SRYAHWA PUBLICATIONS

Journal of International Politics
ISSN: 2642-8245 | Volume 6, Issue 2, 2025
https://doi.org/10.22259/2642-8245.0602002

RESEARCH ARTICLE

The Danish Model and Ukraine's Wartime Defence Industry

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Received: 08 November 2025 Accepted: 24 November 2025 Published: 03 December 2025

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Abstract

This paper presents an in-depth analysis of the 'Danish model,' a novel funding mechanism through which Denmark and partner governments procure Ukrainian-made defence equipment directly from Ukrainian manufacturers for use by the Armed Forces of Ukraine. It argues that this model serves as a powerful catalyst for developing dynamic capabilities within Ukraine's defence industrial base, operating under the extreme pressures of war, resource scarcity, and high operational uncertainty. Drawing upon the theoretical frameworks of dynamic capabilities—specifically the sensing, seizing, and transforming trilogy (Teece, 2007)—organisational ambidexterity (O'Reilly and Tushman, 2004), and entrepreneurial bricolage (Baker and Nelson, 2005), the paper examines how the model accelerates the development of critical organisational routines. By shortening cash-to-capability cycles, de-risking investment for private firms, and institutionalising rapid learning loops between frontline demand and a distributed production network, the Danish model fosters systemic resilience and innovation. The analysis interprets the observed outcomes—including hundreds of millions of euros in direct orders, the establishment of co-production facilities on NATO territory, and measurable increases in the output of critical systems like artillery and drones—not as isolated procurement successes, but as evidence of system-level capability building. The paper concludes by discussing governance risks, proposing a framework for measuring capability growth, and outlining a research agenda to further explore this innovative approach to defence-industrial cooperation.

Keywords: Danish Model, Direct Procurement, Ukraine Defence Industry, Dynamic Capabilities, Sensing–Seizing–Transforming, Organisational Ambidexterity, Entrepreneurial Bricolage, Wartime Production, Distributed Manufacturing, Capability Building, Supply-Chain Resilience, Defence-Industrial Cooperation.

1. Introduction

Russia's full-scale invasion of Ukraine in February 2022 precipitated the most significant interstate conflict in Europe since the Second World War, presenting an existential threat to Ukrainian sovereignty and subjecting its industrial base to unprecedented pressures (Bourgeois and Eisenhardt, 1988). In the initial phases of the conflict, Ukraine was heavily reliant on the provision of military aid from Western partners, which primarily took the form of in-kind donations of equipment from their own national stockpiles. While crucial for Ukraine's immediate survival, this model of support presented long-term challenges, including issues of equipment standardisation, logistical complexity, and the depletion of donor inventories. More fundamentally, it did not directly address the critical need for Ukraine to rebuild and scale its own domestic defence production capabilities to ensure its long-term security and strategic autonomy, a cornerstone of modern defence industrial policy (Hartley, 2006).

In response to this challenge, a novel and innovative approach to defence-industrial cooperation has emerged: the 'Danish model'. Established in 2024, this model represents a paradigm shift away from simple equipment donation towards direct financial investment in Ukraine's own defence industrial base. Through this mechanism, Denmark, often acting as

Citation: Vincent English. The Danish Model and Ukraine's Wartime Defence Industry. Journal of International Politics. 2025; 6(2): 14-29.

an implementing partner for a coalition of nations, channels funds to procure Ukrainian-produced weapons and equipment directly from Ukrainian firms for the use of the Armed Forces of Ukraine. This approach is designed to be faster, more cost-effective, and more sustainable, leveraging local manufacturing to shorten supply chains and ensure that maintenance and training can occur in close proximity to the front lines.

This paper poses the central research question: *How does the Danish model contribute to the development of dynamic capabilities within Ukraine's wartime defence industry?* It advances the argument that the model functions as a powerful external catalyst, accelerating the development of the core organisational routines that underpin strategic adaptation and long-term competitive advantage in high-velocity environments. Specifically, it contends that the Danish model fosters the critical dynamic capabilities of sensing, seizing, and transforming across Ukraine's defence ecosystem. By providing predictable demand and alleviating critical financial constraints, the model enables Ukrainian firms to move beyond the ad-hoc, improvisational survival strategies characteristic of early-war 'bricolage' towards the development of more robust, scalable, and ambidextrous organisational structures capable of both efficiently producing existing systems and innovating to meet future threats.

To substantiate this argument, the paper employs a multi-layered theoretical framework. It draws primarily on the dynamic capabilities view of the firm, as articulated by Teece, Pisano, and Shuen (1997) and further developed by Teece (2007), which posits that sustainable advantage in turbulent environments stems not from the mere possession of resources, but from a firm's ability to reconfigure its resource base. ThiThis is complemented by the literature on organisational ambidexterity (O'Reilly and Tushman, 2004; Raisch and Birkinshaw, 2008), which explores how organisations can simultaneously manage the competing demands of exploiting existing competencies and exploring new opportunities.. FinaFinally, the concept of entrepreneurial bricolage (Baker and Nelson, 2005) is used to characterise the initial state of resource-constrained ingenuity from which more formalised capabilities emerge, a process central to organisational learning (Jerez-Gomez, Céspedes-Lorente and Valle-Cabrera, 2005).

The analysis is conducted as a qualitative case study, synthesising and interpreting publicly available data from a range of sources, including official reports from the Ukrainian and Danish Ministries of Defence, specialist defence industry publications, reputable international news media, and the foundational academic literature on strategic management. The scope of the study is focused on the period from the model's inception in early 2024 through to the latest available data in late 2025, a period which has seen the model's rapid expansion and tangible impact on Ukrainian defence output.

