacks each selected case. Aside from the cases derived from Hartley and Belin, we also assess prior Belgian mapping exercises.

The employed methodology is not without limitations, as it analyses a narrow set of cases at a narrow span in time. Hence, we suggest further research consider a wider scope for its conceptual analysis:

> *"Given the case study methodology and limited cases analyzed, future research can improve the external validity of the findings by broadening the scope through a more extensive*

structured review of the literature and of hands-on mapping analyses. Furthermore, it may be interesting to include in how concepts (defence industry, D(T)IB) have evolved over time due to changes in Defence requirements and responsibilities (e.g. the increased focus on dual-use products due to the changing battlefield or on security products for defensive cyber).”

- Extract –

Results – While there are limited similarities between the selected case studies, we find that there is a lack of generalizability between mapping studies (delimitations, data sourcing, scope, terms), which complicates comparative analyses between countries.

“Overall, there is limited generalizability to derive a clear common definition. The lack of a common definition and sourcing methodology for domestic DTIBs hampers comparability between countries. Due to this reason, the SIPRI 100 figures remain the most current tool to analyze general trends, even between countries. Of course, the SIPRI figures are limited in scope as they are meant to track the biggest players. They can therefore not be used for more detailed comparative analysis of countries’ DTIBs. An optimal solution to improve comparability and insights on the EDTIB would be for the EDA (or DG Defis) to push for developing clear delimitations that can be employed as reporting standards for national authorities to collect standardized figures for their DTIB. Alternatively, more defence additions within the sectoral NACE codes would also facilitate aggregate analysis, as well as facilitate identifying entities within domestic DTIBs. As noted above, current frameworks (NACE, CPV, Export and transfer reporting) are insufficient to employ for mapping analyses.”

- Extract -

Based on the generalizable insights and the analysis of the DTIB concept, we nevertheless developed a definition for the BE-DTIB and outline inclusion criteria for an entity to be considered part of it. From the analysis, we understand the BE-DTIB generally as: *domestic sources that provide goods, services and technologies required by armed forces to fulfil their responsibilities, either directly or by being part of the value chain.* More specifically, the definition of the BE-DTIB is delimited as the following:

Any entity,

i. registered in Belgium in the Crossroad Bank of Enterprises (CBE);
    a. that was established under Belgian law and;
    b. that is considered a separate legal entity (regardless of its specific legal status and the way in which it is financed);

ii. with economic activities occurring on Belgian soil;

iii. which supplies ‘defense-use products’ or ‘security-use products’, including ‘dual-use items and technologies’ to any (i.e. foreign or domestic) ‘Defense actors’ or as inputs or components to ‘other legal entities active in the DTIB value chain’ OR;

iv. which *significantly or continuously* supplies 'any other products' directly to any 'Defense actors' or as significant inputs (e.g. critical materials), components or services to 'other entities active in the (global) DTIB value chain'.

is considered part of the BE-DTIB.

Operationalising the definition: mapping and analysis of the BE-DTIB

Activity – *This paper describes the methodology employed for mapping the BE-DTIB in line with the BE-DTIB definition and provides a high-level aggregated analysis of the outcome.*

Methodology – *For a shortened description of the methodology for the development of the database, see 'Research objective 2' below. While the methodology encompasses a broad scope of sources, we outline several limitations that persist, e.g.:*

> *Limitations of employed sources - "From an academic standpoint, this paper contributes to the operationalization of the BE-DTIB by operationalizing a conceptual definition into an empirical mapping. This process serves to expand our understanding of Belgian legal entities within the broader EDTIB. However, the working definition employed in this study, while comprehensive, may be critiqued for not fully capturing certain entities with potential relevance to the DTIB. For example, only a limited number of entities involved in biotechnology are currently represented in the dataset, largely due to the scarcity of such entities identified in the sources. Nonetheless, Belgium is well-positioned to leverage its expertise in biotechnology (e.g. human enhancements) to provide goods and services for military applications in the future. This suggests that the full potential of the BE-DTIB may not be entirely reflected in the current mapping, and further research could expand on these underrepresented parts holding potential."*
>
> *- Extract from 'Operationalizing the BE-DTIB definition'*

> *Limitations of cross-sectional approach – "The analysis for the DTIB-related impact in this paper is limited to a cross-sectional methodology, i.e. the DTIB-derived turnover, employment and GVA data is collected from the legal entities at a single, or rather a narrow, point in time for statistical analysis to compare the differences between the legal entities according to their assigned characteristics (e.g. CapTechs). Looking forward, it is advised to continue obtaining the required data in the following years in order to set-up a time-series analysis that tracks the development of the mapped legal entities across the years and to retroactively update previous estimation based on increased capturing of data for the current year analyzed."*
>
> *- Extract from 'Operationalizing the BE-DTIB definition'*

Results

> *Based on the currently available data, we derive the following key insights. First, the BE-DTIB mapping includes 892 legal entities with an estimated DTIB-derived turnover of 5.01 billion EUR, directly employing around 16,300 people and contributing approximately 2.02 billion EUR in GVA in 2023. The total direct impact of the BE-DTIB constitutes around 0.33% of Belgian*

employment and 0.34% of Belgium's GDP. Exports from BE-DTIB legal entities account for 47% of their turnover, amounting to about 2.4 billion EUR. Around 18% of turnover (approximately 917 million EUR) is allocated to R&D with R&D employment representing 24% of BE-DTIB's FTEs, totaling an estimated 4,124 FTEs. In terms of entity size, Micro-sized entities (40.13%) represent the majority but contribute minimally, while MidCaps (13.45%) account for the bulk of the impact, contributing 65% of turnover and 61.72% of employment.

