

# MODELLING DEFENCE INDUSTRY GOVERNANCE IN SMALL STATES: BUILDING AN ANALYTICAL TOOL

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**Abstract.** This study addresses the questions that small European states face when weighing the different ways to analyse their defence industrial policy options, i.e. when trying to mould their respective governance decisions. Although a wider industry-oriented model has already been developed, addressing defence industry specificities reveals a research gap. This article builds a defence industry-specific layer for a technology-based industry governance model for small states. An earlier model for priority-setting in small economies is amended with specific categories found relevant to the defence industry. The article draws mainly on the experience of Estonia. We argue that next to global R&D trends, geopolitical developments should not be ignored either. Also, in addition to existing technological and industrial specialisation, one should also take into account the domestic defence industrial market features. Finally, while looking at growing markets, trends in modern warfare should also be carefully followed.

**Keywords:** defence industry; governance; small states

## 1. Introduction

As far as the economic and technological aspects are concerned, the defence industry may seem like quite an ordinary industry. However, a closer look reveals the peculiar status it carries. States tend to keep this sector under tighter control than is ordinarily the case with other sectors. Also, domestic markets for defence equipment and services are more heavily regulated, entailing *inter alia* that domestic and especially international investments are monitored in detail. Likewise, states usually keep an eye on defence exports and often regulate them in a stricter manner than they do for other goods. Drawing on the above, this article proposes to elicit the defence industry-specific categories that small states need to consider when setting their policy priorities.

But next to the defence sector as such, the size of states and their respective defence markets is also a vital component that determine the governance

logic. Defence industry's research often focuses on major arms-producing companies and their markets (e.g. Meijer 2010; Hartley 2010)<sup>1</sup>. By implication, this means that small states have escaped closer scrutiny. The first extensive edition on the economics of the defence industry (Hartley, Belin 2020) only included a couple of smaller states. In this context, the aim of the current article is to reflect on the defence industry governance categories and options for small European states in the contemporary security environment. Thus, a research gap appears when addressing the defence industry governance specificities of small states.

The probable reason why the defence industry in small states has remained an understudied field lies in the fact that the volume and impact of the production of small states is hardly noteworthy on a global scale. Still, the defence industry is a vital part of a state's economy and security. Likewise, even if mostly SME-s, companies that manufacture for the defence industry remain a vital part of global value chains. As the recent crises have shown, issues with SME-s can cause serious problems. Therefore, assuming the perspective of a small state, this article discusses the factors and conditions that should be taken into account to understand the defence industry of a small state in its complexity.

In particular, this study focuses on the example of Estonia. One way to scrutinize the defence industry is from the perspective of technology and innovation. For this purpose, the authors developed a wider industry-oriented model of how industrial governance priorities could be set in small states. Therefore, while relying on an earlier technology-based model, we attempt to add a defence-oriented governance layer to it. And it is the second layer—since it is defence-specific—that will be more specifically studied in this article. In other words, the article attempts to sketch an amended version of the priority-setting model for the governance of the industries of small states, with a particular view on the defence sector.

In this regard, we decided to rely on our previous work. As for the technological side, the authors have previously developed a governance model for small catching-up economies, labelling it an 'intelligent piggybacking' approach. Thereby, we acknowledge that the smallness of a country can be a source of multiple constraints on innovation and economic development. As mentioned above, in order to address the defence industry governance of small states, we have upgraded the original framework and added an extra

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<sup>1</sup> At request of the authors, an in-text referencing style is used.

layer to it primarily concerning geopolitical and governance-related aspects. This extra layer has been moulded by generalizing a study on the Estonian defence industry governance practice. We have been interested in mapping the main non-technological factors that influence the Estonian defence industry policy. This extra layer will also be the main focus of this article.

As for the structure, we will first outline theoretical considerations, then reveal the assumptions of the earlier model, and finally offer a framework or governance model for the defence industries of small states.

## 2. Theoretical Framework: Governance of the Defence Industry in Small States

The defence industry is a moving target for continuous analyses due to its inner complexity, but also because of its amorphous nature. As Alyson Bailes from the Stockholm International Peace Research Institute (SIPRI) has put it,

*Part of the challenge with arms industry and other defence production is that it is, in several senses, a hybrid business. Many products are uniquely designed for the military, but a growing number of advanced techniques are dual- or multi-use. Parts of the industry worldwide remain fully or partially state owned while others are shareholder owned and compete on an open market. (Surry, 2006, p. 4)*

Indeed, an increasing amount of dual-use goods and services produced in the defence industry is puzzling. Therefore, instead of and in parallel with “the defence industry,” this heterogenous group of companies is named “the defence-related industry”, “the defence and security-related industry” or “defence-related companies” (Berrebi, Klor 2010). Thus, a clear line of demarcation is hard to draw between defence and non-defence products and services, and this is made even more complex with emerging hybrid threats where, among others, computer programmes or information narratives can be used for attack or defence.