This paper is structured as follows. Section 2 provides a comprehensive review of the theoretical framework, detailing the concepts of dynamic capabilities, organisational ambidexterity, and bricolage. Section 3 presents the empirical evidence, outlining the mechanics, scale, and observed industrial outcomes of the Danish model in practice. Section 4 conducts the core analysis, systematically applying the theoretical framework to the empirical case to demonstrate how the model builds dynamic capabilities. Section 5 discusses the critical issues of governance, risk, and measurement, and offers a comparative perspective on the model's logic. Finally, Section 6 concludes with a summary of the findings, a discussion of their theoretical and policy implications, and an agenda for future research.

2. Theoretical Framework: Capabilities for High-Velocity Environments

The strategic challenges faced by Ukraine's defence industry—characterised by extreme uncertainty, rapid technological change driven by battlefield imperatives, and severe resource constraints—necessitate a theoretical lens capable of explaining how organisations adapt and build advantage under such high-velocity conditions. A static, resource-based view (RBV) of the firm, which emphasises the value of owning rare and inimitable assets (Barney, 1991; Wernerfelt, 1984), is insufficient to explain performance in such a turbulent environment. Instead, the dynamic capabilities framework, complemented by the concepts of organisational ambidexterity and entrepreneurial bricolage, offers a more robust analytical framework. This section outlines these theoretical pillars, which collectively provide a multi-layered perspective on the processes of adaptation, innovation, and capability development at play within Ukraine's wartime defence ecosystem. It will delve into the nuances of each theory, establishing the precise analytical tools that will be used to dissect the impact of the Danish model in the subsequent chapters.

2.1 The Dynamic Capabilities View

The concept of dynamic capabilities emerged in the 1990s as a response to the limitations of the traditional RBV in explaining how firms achieve and sustain competitive advantage in rapidly changing markets. While the RBV correctly identified that a firm's unique resources and capabilities are a source of value, it was less clear on how these capabilities are created and renewed over time. Teece, Pisano, and Shuen (1997) addressed this gap by introducing the concept of dynamic capabilities, which they defined as 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments'. In this view, it is not the ownership of specific assets that confers long-term advantage, but rather the organisation's mastery of routines for creating, evolving, and recombining its asset base.

This perspective distinguishes between 'ordinary' or 'operational' capabilities and 'dynamic' capabilities. Ordinary capabilities pertain to the efficient execution of current operations—'doing things right'—and are essential for day-to-day functioning. Dynamic capabilities, in contrast, are concerned with adaptation and strategic renewal—'doing the right things'—by shaping the firm's resource base to align with shifting environmental demands (Eisenhardt and Martin, 2000; Winter, 2003). In a wartime context, this distinction is stark: an ordinary capability might be the ability to assemble a drone according to a fixed design, whereas a dynamic capability is the ability to rapidly redesign that drone in response to a new electronic warfare threat, source the necessary components, and re-tool the assembly line, all while maintaining production tempo.

To make the concept more concrete, Teece (2007) later elaborated on the 'microfoundations' of dynamic capabilities—the specific, identifiable processes, procedures, organisational structures, and decision rules that underpin a firm's capacity for strategic change. He organised these microfoundations into a trilogy of core organisational and managerial processes:

- *Sensing:* This refers to the firm's ability to constantly scan, search, and explore its environment to identify and interpret opportunities and threats. It involves activities such as market research, R&D, and building relationships with customers and suppliers to gain insights into unmet needs and emerging trends. In the context of Ukraine's defence industry, sensing involves deep engagement with frontline military units to understand evolving battlefield requirements, monitoring adversary tactics and technological adaptations, and scanning global markets for new components and technologies.
- *Seizing:* Once an opportunity is sensed, the firm must have the capacity to 'seize' it by mobilising resources and making investment commitments. This involves creating a viable business model, developing new products or services, and securing the necessary financial, technological, and human capital. For a Ukrainian defence firm, seizing might involve committing to a new production line for a modified artillery shell, investing in advanced manufacturing equipment, or entering into a joint venture to secure a critical technology, all under conditions of high risk and uncertainty.
- *Transforming:* This is the capacity for continuous renewal and reconfiguration of the firm's asset base and organisational structure. It involves the ability to recombine and redeploy existing assets, shed obsolete ones, and maintain organisational resilience and adaptability. As Teece (2007, p. 1342) notes, 'the ability to reconfigure and transform is itself dependent on investment and the creation of new capabilities'. In the Ukrainian context, this is visible in the physical dispersal of production facilities to mitigate the risk of Russian strikes, the codification of manufacturing processes to enable multi-site production, and the continuous restructuring of supply chains to enhance their resilience.

Figure 1 maps how Denmark's direct-procurement mechanism catalyses capability building across Ukraine's defence industrial base. Reading left to right, external donor funding and governance standards flow through the Danish contracting channel to domestic firms, where dynamic capabilities are activated. Sensing captures how firms engage frontline units, track adversary adaptations, and scan global suppliers to detect shifting requirements and component options. Seizing shows the conversion of those insights into commitments—mobilising finance, tooling, partnerships, and new product lines despite high uncertainty. Transforming depicts continual renewal: dispersing and hardening facilities, codifying processes for multi-site production, and reconfiguring supply chains for resilience. Feedback from battlefield performance loops back into sensing and procurement oversight, shortening the cash-to-capability cycle. The rightmost outcomes—higher

output in critical systems, more resilient supply chains, and strengthened industrial competitiveness—signal system-level capability growth rather than isolated procurement wins.

Figure 1. *Danish Model Pathway to Dynamic Capabilities in Ukraine's Wartime Defence Industry*

2.2 Organisational Ambidexterity: Balancing Exploitation and Exploration

A central challenge for any organisation operating in a dynamic environment is what March (1991) termed the tension between 'exploitation' and 'exploration'. Exploitation involves refining and improving existing products, processes, and capabilities to maximise efficiency and reliability. Exploration, conversely, involves searching for new possibilities, experimenting with novel technologies, and developing breakthrough innovations. While exploitation is essential for short-term survival and profitability, exploration is critical for long-term adaptation and growth. The difficulty lies in the fact that these two activities require fundamentally different mindsets, structures, and processes, and organisations that focus excessively on one at the expense of the other are likely to fail.