The BE-DTIB is concentrated in several Capability Technology (CapTech) groups, notably Materials, Land, Ammo, and Air, with Materials showing the largest number of entities and impact. Cyber and Information CapTechs, although smaller in turnover, are highly reliant on human capital. Maritime capabilities, though currently low in impact, are strategically positioned for future growth, particularly through the participation of Belgian legal entities in naval defence R&D projects and procurement.

The BE-DTIB shows a strong concentration in Liège, Kortrijk, and surrounding Brussels, with Wallonia as a whole exhibiting a higher GVA-to-turnover ratio for DTIB-related activities, suggesting that its entities are more effective at generating value. Self-identified defence-focused entities are predominantly located in Wallonia. The BSDI business group represents a significant share of the DTIB's economic impact despite covering only 13% of legal entities, with associations like Skywin's Defence pole and Pole Mecatech's Defence ecosystem covering a comparatively smaller amount of the DTIB-related impact.

Foreign ownership is concentrated in Belgium to only a few countries, with foreign-controlled entities from France and the United States accounting for a larger portion of the economic impact, contributing 25.1% of FTEs and 24.8% of GVA for French-owned entities and 8.2% of FTEs and 10.4% of GVA for US-owned entities. While 71.8% of the legal entities are Belgium-owned, they represent only 43% of the FTE impact and 41% of the GVA, indicating that foreign ownership has a greater influence on the economic footprint of the DTIB.

- Extract from 'Operationalizing the BE-DTIB definition'

Belgium in the EU defence ecosystem: EDF and precursor analysis

Activity & Methodology – *"This study examines the Belgian Defence Technological and Industrial Base (BE-DTIB) within the cooperative EU defence ecosystem. We employ the European Defence Fund (EDF) and its precursor programs as a proxy for the ecosystem to assess the presence of Belgian entities and their comparative success. The study addresses a gap in the literature by focusing on the actual EU contribution per entity, rather than the average contribution per entity employed in existing literature. Additionally, we include both the EDF and its precursors, which provide insights over time. The data is sourced from the EU funding and tenders portal (SEDIA), the EU financial transparency system, project factsheets and supplemental material. Since no single source exists from which all data can be obtained, we discuss the challenges encountered during data collection so others may replicate our approach." - Extract*

Results – The analysis finds that the EDF and its precursors are an overall success for Belgium, according to the outlined criteria. Nevertheless, the positioning in the EDF and its precursors does not

align in some key cases with Belgian characteristics such as the BE-DIRS, defence exports and the core self-identified defence industry.

> *"In the table below, we indicate the outcomes of the success indicators outlined in the methodology section. The EDF and its precursors are a success for Belgium concerning its comparative success in obtaining funding relative to defence investment with all indicators scoring above the threshold. Belgian legal entities also meet both thresholds for the indicators outlined for network success, meaning Belgian legal entities are successful in participating in the majority of the EDF in terms of consortia funding and network connections. However, Belgium does not fulfil the outlined success criteria for alignment success, indicating that its funding success does not align with key strategic priorities of the DIRS or general characteristics of Belgian defence export or the self-identified main defence industry." - Extract*

Indicator	Success Criteria	Result
Comparative/Relative Success Indicator		
Relative overall funding	Rank better than 9th	4th
Relative Research funding	Rank better than 9th	6th
Relative Development funding	Rank better than 9th	4th
Relative program competitiveness over time	Increase of position over time	Yes
Alignment Success (to BE characteristics)		
DIRS prioritization alignment	If both priority domains are in the top 5 categories of % funding received by BE.	Cyber (11th)
Overall DIRS alignment	No significant capabilities/tech funded by EDF & precursors that are not a domain in DIRS.	Armoured systems
Export alignment	No significant misalignment	AIR
Defence industry alignment	No significant misalignment	AIR
Network Success		
Distinct connection ratio	If Belgian legal entities have connections in consortia with more than 50% of all participating legal entities.	Yes

Consortia funding ratio	If more than 50% of the total EU contributions are allocated to the consortia Belgian legal entities are active in.	Yes

RESEARCH OBJECTIVE 2: DEVELOPMENT OF A DATABASE *(also see: WP 3.2 above)*

Composition of BE-DTIB actor list

Activity and methodology - Based on the definition of the BE-DTIB, we compose a list of relevant actors. Due to a lack of existing statistical sources that can be employed as-is, this needs to be derived from multiple sources.

> *"The mapping of the BE-DTIB cannot be deduced from existing national statistics or the NACE-BEL classification system of activities. NACE-BEL serves as the Belgian version of the statistical nomenclature (NACE Rev. 2) employed in the European Union for categorizing economic activities and is the standard reference framework for generating and disseminating economic activity-related statistics in Belgium. However, NACE-BEL incorporates only a limited number of codes (e.g., 20510 for 'Explosive products manufacturing' and 25400 for 'weapons and ammunition manufacturing') that allow for the identification of military goods production. Moreover, the NACE-BEL classification system lacks the capability to differentiate between military and civilian market economic activities in the production of dual-use and dual-product goods. The same issues apply to the other existing classification systems of activities. Hence, we employ the following sources to set-up the mapping of the entities of the BE-DTIB.*
> *(1) Defence and Security Procurement contracts*
> *(2) EU, NATO, and Belgian Defence (R&D) programs*[1]
> *(3) Already listed in the Group for Research and Information on Peace and Security (GRIP) database of the Belgian 'armaments industry'.*
> *(4) D&S-focused or relevant business associations*[2]
> *(5) 'Defence-related' or 'dual-use' products exports*[3]
> *(6) Existing reports, e.g. reports from the Flemish Peace Institute.*
> *(7) DG HOME list of EU security market*
> *(8) EU Register of Certified Defence-related Enterprises - CERTIDER*
> *(9) Defence-relevant NACE codes (limited)*
> *(10) LinkedIn (legal entity self-identified as defence-related')*
> *(11) Mentioned in newspaper articles or other open sources as having DTIB-relevant activities.*
> *(12) Business days & events*[4]