**The defence industry is, nevertheless, to a great degree an economic phenomenon.** In this regard, one can approach the defence industry by adding to it concepts from the field of economics. Especially in the last decade, significant paradigm shifts have emerged in economics to explain disparities in living standards within and between nations. The key premise of frontier economics research is that all economic activities are not qualitatively the same. Evolutionary economics maintains that, in order to increase

living standards, nations should increase the knowledge intensity of products. According to this vantage point, it is the composition of the export portfolio of economies and their role in global value chains (GVC) that determine the living standards of cities, regions, and whole nations<sup>2</sup>.

In a globalised world, the smallness of a country adds an extra layer of complexity (Armstrong, Read 2003; Edquist, Hommen 2008; Kattel et al. 2010; contrast with Easterly, Kraay 2000). Namely, small states do not have the financial capabilities or human resources needed to invest in cutting-edge science, research, and development. Small states (particularly less-developed ones) have small domestic markets that limit economies of scale and geographical agglomerations. In addition, small domestic markets and a dependence on export threatens small states with over-specialisation, lock-in, and an insufficient diversification of the economic structure<sup>3</sup>. Small states might also have limited administrative capacities (Kattel et al. 2010; Randma-Liiv 2002).

Along with an increasing fragmentation and the delocalisation of industry value chains, we should also mention the ‘small country squeeze’ as defined by Levinsen and Kristensen (1983). It refers to the trend that old large industrial countries prevail in fields related to complex technologies and products, and large developing countries dominate in manufacturing simple products and technologies. Thus, small states are squeezed from both sides, and this has become even more intensive over time. It is impossible for small economies—and often for medium-size ones—to cover the whole spectrum of cutting-edge science and technology that is needed to nurture new basic technologies. The concentration of resources required to develop new high-tech industries is increasingly risky, as is the inability to compete in scale-intensive mass production with larger emerging economies that have abundant ‘cheap’ labour (see also Walsh 1988).

Smallness entails a fairly limited diversification of innovative and productive capabilities. This may lead—as exemplified by the dominance of Nokia in the Finnish economy—to a strong domination of individual industries in a

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<sup>2</sup> See, e.g. **Hidalgo, C. A.; Klingler, B.; Barabasi A.-L.; Hausmann, R.** 2007. The Product Space Conditions the Development of Nations. – *Science*, Vol. 317, Issue 5837, pp. 482–487; **Brummitt, C. D.; Ponte, S.; Gereffi, G.; Raj-Reichert, G.** 2019. *Handbook on Global Value Chains*, Cheltenham, UK: Edward Elgar Publishing; **Foray, D.; David, P. A.; Hall, B.** 2011. *Smart Specialisation: From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation*. MTEI Working Paper, Lausanne: Ecole Polytechnique Federale de Lausanne.

<sup>3</sup> For further discussion, see **Freeman, Lundvall** 1988; **Kattel et al.** 2010; **Robinson** 1963; **Walsh** 1988.

country's economic development as well as to a notable concentration of risks if a dominant industry declines (e.g. Ali-Yrkkö 2010).

### **3. Priority setting in the Industrial Policy of Small States**

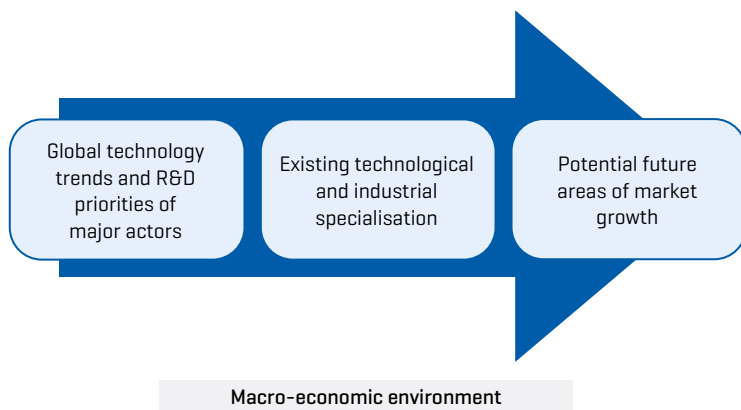
Well-informed priority setting on the level of both individual businesses and public policy has become even more important for a successful development. In comparison to larger advanced economies, the dominance of imported technologies and the importance of export markets, however, make the priority-setting and strategic policy-planning process very different for small countries.