The concept of organisational ambidexterity addresses this challenge, defining it as the ability of an organisation to pursue both exploitation and exploration simultaneously (O'Reilly and Tushman, 2004). Ambidextrous organisations are able to compete in mature markets and technologies while also developing the innovations that will define the future. O'Reilly and Tushman (2004, 2013) argue that one of the most effective ways to achieve this is through structural ambidexterity, where exploration and exploitation activities are housed in separate, loosely-coupled organisational units. These units can have their own distinct cultures, processes, and metrics, but are integrated at the senior executive level to ensure strategic alignment and resource allocation.

In the context of Ukraine's wartime defence industry, the need for ambidexterity is acute. Firms must 'exploit' proven designs by mass-producing reliable and cost-effective systems like FPV drones and artillery ammunition to meet the immediate and insatiable demands of the front line. Simultaneously, they must 'explore' new technological frontiers to counter Russian adaptations and create future battlefield advantages, such as developing autonomous drone swarms, advanced electronic warfare systems, and long-range precision-strike capabilities. A procurement model that supports both of these activities is therefore crucial for fostering a truly resilient and innovative defence industrial base. The Danish model, as will be argued, provides the financial stability for firms to create these separate 'exploit' and 'explore' units, a core tenet of structural ambidexterity.

2.3 Entrepreneurial Bricolage: Making Do and Making New

In environments characterised by extreme resource scarcity, organisations often cannot rely on acquiring the ideal resources needed to pursue a given opportunity. Instead, they must rely on 'bricolage'—a term borrowed from anthropology by Baker and Nelson (2005) to describe the process of 'making do with the resources at hand' to solve problems and create new solutions. Bricolage involves creatively combining existing resources for new purposes, refusing to be constrained by the limitations of the current environment, and improvising novel solutions. It is a process of resource construction, not just resource allocation.

The early phases of Ukraine's industrial response to the full-scale invasion were a masterclass in bricolage. Engineers and volunteers utilised commercially available components, 3D-printed parts, and materials sourced from local hardware stores to design and modify weapons systems. Garages and small workshops were converted into makeshift

drone assembly lines. This improvisational ingenuity was vital for survival and provided the initial spark of innovation that has since been scaled. However, while bricolage is a powerful tool for problem-solving under duress, it is not a scalable or sustainable model for industrial production. Its outputs can be inconsistent, and its processes are often difficult to replicate. The challenge, therefore, is to transition from bricolage to more formalised capabilities without losing the agility and creativity that bricolage fosters. This is the transition that the Danish model facilitates.

2.4 Synthesis: An Integrated Analytical Framework

These three theoretical concepts—dynamic capabilities, organisational ambidexterity, and bricolage—are not mutually exclusive; rather, they provide an integrated and developmental framework for analysing the evolution of Ukraine's defence industry. Bricolage can be seen as the foundational, entrepreneurial response to the initial shock of the invasion, a necessary but insufficient condition for long-term success. The challenge for Ukraine's defence ecosystem is to transition from this state of ad-hoc improvisation to a more structured and scalable model of industrial production and innovation.

This is where the dynamic capabilities framework becomes critical. The processes of sensing, seizing, and transforming are the mechanisms through which the lessons learned from bricolage can be codified, institutionalised, and scaled. A stable and predictable procurement environment, such as that provided by the Danish model, can provide the financial and institutional scaffolding necessary for firms to invest in building these more robust routines. As these capabilities mature, they enable the development of organisational ambidexterity, allowing firms to manage the dual imperatives of exploitation and exploration. This paper argues that the Danish model acts as a key enabler of this developmental trajectory, providing the external stimulus that helps to convert the raw, improvisational energy of bricolage into the durable, strategic advantage of dynamic capabilities.

3. The Danish Model in Practice: Mechanics, Scale, and Industrial Deepening

Having established the theoretical framework for understanding capability development in high-velocity environments, this section turns to the empirical heart of the analysis: the Danish model itself. The model's significance lies not only in its financial contributions but in the specific mechanisms through which it operates, which directly influence the incentives and constraints facing Ukrainian defence firms. This section details the model's operational workflow, quantifies its scale and scope, examines its observed impact on key production lines, and analyses its most profound strategic evolution—the move towards co-production on NATO territory. This evidence provides the foundation for the subsequent analysis of how the model builds dynamic capabilities.

3.1 Definition and Mechanism

The Danish model, established in 2024 through a partnership between the Ukrainian Ministry of Strategic Industries and the Danish government, represents a fundamental departure from the dominant paradigm of military aid provided to Ukraine since the 2022 invasion, shifting the focus from aid to industrial partnership (Markowski, Hall and Wylie, 2009). Instead of donating equipment from their own inventories, participating nations provide funds for the direct procurement of weapons and military equipment from Ukrainian manufacturers. This 'buy Ukrainian' approach was conceived as a more sustainable and responsive form of support, designed to simultaneously equip the Armed Forces of Ukraine and stimulate the country's domestic industrial base. The Danish Ministry of Defence has framed the initiative as a means to secure "fast delivery times, competitive prices, and the possibility of organising training and maintenance near the front" (DSEI, 2025).

The operational mechanics of the model are designed to be both demand-driven and subject to rigorous external oversight, creating a transparent and efficient procurement channel. The process, as described by the Ukrainian Ministry of Defence, follows a clear workflow (NAKO, 2024; DSEI, 2025):

1 *Demand Signal:* The process begins with the Ukrainian Ministry of Defence, which identifies priority capabilities and projects based on the urgent and evolving needs of the front line. This ensures that procurement is tightly aligned with operational requirements.