[1] e.g., the European Defence Fund (EDF) and its precursors programs – the European Defence Industrial Development programme (EDIDP), Preparatory Action for Defence Research (PADR) and Defence Pilot Projects (PP); European Defence Industry Reinforcement through common procurement act (EDIRPA); Act in Support of Ammunition Production (ASAP); Defence Research Action (DEFRA); Royal Military Academy, Royal Higher Institute for Defence and other direct projects at Belgian Defence; Defence Innovation accelerator for the North Atlantic (DIANA).
[2] e.g.: BSDI; Skywin; FLAG; EWA; Pole Mecatech D&S; Belgospace; BAG. See more on this *infra.*
[3] Via open source, as the regional export control services do not share this info publicly.
[4] e.g. Belgian Defence and Security association days; EUROSATORY; EURONAVAL.

(13) Obtained via stakeholders (Federal Public Service Economy, The Belgian National Armaments Director office).
(14) Any legal entity participating in the impact survey shared on LinkedIn and the website of the Royal Higher Institute for Defence, which were not yet included via the above sources and indicated they have DTIB-relevant activities.
From these sources, we derive a list of legal entities which forms the basis for the main file that can be used to link to other datasets for further analysis. We link these via the legal entity number of the Crossroad Bank of Enterprises of the Federal Public Service Economy (FPS Economy) in order to further connect to the required datasets for the analysis."

- Extract: 'Step 1: Obtaining legal entities from relevant sources' in Operationalizing the BE-DTIB definition: mapping and aggregate analysis.

Results – Composition of BE-DTIB actor list to further source data for.

Database prototyping

Activity and method – The database prototype developed for this study integrates a comprehensive set of methods and sources to map and analyze the Belgian Defence Technological and Industrial Base (BE-DTIB). Data were sourced from the Belfirst database, which consolidates annual accounts filed with the National Bank of Belgium (NBB), data from the FPS Economy's Crossroads Bank of Enterprises, and the Belgian Official Journal. Data was sourced as well directly from these sources where required. The core dataset was further supplemented through open data from the Federal Public Service Social Security and further enhanced through manual data collection, desk research, and data obtained through python scripting.

To address data gaps, particularly for small companies exempt from full reporting, imputation methods were employed. For example, missing values for micro-entities were inferred using thresholds (e.g., turnover of 700k EUR) or averages based on size categories, ensuring that the aggregated dataset accurately represented the BE-DTIB without skewing the overall analysis. Employment figures were similarly addressed, using the maximum thresholds (e.g., 9 FTEs) where direct data were unavailable. Another essential refinement was the correction of impact allocations from head-office locations to the primary activity locations. Data from the Federal Public Service Social Security's employment registry facilitated this adjustment, mitigating biases introduced by the concentration of headquarters in Brussels and reflecting more accurate regional contributions.

The estimation of DTIB-specific proportions, such as defence-related turnover and employment, sourced from a survey to legal entities and desk research, relies on a stratified weighted averaging method to infer missing data points. This approach provided robust imputations by accounting for heterogeneity across strata defined by characteristics such as geographic location, association membership, and size. The proportions per legal entity can then be employed for aggregated impact estimations. By employing advanced stratified averaging and a robust categorization framework, the database prototype offers an empirically grounded, scalable tool for analysing the BE-DTIB. This methodology not only enhances understanding but also serves as a model for future studies in defence-related industrial mapping.

Legal entities were categorized according to the European Defence Agency's (EDA) CapTech framework, of which the categories largely align with the Belgian Defence Industrial and Research

Strategy their domains/areas (BE-DIRS). This categorization ensured relevance to EU defence priorities, integrating technology roadmaps and capability needs. The CapTech framework's granularity further facilitates the identification of what CapTechs are a key focus within the BE-DTIB, fostering alignment with European value chains.

While the methods employed were rigorous, challenges included limited publicly available data on defence-specific activities and the potential misalignment of the latest available DTIB-related proportions for legal entities that were obtained from desk research as opposed to those obtained via the survey. Future research could address these limitations by enhancing longitudinal data collection and continue capturing information on DTIB-related proportions (e.g. % turnover derived from DTIB-related activities within total turnover) for previous years .

Results – Database prototype. For information of the analysis, see *'Operationalizing the definition'* above.

Technical construction of a (sharable) database

Activity and method – A preliminary database merging several files has been developed in PowerBi by BEPIDS as a draft. Given the size of the datasets, PowerBi is sufficient for the development of a combined database after which dashboard viewing and data access can be truncated based on access rights. As Belgian Defence has PowerBi as a tool in its Microsoft enterprise suite, this may be the most affordable and scalable solution. The construction of such a PowerBi database and accompanying dashboards fall under post-project steps, not under the BEPIDS-project itself. It may be continued post-project depending on the needs and preferences of the Royal Higher Institute of Belgian Defence (RHID) and other stakeholders.