The question remains: how to select an area with breakthrough scientific and economic potential? Usually, this requires a foresight approach. Literature on foresight is extensive, focusing on certain social science methods, e.g. scenario writing, vision building, workshops or Delphi surveys (Gavigan et al. 2001; Georghiou et al. 2008). There is a comprehensive toolbox of methodologies. In addition to using electronic tools, current trends in the foresight domain are moving toward integrating various quantitative and qualitative methodologies to design national foresight exercises and increase cross-border and thematic foresight activities. Following the example of Western Europe and many other advanced economies, the 2000s saw a rise in the popularity of foresight practices all over the world, including in many Central and Eastern European (CEE) countries. In CEE, using foresight as a priority-setting tool was heavily influenced by the technology foresight practices of North-Western Europe (Keenan, Popper 2008: 19).

However, literature on economic development distinguishes between advanced economies that operate at the cutting edge of new technology development, and catching-up economies that are still striving to reach the technological and living standards of the advanced economies. This distinction means that the sources on technological learning, innovation and economic development are very different in these two groups of economies (see Tiits et al. 2008 on catching up in CEE countries). We agree with Havas (2003a) and Porter (2010) who caution that there is no single way to conduct effective foresight exercises and that different foresight endeavours call for the application of different foresight methods. It is, indeed, well established in public-policy literature that policies "borrowed" from different times or states always need to be adapted before they can be properly used. A similar critical assessment is necessary for adopting policy-making practices or policy-intelligence tools from elsewhere (Georghiou et al. 2008: 319–341; Havas 2003b; Rose 1993).

Building on previous research, we developed a governance model for small catching-up economies that should opt for an ‘intelligent piggybacking’ approach to governance, acknowledging that a small size can be a source of multiple constraints on innovation and economic development of a country.

Such an ‘intelligent piggybacking’ approach to governance focuses on mapping global development trajectories and finding ways to restructure and upgrade existing technological and manufacturing capabilities. With such an approach, the key focus shifts from science and technology to an upgrade of existing technological and manufacturing capabilities. Informed discussions on future development visions and scenarios take place within a broader context of global advancement in science and technology, international trade and industrial dynamics, and future socio-economic challenges. Overall, this approach is a more comprehensive and suitable analytical framework for priority-setting in industrial development policy (Tiits, Kalvet 2013).



**Figure 1.** A priority-setting analytical framework for small economies

Source: Tiits and Kalvet, 2013

In the ‘intelligent piggybacking’ approach, priority-setting for a strategy should carefully consider the following aspects.

- **Global technology trends:** They are, for the most part, set in larger advanced economies and characterise major future technological possibilities; in this respect, literature on a techno-economic paradigm (Freeman, Perez 1988; Perez 2002) offers an excellent framework for analysing the evolution of long-term priorities in science and technology, and in global industrial dynamics brought about by the development and dissemination of new knowledge and technologies.

- Existing technological capabilities and industrial specialisation: These define the starting point(s) of any future development scenarios or road-maps. Here, a combination of Porter's clusters (1990) and global-value-chains literature, FDI and trade theory provide a good starting point for analysing the existing industrial specialisation of a particular economy.
- Major domestic and international socio-economic challenges: They serve as an indication of likely changes in future market demand as well as decision points for the willingness of domestic actors to rethink their future production and innovation activities. Here, trend analysis as well as various participatory foresight techniques such as scenario-writing, road-mapping, etc., can become useful (Figure 1).

When devising possible development scenarios, policies and strategies, it is of critical importance to also consider the broader macroeconomic context. Major changes in the macroeconomic environment, e.g. changes in the conditions of access to capital or in the exchange rate can be very powerful in either supporting or inhibiting the impact of activities that are or are not pursued on a level of individual firms or public organisations. Equally, major mistakes in macroeconomic policy can have a devastating effect on the entire economy despite the efforts of individual actors (Tiits et al. 2006a; Tiits et al. 2010; Kalvet, Tiits 2014).