2 *Vendor Identification:* A list of recommended Ukrainian companies capable of fulfilling these requirements is compiled and presented to the Danish partners.

3 *Due Diligence and Vetting:* Danish experts, acting on behalf of the donor coalition, conduct a thorough due diligence process on the recommended firms. This is a critical step that assesses not only the

technical feasibility of a project but also the company's production capacity, financial health, corporate governance, and track record of contract implementation. This external validation serves as a crucial quality control and anti-corruption mechanism, addressing a key challenge in public procurement (Decarolis et al., 2021).

4 *Direct Procurement:* Following a successful vetting process, a contract is signed directly between the Danish Defence Acquisition and Logistics Organisation (DALO), acting as the implementing agency, and the selected Ukrainian manufacturer. The funds are then disbursed, allowing production to commence.

This structure, summarised in Table 1, creates a virtuous cycle. It provides Ukrainian firms with a creditworthy, internationally-backed order book, which in turn unlocks further commercial financing. For the donors, it offers a mechanism to provide high-impact support without depleting their own military readiness. For the Ukrainian military, it ensures the rapid delivery of often bespoke or locally adapted systems that are easier to maintain and for which training pipelines already exist. This direct engagement also fosters a deeper understanding within donor procurement agencies of the realities of wartime production and innovation, a form of inter-organisational learning that is often absent in traditional foreign military sales or aid programmes.

Table 1. *Key Features and Workflow of the Danish Model*

Feature	Description
Funding Source	Direct financial contributions from Denmark and partner nations (e.g., Norway, Sweden, EU).
Procurement Target	Weapons and equipment produced by Ukrainian defence companies.
Initiation	Ukrainian Ministry of Defence submits a list of priority projects and required capabilities.
Vetting Process	Danish and partner experts conduct due diligence on recommended Ukrainian firms, assessing capacity, experience, and integrity.
Contracting	Direct contracts are signed between the Danish implementing agency (on behalf of donors) and the selected Ukrainian manufacturers.
Key Benefits	Reduced delivery times, lower unit costs, proximate maintenance/training, and direct stimulus to Ukraine's industrial base.

3.2 Scale and Scope of Investment

While initially modest in comparison to the multi-billion-dollar aid packages from larger nations like the United States and Germany, the Danish model has rapidly scaled in scope and financial commitment, demonstrating its perceived effectiveness. In its inaugural year, 2024, the model channelled approximately €538 million (nearly DKK 4 billion) worth of weapons to the Armed Forces of Ukraine. This funding was a collective effort, with Denmark implementing tranches on behalf of partners including Norway, Sweden, and Iceland, as well as drawing from the EU's European Peace Facility (EPF) (Danish MoD, 2025).

The momentum has continued and accelerated into 2025. Denmark has already reserved a further €135 million for direct Ukrainian procurement in the coming year, but this figure represents only a fraction of the total anticipated throughput. The model's success has attracted broader institutional support, with the EU entrusting Denmark to implement over €800 million of EPF funds through this channel. Furthermore, there is a growing consensus to use the windfall profits from frozen Russian sovereign assets for this purpose, with Denmark positioned as a key implementing actor (DSEI, 2025). Reflecting this growth, Ukrainian Defence Minister Rustem Umerov stated in late 2025 that he expected the total value of procurement through the model to reach approximately €1.4 billion for the year, a near-tripling of its initial impact. This scaling demonstrates a powerful proof-of-concept, encouraging other nations like Canada and the Netherlands to explore similar direct-procurement initiatives, creating a potential network effect that could further stabilise and expand the funding base for Ukraine's defence industry.

3.3 Observed Outputs and Industrial Impact

The most compelling evidence of the model's impact lies in the measurable increase in the production of critical weapon systems. Official communications and analyst reports directly link the Danish model's investments to a step-change in the output of several key product lines.

- *Artillery:* The most prominent example is the 2S22 Bohdana, a 155mm wheeled self-propelled howitzer that has become a symbol of Ukraine's indigenous defence capability. Having started mass production in early 2023, output was reportedly in the single digits per month. Following investments

channelled through the Danish model, production ramped up significantly. By mid-2024, output was around 10 units per month, and by late 2025, Ukrainian sources were reporting production rates of 20 or even as high as 40 units per month (The Defense Post, 2025; Euromaidan Press, 2025). This rapid scaling, achieved through a dispersed and resilient manufacturing network, has been attributed directly to the financial stability and predictable demand provided by European partners through this procurement mechanism.

- *Drones:* Ukraine's drone industry, a sprawling ecosystem of state and private actors, has been another major beneficiary. The government's stated goal of producing millions of First-Person View (FPV) drones in 2025 has been supported by financing that enables bulk purchasing of components and the expansion of assembly operations. The Danish model has played a role in financing local assembly and testing, reducing the lag between production and deployment and helping to mature the supplier ecosystem.
- *Long-Range Systems:* The model has also been linked to the development and procurement of more sophisticated long-range strike capabilities, including anti-ship missiles and long-range drones, although specific details are often kept confidential for operational security reasons.

3.4 Industrial Deepening through Co-Production: The Fire Point Case

Perhaps the most strategically significant evolution of the Danish model is its expansion from direct procurement to co-production, moving beyond simply buying finished goods to actively participating in the upstream supply chain. In September 2025, the Danish government announced that Fire Point, a Ukrainian defence company, would establish a facility in Denmark to produce solid rocket fuel for its 'Flamingo' (FP-5) long-range cruise missile (Defense News, 2025; Reuters, 2025).