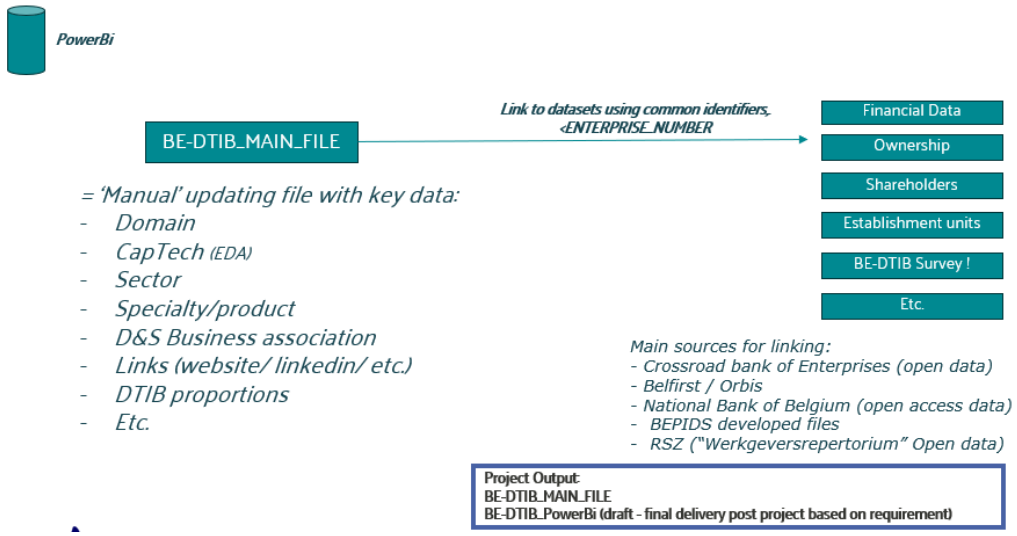

Figure 3. *Simplified Data scheme of the draft PowerBi backend. Source: BEPIDS Final Event presentation.*

Results – Draft dashboard

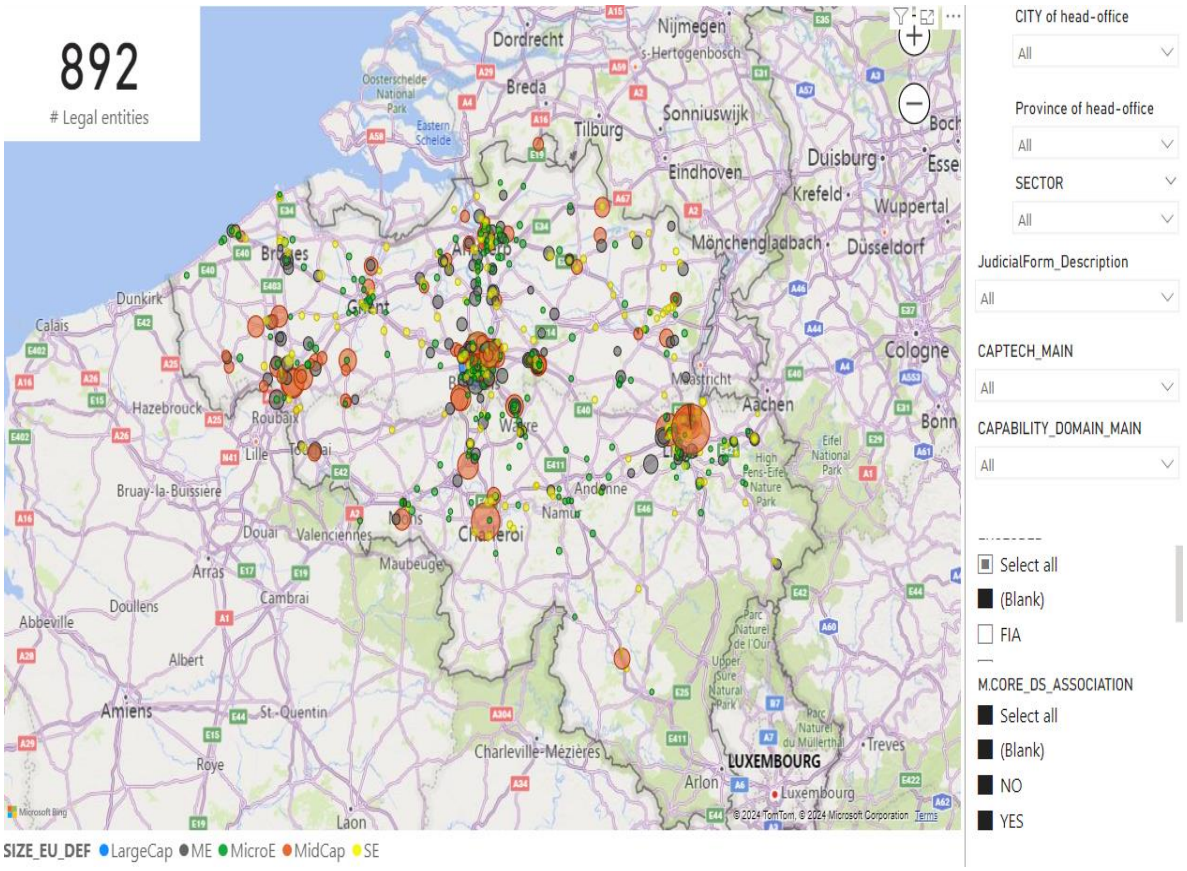

Figure 4. *Example of page of the draft dashboard – mapping per head-office location.*

RESEARCH OBJECTIVE 3: SUPPORT MECHANISMS

Below, we shortly describe the activities, methodology and key results of the main research output for this package. For other relevant output for this package (blogs, short essays), see *'section 6: Publications'* below.

Art 346 paper

Activity & Method – This article examines relevant case-law of the EU Courts to assess to what extent Article 346(1)(b) on the Functioning of the European Union (TFEU) could be employed as an avenue ("loophole") for Member States to financially support strategic autonomy, thereby avoiding restrictions set by EU State aid.