Also, historically, major new industries (especially science-based and scale-intensive, such as the defence industry) have emerged in, or even in competition between, larger major economies that were able to secure the necessary resources. Such countries also served as sizeable lead markets for emerging new industries. Even as recently as a few decades ago, all the main elements of any industrial value chain were located in a fairly limited geographical area. Globalisation and the advancement of ICTs have made international communications and logistics, the management of remote business units, and the relocation (off-shoring) of individual elements of value chains massively easier. With greater specialisation and an increase in manufacturing, intermediate-goods' trade (Cattaneo et al. 2010), successfully catching up, has become increasingly dependent on imported technologies and related production capabilities, as well as on the dynamics of the broader global industry and market. It is no longer enough to discuss specific industries or clusters only within regional/national borders. Instead, industries' value chains (clusters) should be analysed in broader cross-border settings or, depending on the characteristics of a particular industry, even as global value chains (Tiits et al. 2006a).

Such ideas have been tested in two technology foresight exercises in Estonia. The eForesee exercise in 2002–2003 intentionally did not use the ‘intelligent piggybacking’ framework but developed and practiced the approach described retrospectively by the authors step by step. The final result (Tiits et al. 2006a) is a foresight study from the perspective of the theories of techno-economic paradigms and industry life cycles, clusters and global value-chains linking all this with a local, socio-economic context of a small state. The Estonian ICT 2018 foresight project (Tiits, Rebane 2009) followed the intelligent piggybacking framework very closely—not only focusing on a potentially major contribution of ICTs as the paradigm-leading technologies for Estonian socio-economic development but also considering the limitations posed by the context of a small catching-up country which resulted in the project giving influential input into policymaking. We recommend this wider approach to foresight processes in small catching-up economies (Tiits, Kalvet 2013).

#### **4. Priority Setting for the Defence Industry Sector of Small States**

This chapter outlines the defence industry-specific aspects of a priority setting framework for the defence industry governance of small states.

Methodologically, the article draws on different workshops held with the major stakeholders of the Estonian defence industry. Defence industry representatives were from the Estonian Defence Industry Association (EDIA), the state (MoD) and universities (TalTech and Estonian Military Academy). We also conducted a survey during the first wave of COVID in May 2020 among the members of EDIA on the impact of the crisis, a follow-up round of interviews, and a study commissioned by the MoD to consult on a renewal of the Estonian defence industry innovation policy. Based on these workshops and studies, we combined the most conspicuous factors and generalized them into three broad categories that form the extra layer of the above-proposed governance model for priority setting in the defence industries of small states. Our main hypothesis is that in the defence industry sector, economic and political aspects cannot be as separated as they are in other industries.

As argued earlier, the defence industry deserves special treatment since it is not a “normal” industry. It has wider functions, such as contributing to the security of a nation, and is therefore influenced by a wider set of factors. In the context of today’s global value chain prevalence, where the defence



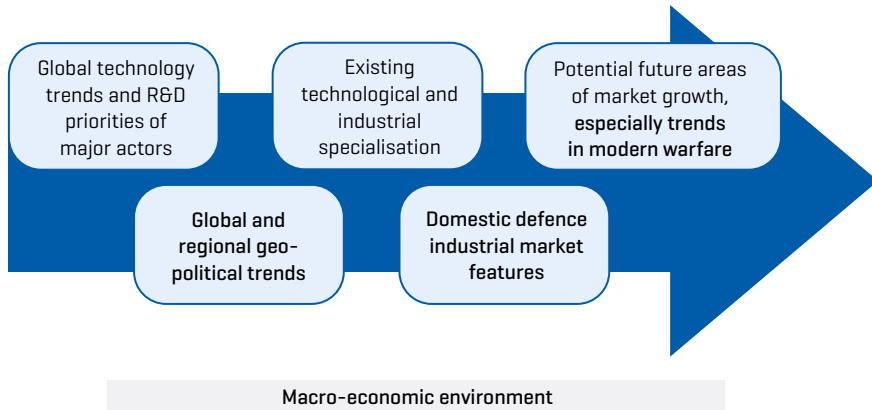
companies of large and evolved industrial states dominate over other industry sectors, the existence and development potential of the defence industry of small states becomes even more important. Entering into the value chains of big producers, as demonstrated, for example, by part of the Finnish deal with F-35, requires strong efforts and a well-focused defence industrial policy. Thus, for defence industry governance, we upgraded the original framework and added an extra layer to it, primarily concerning aspects related to politics and governance. This extra layer was created by analysing the Estonian defence industry governance practice and generalizing upon it.

Our main hypothesis is that in the defence industry sector, economic and political aspects cannot be as separated as they are in other industries. While this appears to apply to all states, it is especially true for small states because they are not trend-setters but rather trend-takers. The securitization of technology (e.g. 5G) and the COVID crisis have both taught us that the economic aspect cannot go against main political values.