This development is remarkable for several reasons. Firstly, it marks the first time a Ukrainian defence company has established a production facility on the territory of a NATO member state. The plant, to be located near Skrydstrup Air Base, provides a secure environment for producing a critical and volatile commodity—propellant—that represents a major bottleneck for scaling up missile production. By locating this fragile upstream node in a secure jurisdiction, the risk of Russian strikes is neutralised, and access to stable supply chains and a skilled workforce is enhanced. This is a clear example of strategic supply chain de-risking, a critical component of building a resilient enterprise (Sheffi & Rice, 2005; Christopher & Peck, 2004). The production of solid rocket fuel is a complex and hazardous process involving the precise mixing of volatile chemical compounds. Establishing such a facility requires significant capital investment and adherence to stringent safety and environmental regulations, which are difficult to guarantee in a country under constant aerial bombardment. By offshoring this single, critical stage of the production process to a secure NATO location, the entire value chain for the Flamingo missile is made more resilient. It allows Ukraine to retain the high-value design, assembly, and testing activities within its borders, while mitigating one of the most significant and vulnerable points of failure in the supply chain.

Secondly, it represents a qualitative leap in the nature of the partnership. It moves beyond a simple transactional relationship to one of deep industrial integration. Denmark is not just a customer; it is becoming a partner in the production process, hosting a critical capability that benefits the entire Ukrainian long-range strike enterprise. This move, which the Danish government is supporting with dedicated funding, sets a powerful precedent for how other allies can support Ukraine by hosting other critical upstream production nodes, such as those for advanced composites, microelectronics, or optical sensors. It is the clearest manifestation yet of the Danish model's potential to build not just products, but resilient, transnational industrial capabilities.

4. Analysis: Building Dynamic Capabilities Under Fire

To synthesise the preceding theoretical framework and empirical evidence, this section introduces a conceptual model (Figure 1) that illustrates the causal pathways through which the Danish model stimulates dynamic capability development in a national defence industrial base. This model provides a visual roadmap for the detailed analysis that follows, structuring the argument and clarifying the relationships between the key variables.

The model consists of six interconnected components:

- *External Environment:* This represents the inputs from allied partners, primarily predictable financial resources and the imposition of high governance standards through due diligence and vetting procedures.

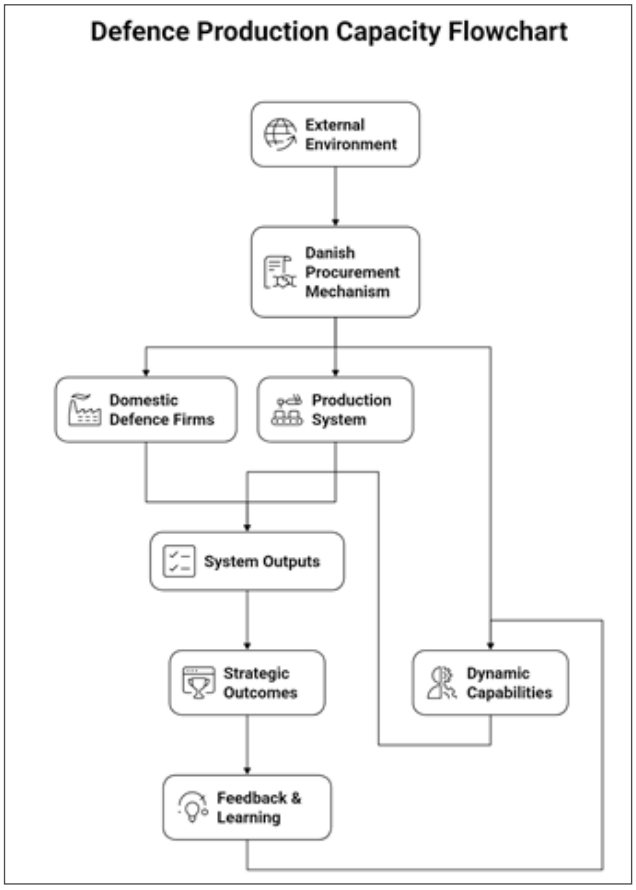

Figure 1. *A Conceptual Model of the Danish Model's Impact on Dynamic Capabilities*

- *Danish Model Mechanism:* This is the core of the model, translating external resources and standards into specific, firm-level incentives through direct procurement contracts, quality assurance requirements, performance monitoring, and, increasingly, co-production arrangements.
- *Dynamic Capabilities Development:* This is the central process of interest, where the model's mechanisms directly foster the development of sensing, seizing, transforming, and ambidexterity within the domestic defence firms.
- *Domestic Defence Firms:* The model impacts a diverse ecosystem of firms, including large state-owned enterprises, established private manufacturers, and agile SMEs and start-ups.
- *System-Level Outcomes:* The cumulative effect of enhanced firm-level capabilities is the achievement of strategic, system-level outcomes, including increased military output, enhanced supply chain resilience, greater industrial competitiveness, and ultimately, greater strategic autonomy for the nation.
- *Feedback & Learning:* The entire system is connected by feedback loops. Battlefield performance data informs future sensing activities, production metrics feed into performance monitoring, and quality benchmarks refine the procurement process, creating a continuous cycle of learning and improvement.

The following subsections will now use this model as a guide to analyse in detail how the Danish model's mechanisms catalyse each of the core dynamic capabilities.

4.1 Accelerating Sensing Capabilities

In a conflict characterised by rapid technological evolution and constant adaptation by the adversary, the ability to 'sense' changes in the operational environment and quickly translate them into product modifications is a paramount capability. The Danish model enhances this sensing capacity in several critical ways.

First, by prioritising direct procurement from local manufacturers, the model dramatically shortens the feedback loop between the frontline user and the factory floor. Unlike traditional foreign military aid, where equipment is often delivered months or years after a need is identified, direct purchasing creates an immediate and continuous dialogue. Ukrainian soldiers provide real-time feedback on the performance of equipment against Russian electronic warfare, air defence systems, and battlefield conditions. This information, unfiltered by long bureaucratic chains,

flows directly to the engineers and designers who can act on it. This creates what Teece (2007) describes as routines for 'learning and discovery', institutionalising a process of rapid, iterative product improvement in a manner consistent with theories of continuous change in high-velocity environments (Brown and Eisenhardt, 1997). The evolution of Ukrainian FPV drones, with constant changes to their avionics, frequencies, and payload configurations to counter Russian jamming, is a direct result of such tight feedback loops, which the Danish model's funding helps to sustain and professionalise.