> *"The current geopolitical situation has led to various calls for investment in Europe's strategic autonomy, for example with regard to the defence and security sector. However, the possibility for Member States to grant financial support is restricted by EU State aid law, leading some stakeholders to argue that there is a friction between the geopolitical need to invest in*

Europe's strategic autonomy on the one hand, and EU State aid law on the other. In this contribution, we examine whether Member States could avoid and/or alleviate this friction by invoking Article 346(1)(b) TFEU. This Treaty provision, often overlooked by legal scholars, stipulates that Member States may, in principle, take all measures they consider necessary for the protection of their essential security interests, without having to consider EU State aid law. By analysing relevant case-law of the EU Courts, however, we argue that the aforementioned Treaty provision has a limited scope, and that, therefore, Member States, in principle, must comply with the EU State aid rules when they contribute to Europe's strategic autonomy." – p.150

Results - Through analyzing relevant case-law of the EU courts we find that Article 346(1)(b) TFEU is strictly interpreted, hence having a limited scope. All criteria below must be met and clearly argued to enable invoking Article 346(1)(b) as an escape clause from the rules of EU state aid law.

- *'Essential security interests (ESI)'*: While the concept is not defined by EU law and can thus be filled in at the discretion of the member state, the EU courts stated that this discretion is not absolute. Only interests primarily arising from security considerations are covered.

- *'Production of or trade in arms, munitions and war material' (Military goods*): article 346(1) TFEU can only be invoked for goods listed in the 1958 list or any new goods that can be placed under one of 15 the categories contained in the list. Art 346(1) can only be invoked when these products are intended for specifically military purposes (i.e. the subjective component) and if goods are designed, developed or adapted (e.g. any of the dual-use products falling under one of the 15 categories) towards that purpose (i.e. the objective component).

- *'Necessary' (necessary, appropriate and proportionate)*: member states must prove invoking art 346(1) is necessary and appropriate to safeguard its 'essential security interests (ESI)'. The measure must be proportionate according to what is necessary and appropriate to secure the ESI. The Treaty provision exempts only specific measures, with a clearly (self-)defined security interest. Hence Member States cannot employ it for broad policy.

- Prevention of Civil market distortion: Member States must ensure that aid granted under Article 346(1)(b) TFEU does not distort the civil market. This can be done by requiring recipients to maintain a separate accounting system that allows verification that the aid only favors its military goods. The recipient cannot use the funds to support its civil market activities.

Despite the indication of a strict interpretation by the EU courts, in practice there seem to be little actions for the (mis)use of article 346(1)(b). (Law vs practice):

- Member states invoke art 346(1)(b) TFEU in a broad manner to support their national defence industrial base.
- Infringement proceeding against misuse appear uncommon. In case of infringement proceeding, the cases are often stopped after negotiations with the Member States. Cases where the commission found the article to be incorrectly applied are few.

- Security decisions of Member States are politically sensitive, making the Commission hesitant to enforce the law.

Best practices:

- While it is not a legal requirement, Member States should consult with the Commission in advance to enable addressing any issues that may lead to infringement proceedings. Member states that are "too compliant" (i.e. do not invoke Art 346(1)(b)) compared to their peers can take full use of this to shape measures while remaining compliant.

Where possible, preference should go to employing other derogations from the State aid ban in Article 107(1) TFEU (see below).

State aid report

Activity – *"This report provides a basic understanding of the State aid rules of the European Union ('EU'). These rules stipulate that it is in principle prohibited for EU Member States to grant State aid to one or more undertakings (Article 107(1) of the Treaty on the Functioning of the European Union ('TFEU')). The main purpose of this report is to develop a framework setting out what aid EU Member States may grant in line with said State aid rules [...] Given the scope of the BEPIDS Project and the DIRS, the report will mainly focus on measures aimed at supporting research, development, and innovations ('R&D&I') ." – p.1*

Method – *"The research for this report has been conducted by employing a classic legal positivist research approach, which is characterised by the traditional legal research strategies of reviewing legally binding instruments, case law of European and national courts, the decisional practice of the Commission, policy documents of the European and national authorities, literature, etc." – p.4*

Results – As noted in the paper on article 346 TFEU above, the scope and applicability of the derogation is limited by the strict criteria that must be met. In general Belgium will have to rely on EU State Aid rules (and procurement rules) to support Research, Development and Innovation (R&D&I) for the DIRS. EU state aid law provides several key derogations from the State aid ban of Article 107(1) TFEU to grant R&D&I aid applicable for the Defence-related Technological and Industrial Base.

- 'De minimis aid' (300k max over a period of three tax years)
- GBER categories - e.g.: aid for research and development projects (Article 25), aid for projects awarded a Seal of Excellence quality label (Article 25a), aid for Marie Sklodowska-Curie actions and ERC Proof of Concept actions (Article 25b), aid involved in co-funded research and development projects (Article 25c), aid for Teaming actions (Article 25d), aid involved in the co-funding of projects supported by the European Defence Fund or the European Defence Industrial Development Programme investment (Article 25e), aid for research infrastructures (Article 26), investment aid for testing and experimentation infrastructure (Article 26a), said for innovation clusters (Article 27), innovation aid for SMEs (Article 28), aid for process and organisation innovation (Article 29), and aid for research and development in the fisheries and aquaculture sector (Article 30).
- R&D&I Framework: aid for R&D projects, aid for feasibility studies, aid for the construction and upgrade of research infrastructure, aid for the construction and upgrade of testing and

experimentation infrastructure, aid for innovations activities, aid for process and organisation innovation and aid for innovation clusters

Important Projects of Common European Interest - IPCEI: the IPCEI Framework enables support for pan-EU projects supporting EU policies and strategies such as the New Industrial strategy for Europe, the Digital Strategy, European Green deal, etc. Importantly, it specifies its application for large projects with industrial policy objectives seeking to (re)balance strategic dependency.

Policy Toolkit

The *policy toolkit* provides a practical tool with steps and questions made during the process when considering support to or procurement from legal entities. Policy makers or procurement officers can use the tool as inspiration and follow the links to key articles serving as derogations under specific circumstances and/or design choices. Given the practical intent of the output, the methodology remains limited to outlining key derogations in accordance with the purpose of the measure and design thereof.