Thus, in the field of the defence industry, global and regional political trends need to be followed in order to not give unnecessary support to unfriendly regimes or become dependent on them. Indeed, this phenomenon is about to affect the so-called normal economic sectors outside of the field of defence more and more as the line between peace-time competition and war-time conflict becomes ever more blurred.

Altogether, the political and security dimensions require small states to focus on the technological and economic trends of friendly larger countries all the more strongly. In this regard, Thorhallsson offers a useful framework for understanding the convergence of economic and political factors for the defence industry governance of small states with his notion of 'shelter' that small states look for (Thorhallsson and Kattel 2013). Here, the political and economic facets reinforce each other.

What the Estonian experience brought to light were different areas of relevance in defence industry governance. There first emerged historical, geographical and political realities that we categorized under the heading of geopolitics. Then we grouped together different aspects of the domestic and regional defence industrial policy, and also the structural features of respective markets. Finally, we considered developments in modern warfare as closely related phenomena pertaining, for example, to hybrid threats and the respective comprehensive defence arrangements.



**Figure 2.** A priority-setting analytic tool for the small state defence industry

So, with an extra layer added to defence industry governance, the following aspects should be considered.

- **Global and regional geopolitical trends:** Security policy trends tend to determine basic presuppositions that the defence industrial policy of small states relies on. These trends are both regional and global, and seem to affect not merely the broader defence policy environment but, within their strictures, the defence industrial policy landscape. To simplify, the way a small state (such as Estonia) sees itself in terms of threats and shelters also conditions its basic defence industrial policy choices.
- **Domestic and regional defence industrial policy environments and markets:** Domestic and regional demand and the capability development priorities of national and friendly defence forces are especially relevant for the defence industry. Here, factors like procurement, export controls, R&D priorities, and also market structure could be listed as the main elements of consideration.
- **Trends in warfare:** Here, possible future areas of demand are influenced by trends in modern warfare and militaries. Among these, the most prominent appears to be the paradigmatic change brought about by the category of hybrid threats and, in parallel, comprehensive or integrated defence.

Although we conducted an extensive literature review and applied its findings in the development of the model (see Ploom et al. 2022 for further details), we will now demonstrate the model's relevance by highlighting its alignment with

the most recent prominent works on the subject. The growing body of research on this topic underscores its significance. The framework for studying “The Economics of the Global Defence Industry” (Hartley, Belin 2019) focuses on the analysis of defence industries, their integration into global value chains, the interplay between global development and local markets, and government policies. The examination of small states such as Sweden, Norway, and Israel primarily highlights the significant impact of global and regional geopolitical trends, trends in modern warfare and militaries, the importance of identifying and concentrating on specific niches, and their advancement through government policies (including public procurement). “Small States and the New Security Environment” (Brady, Thorhallsson 2020) vividly demonstrates how the new security environment poses particular challenges for small states, emphasizing hybrid challenges and threats. The authors argue that “small-state security depends on stability, predictability, and cooperative solutions to global problems” (p. 2). In “Defence Innovation and the 4<sup>th</sup> Industrial Revolution” (Raska et al. 2022) the authors examine how military innovation and the defence industries are affected by disruptive technologies such as artificial intelligence, robotics, and autonomous systems. Case studies of Israel and Scandinavian countries illustrate how they adopt and integrate novel technologies, exploring the differences between various innovation and adaptation models. Lastly, “Defence Industries in the 21<sup>st</sup> Century” (Kurç et al. 2020) investigates the transformation in global defence industrial production by examining the interaction between international and domestic factors. The significant contributions of these essential research studies further substantiate the relevance and importance of the components incorporated into our analytical model.

## 5. Conclusions

The authors of this article argued that well-informed priority setting on the level of individual businesses as well as public policy has become ever more important for a successful development. This is especially true for small states and applies in particular to their defence industries. In comparison to larger advanced economies, the dominance of imported technologies and the importance of export markets, however, makes the priority-setting and strategic policy-planning process very different for small states.

To sum up, one can see how important a role the state plays in the policies of the defence industrial sector. Still, within global and regional security

policy limits and emerging warfare trends, the need to move to more complex product groups and increase the labour productivity of exporting companies is the most critical issue that needs to be addressed to increase the export income of small states in general. It is also important to help companies focus on increasing the market share of their exports, especially in moving to product groups and target markets with a rapidly growing demand where both added value and export volumes can be increased. Preference should be given to the product groups that are closer to today's capabilities and create more opportunities for moving to other more complex product groups.

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