Second, the model's structure provides a more reliable and statistically significant demand signal. Because Denmark often acts as an implementing partner for a coalition of donors, the order cadence is steadier and more predictable than if each country were to make sporadic, one-off grants. This regular rhythm of orders allows manufacturers to gather more data across multiple production batches, increasing the statistical power of feedback and allowing for more effective A/B testing of different design modifications in the field. This process helps to distinguish genuine performance improvements from random battlefield noise, accelerating the learning process. This data-driven approach to capability development is further amplified by Ukraine's burgeoning ecosystem of digital feedback platforms, such as the Brave1 defence-tech cluster. While not formally part of the Danish model, these platforms, which connect developers directly with military end-users, create a complementary channel for sensing. The Danish model's funding provides the resources to act on the insights generated through these platforms, creating a powerful synergy between state-sponsored digital innovation and internationally-funded industrial production.

Finally, the Danish due diligence process itself functions as a form of external market intelligence and a sensing mechanism for the donor coalition. In vetting potential Ukrainian suppliers, Danish experts gain a granular understanding of the capabilities, capacities, and limitations of the Ukrainian industrial base. This process identifies which firms are truly capable of delivering quality products at scale and which are not, allowing investment to be channelled to the most effective and innovative producers. This external audit creates a competitive pressure that rewards firms with strong internal sensing and learning routines, effectively amplifying the market signals for quality and performance across the entire ecosystem. This process can be viewed as a form of 'institutional isomorphism', where Ukrainian firms begin to adopt the organisational structures and processes of their Western partners not just to secure contracts, but to enhance their own legitimacy and operational effectiveness. The Danish model, therefore, acts as a conduit for the transfer of not just capital, but also of institutional norms and best practices in governance and project management.

4.2 De-risking the Seizing of Opportunities

Sensing an opportunity is useless without the capacity to 'seize' it through investment and resource mobilisation. For many private Ukrainian defence firms, particularly in the early stages of the war, the primary binding constraint was not a lack of ingenuity, but a lack of capital. The risk of investing in expanded production facilities, stockpiling long-lead materials, or hiring more staff was immense when future demand was uncertain and state budgets were under extreme strain. The Danish model directly addresses this market failure and de-risks the 'seizing' process.

The provision of firm, creditworthy orders from a stable, internationally-backed entity like the Danish government provides Ukrainian firms with a predictable cash flow and a bankable order book. This has a powerful catalytic effect on the financial ecosystem. With a Danish government contract in hand, a Ukrainian firm can approach commercial banks for working capital loans, secure credit lines from suppliers, and make confident investments in tooling, machinery, and workforce expansion. The model effectively acts as a government-backed guarantee, mitigating the perceived risk of investing in a wartime economy and 'unlocking' the private capital necessary for scaling production.

Furthermore, the model helps to standardise and diffuse what Eisenhardt and Martin (2000) refer to as 'best-practice' routines for scaling. The contracting, quality assurance, and reporting requirements imposed by the Danish procurement agency compel Ukrainian firms to adopt more rigorous and professionalised management practices. These standardised templates for vendor qualification, project management, and financial oversight become reusable organisational routines that firms can apply to other projects, whether funded by domestic or other international partners. This diffusion of best practices raises the overall quality and reliability of the industrial base, producing economies of repetition and enabling firms to scale their operations more quickly and with a lower

risk of failure. For instance, a firm that successfully navigates the Danish model's quality assurance and documentation requirements for an artillery shell contract can then apply that same certified process to a subsequent contract for mortar rounds, whether funded by Denmark, the Ukrainian state, or another partner. This transfer of procedural knowledge is a core mechanism for building system-level capability from firm-level interactions, reflecting a form of institutional isomorphism where firms adopt practices to gain legitimacy and efficiency (DiMaggio and Powell, 1983).

4.3 Driving Transformation: From Bricolage to Scalable Architectures

The initial industrial response to the invasion was a testament to Ukrainian ingenuity and bricolage—the art of 'making do' with the resources at hand (Baker and Nelson, 2005). While this improvisational capacity was vital for survival, it was not a foundation for sustained, industrial-scale output. The Danish model has been instrumental in driving the 'transformation' of this ecosystem, helping firms to convert the lessons of bricolage into repeatable, scalable, and resilient product and process architectures.

The financial stability provided by the model gives firms the breathing room to move beyond one-off, improvised solutions and invest in the codification of their knowledge. This involves creating detailed work instructions, developing robust quality assurance checklists, and even building 'digital twins' of their production processes. This codification is essential for achieving consistent quality and for enabling distributed manufacturing—a key element of resilience in the face of Russian strikes. By dispersing production across multiple smaller, less conspicuous sites, firms can reduce their vulnerability, but this is only possible if the process knowledge is explicitly documented and transferable, rather than being tacitly held by a few key individuals in a single location. The Danish model's emphasis on capacity and implementation checks during the vetting process directly incentivises this crucial work of process institutionalisation.