Paper Research and Development in the Defence Sector: How to Close the Commercialisation Gap?

In this article we explore how the public procurement rules can be used to mend this investment gap by combining the contracting authority's investment in R&D and procurement of the final products and services. "The Defence and Security Directive offers several possibilities for making such combined transactions and the rules are more lenient than under the general public procurement directives. Where the possibilities for combining investment in R&D and procurement of the final products/services bring the contracts outside the scope of the Defence and Security Directive, the Treaties and the principles of equal treatment and transparency require competition for the selection of the economic operator, unless the transaction relating to the R&D services is in reality merely the grating of State aid. This paper concludes that there are many possibilities to design support for R&D in the defence sector upfront to include the potential procurement of the final products and services, to ensure that the fruits of the support to R&D can be reaped."

EDIS – Blog

In the CELIS-blog "Can the "buy European" requirement counter the challenges of the European Defence Technological and Industrial Base? A critical perspective on EDIS and EDIP", we analyse whether the 'buy European' requirement.

4. SCIENTIFIC RESULTS AND RECOMMENDATIONS

Key Recommendations

- For an effective use of the DTIB and underlying Industrial base, Wallonia's focus on defence should be further leveraged, while Flanders and Brussels should primarily focus on promoting spill-overs of dual-use technologies and motivate legal entities to more proactively position themselves as being relevant for the BE-EU-NATO DTIB.

  "While the analysis in this paper is too limited on its own to sculpt detailed policy advice, some key implications for policy can be outlined. Given Wallonia's higher GVA-to-turnover ratio, indicating greater economic efficiency per unit of turnover, policies can lean into this advantage to further support legal entities indicating the defence market as core to their activities. The higher focus on DTIB-related activities for the legal entities mapped to Wallonia suggests they are on the aggregate better positioned to increase output when demand from defence actors increases.
  With a larger number of legal entities, Flanders plays a significant role in the DTIB. However, many entities do not consider defense as their primary activity. Policies aimed at increasing the positioning of the DTIB should encourage these legal entities to integrate more deeply into the defense value chain, through incentives for spill-overs of dual-use technologies and by more proactively seeking their participation in the DTIB. The latter applies to the Brussels Capital Region as well. As indicated above (see: Section 'CapTechs per Region'), existing mechanisms, aligning with the focus domains of the regions, can be leveraged to do so.

- Incorporate/promote focus within current cluster (e.g. the 'Speerpuntclusters' in Flanders, if doing so is permissible by the currently signed 'clusterpacts'). Aside from the defence-focused clustering, also existing non-defence focused clustering mechanisms on a regional level could be leveraged to contribute to the DTIB by including defence more actively in these mechanisms to promotes spill-overs.

- Consider aligning the DIRS to leverage Belgian strengths within the EU defence ecosystem and to align with key Belgian defence aspects such as the underlying industrial and technological base of the main self-identified defence industry in Belgium and its export position.

  [...] the funding obtained by Belgian legal entities in the EDF and its precursors is only partially aligned to key defence characteristics of Belgium. The latter implies there is room for further considerations within the BE-DIRS program. On the one hand the DIRS can choose to lean into supporting capabilities which have competitive strength in the EDF and its precursors as well as within defence-related exports (e.g. 'Ground Vehicles and related components'), which are currently not a key focus in the DIRS. On the other hand, it can also use the findings concerning where the BE-DTIB currently lacks positioning within the EDF to support domestic programs and be more proactive multinational cooperation, to rejuvenate the participation of parts of

the BE-DTIB within the EDTIB deemed key for Belgium. A key example of this is for the DIRS domain 'next generation combat aircraft technology', which had the lowest competitive position for Belgium across all the EDF categories, yet is vital to maintain a positioning in if Belgium wants to maintain an edge and competitiveness to its defence-related aeronautics industry. This is moreover the case given that 'Aircraft, UAVs and related components' (ML10) is a top defence export category for Belgium in terms of absolute value. The recent call for the Belgian NGCAT program,[43] which will provide funding for R&D related to Next Generation Combat Air Technologies (NGCAT), is a good step to correct the discrepancy between its importance for Belgium and lack of positioning within the emerging EU value chains as seen through the EDF and its precursors. However, long-term success will also necessitate proactively positioning Belgian legal entities within value chains being developed in multinational development programs (e.g. The EU Future Combat Air System – FCAS), which is dependent on political decision-making and follow-through of made commitments.[44]

- Extract 'Belgium within European competitive cooperative defence ecosystem'

- Ensure that domestic defence-specific funding programs complement EU funding.

"Policymakers may also wish to emphasize that domestic defence-specific funding programs (e.g. DEFRA, NGCAT, Inno4Def) are not intended to replace EU funding, but rather to complement it. Belgian legal entities should be expected to pursue funding via EU and NATO defence funding programs and initiatives, as these aligns with broader defence requirements and facilitate positioning within new value chains. For lower level TRLs (Technology Readiness Levels), funding can be allocated for projects where participation in EU or multinational programs is a realistic future expectation, while those successful in obtaining EU funding could be rewarded by receiving funding continuation to develop capabilities. Domestic funding programs can then serve as supplementary support, filling gaps where EU funding is not available or addressing national priorities that are not sufficiently covered by the scope of EU funding programs. This approach ensures optimal resource allocation by continuing to incentivize EDF participation, thus strengthening Belgium's role in EU defence initiatives and avoiding duplication of efforts, thereby contributing to a more efficient EDTIB and the BE-DTIB's positioning within it."

- Extract 'Belgium within European competitive cooperative defence ecosystem'

- Consider branching out delta financing alignment (cfr. DIANA & NATO innovation fund interfederal funding agreement) to other defence programmes such as EDF, but also to BE-DIRS and (potential) Belgian participation in FCAS.*

Finally, it may be valuable to explore the possibility of expanding delta financing decisions to include regional authorities alongside the federal government. While the federal government, in coordination with Belgian Defence and the Federal Public Service (FPS) Economy, currently handles the co-financing of EDF projects, the regional governments also have an economic and industrial policy interest in supporting certain defence-related initiatives. Each region has its

own strategic focus on specific sectors such as aerospace, materials, or cybersecurity, which contribute to an overall industrial and technological base that can contribute, both direct and indirectly, to European and NATO defence requirements. By integrating the regions into the decision-making process, or at minimum by providing the option to the regions to add co-financing to projects the federal government did not co-finance to the full extent, there is an opportunity to better incorporate regional industrial and technological strengths and objectives with EU and NATO defence requirements. This expansion of co-financing would be similar to the recent DIANA and NATO innovation fund interfederal funding agreement, which established funding cooperation between Flanders, Wallonia and the federal state.[45] Furthermore, similar initiatives could be taken for the BE-DIRS, as well as for the foreseen participation in the FCAS program.

- Extract 'Belgium within European competitive cooperative defence ecosystem'

- Establish an Interfederal Coordination platform (cfr. Voorstel interfederale samenwerking Defensie), preferably using the BE-DIRS governance mechanism, to align and coordinate cooperation between the different federated entities with distinct competencies.

To ensure alignment with the DIRS, it is sensible to avoid setting up distinct cooperation mechanisms per interfederal cooperation agreement, but rather to include these within, or add these to, the DIRS governance mechanisms where possible. This not only increases efficiency in terms of saving time and costs, but also enables a better flow of information and cooperation between the parties required to develop a stronger BE-DTIB.[46] From a governance perspective, it is also more likely to increase transparency on the decision-making process and enable tracking of the effectiveness of support. It must be noted that calls for an interfederal cooperation mechanism for defence industry and innovation are not new.[47] Currently, there is a 'proposal for strengthening interfederal cooperation on security and defence for defence industry and defence innovation' pending in the Belgian house of representatives. At the time of this writing it does not seem likely the proposal will reach an agreement within the current legislative period before the 2024 elections, meaning it will need to be re-introduced in the next legislative session.

- Extract 'Belgium within European competitive cooperative defence ecosystem'

- Employ article 346(1)(b) TFEU where required to secure Essential Security Interests and consult the EU Commission to ensure alignment.

The paper on article 346(1)(b) indicates the strict interpretation concerning the breath and scope of article 346(1)(b) TFEU and the limits to the freedom to define 'Essential Security Interest', which should be respected to comply with the interpretation of the EU Courts. Nevertheless, the EU Commission can be consulted to address issues there may be with the use of article 346 TFEU for certain support measures or procurement, thereby preventing

possible infringement procedures. Hence, Belgium should not shy away from using the derogation within the context to secure its own 'Essential Security Interests'.

- Where possible, it is preferred to employ state aid derogations from the State aid ban in Article 107(1) TFEU (see: State aid report results *Supra*) and exemptions included in the EU Defence and Security Directive for procurement (See: toolbox). Especially for regional competences, the State aid framework (see: *Supra*) can be employed where required and deemed necessary to contribute to strategic autonomy and to EU/NATO defence industrial and innovative capabilities/capacity.

- Given Belgium's low portion of R&D budget allocation to defence, consider shifting a portion of the R&D budget to defence to align with peers and to reach the commitments made by Belgium concerning spending on Defence Research & Technology (R&T).

- Communicate clearly on the need of Higher Education Institutions, especially those of the Flemish community to be an active player.

  While researching this aspect was not an aim or focus of the BEPIDS project, another raised issue that emerged in contacts with stakeholders was that there remains an unwillingness of Flemish universities to research technologies that could be used for military purposes. Many still in practice adhere to the old (IWT-richtlijn) ethos instead of the Muyters richtlijn.

- Use best practices in data management and reporting by including legal entity numbers from the Crossroad Bank of Enterprises (CBE) when setting up databases or in reporting.

  Much time is lost cleaning datasets when CBE numbers are not employed. While methods can estimate linking based on other characteristics (e.g. closeness of name), this is insufficient and requires further cleaning to ensure linking is correct and done to the right Legal Entity (as companies use the same base name for subsidiaries). The Full Time Equivalents (FTEs) saved for researchers and businesses from implementing this simple best practice in any reporting should not be underestimated. If CBE numbers are consistently used in reporting, the data can be pulled and linked directly within files with the matching entity values.

- Further research how to engage the financial markets to avoid the "valley of death".

  While researching this aspect was not an aim or focus of the BEPIDS project, a raised issue that emerged in contacts with stakeholders was the difficulty to scale up once a company comes out of the R&D stage (i.e. "the valley of death").

- Further research and address ESG-interpretation concerns (cfr. EDIS on the misinterpretation of ESG for defence-related activities).

- Further research the impact of support for defence-related research and development and its economic, scientific and social return.

Impact on Scientific Knowledge

The contribution of the BEPIDS project is threefold. The first contribution relates to the methodology used to establish the database where different methods are used and complementary databases are combined. The methodology used to define and map the sector can be used in different domains and sectors as well so exceeds the domain of defence economics. The main contribution is off course to this strand of the scientific literature where the project adds to other existing mappings of other national industrial bases. The third contribution follows from the second work package and relates to the juridical analysis of the use of different support measures.

Impact on Policy and Public Services --- Impact on Economy

While the project in itself doesn't directly impact our economy, the objective of the project is to deliver outputs that can help to increase the contribution and value added of the sector the Belgian economy. Moreover, by providing our administrations with a concise but clear toolkit on the different possible support measures to use, the project has a clear policy input.