The stabilisation of the Bohdana howitzer's supply chain is a prime example of this transformation. What began as a more bespoke, almost artisanal production process has been transformed into a resilient, multi-site manufacturing network capable of producing at a vastly increased scale. Similarly, the FPV drone ecosystem has matured from a collection of small, garage-based operations into a more structured industry with tiered suppliers, common payload interfaces, and increasingly standardised firmware. This is the essence of the transforming capability: reconfiguring and recombining assets to institutionalise learning and build a more resilient and scalable industrial base. A key element of this transformation is the widespread adoption of modular design principles. Instead of developing monolithic, tightly integrated systems, Ukrainian firms are increasingly creating platforms with common interfaces and interchangeable components. This modularity, evident in both drone airframes with swappable payloads and artillery systems designed for easier field repair, is a direct response to the need for rapid adaptation. It allows for specific subsystems (e.g., a drone's camera, an artillery piece's fire-control system) to be upgraded or replaced without redesigning the entire platform, dramatically reducing the cost and time of iteration. The stable demand from the Danish model provides the incentive to invest in these more complex, but ultimately more adaptable, architectural designs, which can be seen as a form of developing deeper core competencies (Prahalad and Hamel, 1990).

4.4 Fostering Ambidexterity by Design

The dual pressures of a protracted war require Ukraine's defence industry to be ambidextrous—to simultaneously 'exploit' proven, existing technologies to meet immediate battlefield needs and 'explore' novel, next-generation capabilities to secure a future advantage (O'Reilly and Tushman, 2004). The Danish model's structure inherently supports this dual objective.

By providing a steady stream of funding for the production of mature and proven systems—such as the Bohdana howitzer or standard FPV drones—the model allows firms to establish stable, efficient production lines focused on exploitation. This reliable revenue stream covers overheads, sustains the workforce, and generates the profits necessary to fund more speculative R&D. It allows firms to create what O'Reilly and Tushman (2004) would describe as structurally ambidextrous organisations, with dedicated units focused on the efficient mass production of current systems, while separate, more agile teams are free to explore new designs.

This is further enabled by the substitution effect the model has on Ukraine's national budget. With allies funding the procurement of more mature systems, the Ukrainian Ministry of Defence can allocate a greater proportion of its own limited resources to higher-risk, exploratory projects that international partners may be less willing to fund. This creates a national-

level portfolio approach to defence innovation, where external funding supports the 'exploit' side of the equation, freeing up domestic funds for the 'explore' side. The co-production agreement for missile fuel in Denmark is a perfect illustration of this dynamic. While the Danish model helps to scale the production of existing systems within Ukraine, it is also enabling the upstream conditions for a future, exploratory capability—long-range precision strike—to be developed and sustained. This represents a sophisticated form of national-level ambidexterity, where the portfolio of defence projects is strategically managed across different funding sources and geographical locations to balance the competing demands of the present and the future (Gibson and Birkinshaw, 2004).

5. Discussion: Governance, Risks, and Measurement

The analysis thus far has argued that the Danish model is a potent catalyst for developing dynamic capabilities within Ukraine's defence industry. However, the long-term success and scalability of this model are contingent on navigating a complex landscape of governance challenges, operational risks, and policy uncertainties. Furthermore, to validate the thesis that the model is indeed building capability and not just procuring equipment, a robust framework for measurement is required. This section addresses these critical issues, discussing the governance structures necessary for integrity, the key risks and bottlenecks that could impede progress, a proposed framework for measuring capability growth, and the comparative advantage that enables a state like Denmark to play such a pivotal role.

5.1 Governance and Integrity

No capability, dynamic or otherwise, can be built on a foundation of poor governance. Ukraine's defence sector has historically been burdened by a legacy of Soviet-era corruption, clientelism, and a lack of transparency, which has stifled innovation and deterred foreign investment (SIPRI, 2025), a common challenge in post-Soviet economies transitioning their defence industries (Markowski, Hall and Wylie, 2009). The full-scale invasion created a powerful impetus for reform, leading to the transformation of the state-owned conglomerate Ukroboronprom into a more modern joint-stock company, Ukrainian Defence Industry (UDI), and the establishment of a new, more transparent Defence Procurement Agency within the Ministry of Defence. These reforms aim to professionalise purchasing, enhance corporate governance, and establish a level playing field for both state-owned and private enterprises.

The Danish model reinforces and complements these internal reform efforts by introducing a crucial layer of external diligence and accountability. The mandatory vetting process conducted by Danish experts before any contract is awarded serves as a powerful filter against rent-seeking and inefficiency. It creates a strong incentive for Ukrainian firms to improve their corporate governance, financial transparency, and quality control systems to be eligible for funding. In this sense, the model not only rewards operational excellence but also actively cultivates it by making good governance a prerequisite for participation. This external validation is crucial for establishing trust, not only with the Danish government but also with the entire coalition of partners and potential future investors.

However, risks remain. The case of Fire Point, the manufacturer of the Flamingo missile, facing a domestic anti-corruption investigation even as it partners with Denmark, highlights the persistent challenges (Defence News, 2025). The long-term integrity of the model will depend on continued and deepened transparency. This should include the publication of benchmarks for delivery times and costs, independent audits of procurement processes, and the tracking of field performance and defect rates. By making performance data a central component of the governance framework, the model can institutionalise the microfoundations of quality and transparency, ensuring that funding flows to the most capable and reliable producers, thereby reinforcing the positive feedback loop between performance and investment. This data-driven approach to governance also has the potential to mitigate the information asymmetries that often plague defence procurement (Decarolis et al., 2021), providing both donors and the Ukrainian public with greater confidence that funds are being used effectively.

5.2 Managing Risks and Bottlenecks

Beyond governance, the scalability of Ukraine's defence production faces several critical risks and bottlenecks that the Danish model, on its own, cannot fully resolve.