The project also resulted in different collaborations, e.g. with VARIO and FOD economy.

5. DISSEMINATION AND VALORISATION

Conversational Seminars and workshops with stakeholders

- 24/11/22: BEPIDS Lunch seminar and kick-off:
  - As opposed to the approach mentioned in the BEPIDS proposal, we did not opt for structured conversational workshops, as a meeting with Agoria-BSDI and other contacts indicated a low willingness for this approach. Hence, we opted for a seminar approach with an open Q&A during which stakeholders provided feedback. After the seminars, an informal networking event provided us with more feedback that pinpointed pain-points for the BE-DTIB. More info on the event can be found in the following link: https://www.defence-institute.be/en/defence-industry-and-research-strategy/the-belgian-economic-potential-in-the-industry-of-defence-and-security/

- 24/02/23: APEC seminar: Presentation of the project and some preliminary outcomes.

- 01/03/23: Presentation of the project at EWI Flanders.

- 08/03/23: DEML Research Seminar: Presentation of the project to DEML.

- 13/12/23: BEPIDS Event: 'BE-DTIB triple helix day at the RMA', organized by BEPIDS in cooperation with the RMA and AGORIA BSDI.
  - *Presentation 1: Overview of the BE-DTIB: key preliminary findings.*
  - *Presentation 2: Article 346 TFEU and alternatives: support to R&D in the defence sector and subsequent acquisition.*
  - More info on the event can be found via the following link: https://www.rma.ac.be/nl/belgian-defence-technological-and-industrial-base-day-in-de-kms

- 22-23/04/24: Prague workshop on the Dynamics of the European Defence Technological and Industrial Base.
  - *Presentation: National specificities as lever and obstacles*? *How to lever the EU toolbox?*

- 10/07/24: Meeting with VARIO to provide input for a report concerning the opportunities of and needs for the BE-DTIB in Flanders.

- 08/10/24: the BEPIDS project presented its results in a webinar organized by the RMA. This webinar is accessible to the public and the video recording has been disseminated afterwards.

- 17/12/24: A final symposium took place on 17 December 2024, where we presented results and recommendations.

Academic communication strategy

The following presentations at academic conferences have been completed:

- *"Defining and outlining inclusion criteria for the BE-DTIB"*, presented by Gregory Kegels at the International Conference on Economics and Security (ICES2023) in Stockholm, Sweden, June 2023.

- *"Research and development to fulfil the needs of the State in the defence sector: how to close the circle?"* presented by Grith Skovgaard Ølykke*:* at Global Revolution: Public Procurement, session on defence procurement, Nottingham, June 2024.

- "Analysis of the Belgian Defence technological and Industrial Base within the EU Defence ecosystem", presented by Gregory Kegels at the Bordeaux Workshop on Defence Economics, June 2024.

6. ACADEMIC PUBLICATIONS, WORKING PAPERS AND REPORTS

Mapping

[1] Kegels, G. , Buts, C. , & Du Bois, C. (2024). Defining the BE-DTIB through Multiple Case Study Analysis. *BEPIDS project*. [Working paper - Link]

[2] Kegels, G. , Buts, C. , & Du Bois, C. (2024). Operationalizing the BE-DTIB definition: mapping and analysis of the BE-DTIB. *BEPIDS Project*. [Working paper - Link]

[3] Kegels, G. , Buts, C. , & Du Bois, C. (2024). Belgium in the EU defence ecosystem: EDF and precursor analysis. *BEPIDS project*. [Working paper - Link]

Support

[4] De Cock, W. , Kegels, G. , Buts, C. , & Du Bois, C. (2023). Article 346(1) TFEU and Strategic Autonomy: A Possible Loophole to Grant State Aid in the Context of Geopolitical Struggles?. *European State Aid Law Quarterly Volume 22, Issue 2*, pp. 150 – 160. DOI: 10.21552/estal/2023/2/5 [academic publication - Link]

[5] De Cock W., Kegels G., Buts C., Du Bois C. (2023). A state aid framework. *BEPIDS project*. [BEPIDS report - Link]

[6] Ølykke, G. S., et al. (2024). A policy toolkit for the BE-DTIB. *BEPIDS project.* [Link]

[7] Ølykke, G. S. (2024) R&D in the Defence Sector: How to Close the commercialization Gap? *European Procurement & Public Private Partnership Law Review*, 19(3). [academic publication - Link]

[8] Ølykke, G. S., et al. (2024) Can the "buy European" requirement counter the challenges of the European Defence Technological and Industrial Base? A critical perspective on EDIS and EDIP. *Celis Institute.* [Blog post - Link]

[9] Ølykke, G. S. (2024), The European Defence Industrial Strategy and its implementing regulation viewed through procurement law spectacles, *Public Procurement Law Review, 33(4)*. [academic publication - Link; Link]

[10] Kegels, G. (2024). EDIS: What does it mean for Belgium? *GeoEconomics group.* [Blog post Link]

[11] Kegels, G. (2024). Access to finance for the BE-DTIB: time for action. *GeoEconomics group.* [Opinion piece Link]

Other

Interview in Trends: Mouton, A. (2025). Groeikansen en werkpunten voor de Belgische defensie industrie. *Trends*. [Link]

Input for a VARIO report: *Opportuniteiten en noden voor een brede Vlaamse Defensie-Industrie en Defensie Innovatie Deel 1 & Deel 2.* [Link 1] [Link 2]

For other output and presentations, see the GeoEconomics Group Website [Link]

**Academic publications are available via the publishing journal*

***BEPIDS reports and output are uploaded to : https://www.geoeconomicsgroup.be/bepids*

7. ACKNOWLEDGEMENTS

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