- *Capacity Bottlenecks:* While funding is a crucial enabler, it is not the only constraint. Ukraine faces significant bottlenecks in several key upstream industrial areas. These include the production

of energetics and propellants (the chemical compounds essential for munitions and rocket motors), high-precision machining for components like artillery barrels, and the supply of critical electronic components, particularly those resistant to electronic warfare. The Danish model can help by providing the capital to invest in these areas, but the technical expertise and physical infrastructure can take years to build. The co-production of missile fuel in Denmark is a direct and innovative response to one of these bottlenecks. This strategy of establishing 'upstream nodes' on allied soil for the most fragile or critical inputs, while keeping downstream assembly and integration in Ukraine, provides a template for future efforts. Similar arrangements for advanced composites, optical sensors, or microchips could further de-risk Ukraine's supply chains and increase overall throughput. This approach can be conceptualised as a form of 'geographically distributed dynamic capability', where the different elements of sensing, seizing, and transforming are not all co-located within a single national boundary, but are instead optimised across a network of allied nations, each contributing their unique comparative advantages in security, technology, or industrial capacity, reflecting a sophisticated form of alliance-based industrial policy (Hartley, 2006).

- *Policy Volatility and Donor Concentration:* The model's reliance on the annual appropriation cycles of donor governments exposes it to policy volatility. A sharp political swing in a key partner nation or a general sense of 'donor fatigue' could slow the cadence of orders, undermining the very predictability that makes the model so effective. Two mitigation strategies are emerging to counter this risk. The first is the 'portfolio' approach, where Denmark implements funds on behalf of a growing number of partners. This diversifies the political risk, making the overall funding stream less dependent on any single government. The second, and more significant, is the increasing integration of the model with EU-level funding mechanisms, such as the European Peace Facility and the use of profits from frozen Russian assets. By linking the model to these larger, more stable, and multi-year funding windows, its long-term political durability can be significantly enhanced.

5.3 A Framework for Measuring Capability Growth

To move beyond anecdotal evidence and rigorously test the proposition that the Danish model builds dynamic capabilities, a framework of measurable proxies is essential. An academic analysis must propose quantifiable indicators that can track the accumulation of these capabilities over time. Table 2 outlines a potential framework, mixing input, process, and outcome metrics designed to capture the different facets of capability growth. Tracking these metrics would allow for a more robust causal assessment of the model's impact, potentially through quasi-experimental designs (e.g., comparing the performance of firms participating in the model with those that are not) if sufficient data were to become available.

Table 2. *Proposed Metrics for Measuring Dynamic Capability Accumulation*

Capability	Metric Category	Proposed Metrics
Sensing	Learning & Adaptation	Mean time from frontline feedback (e.g., new EW threat) to implemented design change. Field failure rate per production batch (learning-curve trend).
Seizing	Investment & Scale	Median days from contract award to first delivery. Growth in commercial credit facilities available to participating firms. Capital expenditure (capex) per unit of output over time.
Transforming	Process Institutionalisation	Share of firms with documented QA/QC systems (e.g., ISO 9001). Number of upstream co-production nodes on allied territory. Ratio of modular to monolithic system designs in portfolio.
System Outcomes	Cost & Readiness	Unit cost per standardised effect (e.g., cost per 155 mm shell delivered on target). System availability rate at the front (uptime).

This framework provides a starting point for a more systematic evaluation. For example, a reduction in the 'mean time to design change' following a battlefield event would be a strong indicator of improved sensing. An increase in the value of commercial credit lines tied to Danish-implemented contracts would provide clear evidence of enhanced seizing capacity. A rising share of participating firms achieving ISO 9001 certification would signal a deepening of transforming capabilities through process institutionalisation. Finally, a falling 'cost per standardised strike effect' would be a powerful outcome metric, demonstrating that the ecosystem is becoming more efficient and effective.

5.4 Comparative Advantage: Why Denmark?

An important question is why a small-to-mid-sized state like Denmark has been so effective in pioneering this model. The answer lies in the concept of comparative advantage. While larger allies possess vast stockpiles of equipment to donate, their large, bureaucratic procurement systems are often ill-suited to the kind of agile, hands-on industrial engagement required in this context. Denmark, in contrast, can leverage its comparative advantage in good governance, institutional agility, and financial transparency.

As a smaller state with a highly professional and relatively nimble civil service, Denmark is well-positioned to perform the intensive due diligence and project management functions at the heart of the model. Its strong reputation for transparency and low corruption provides the credibility needed to act as a trusted implementing partner for other nations and for the EU. Furthermore, because Denmark has more limited surplus stocks to donate, it has a stronger incentive to explore innovative force-multiplying strategies that leverage its financial and institutional strengths rather than its material ones. The Danish model shows how smaller allies can play an outsized role in coalition efforts by specialising in the provision of governance and coordination, effectively raising the productive capacity of the entire alliance while preserving their own military readiness. It is a model of how to be a force multiplier not just through military power, but through institutional excellence in public administration. This highlights a potential shift in the role of smaller states within large alliances. In an era of complex, technologically driven warfare, the ability to effectively manage and coordinate intricate industrial and financial networks can be as strategically important as possessing a large standing army. The Danish model may therefore be a harbinger of a new form of 'smart power' in international security, where institutional agility and governance expertise become key instruments of statecraft, a concept that aligns with modern views on national competitiveness and strategic management (Prahalad & Hamel, 1990).

6. Conclusion

This paper aims to develop a comprehensive analytical account of the 'Danish model' of military support for Ukraine, arguing that its strategic importance exceeds the transactional value of the equipment it procures. The model, through its innovative mechanism of directly funding Ukrainian manufacturers, serves as a powerful engine for building the durable, adaptive, and resilient industrial capabilities that are essential for Ukraine's long-term security. By systematically applying the theoretical lenses of dynamic capabilities, organisational ambidexterity, and entrepreneurial bricolage, this analysis has demonstrated that the model is not merely buying materiel; it is actively cultivating the organisational routines and structures that enable Ukraine's defence industry to thrive under the extreme pressures of a high-intensity war.

6.1 Summary of Findings

The core finding of this paper is that the Danish model serves as an external catalyst, accelerating the development of dynamic capabilities across Ukraine's defence ecosystem. It achieves this by directly addressing the most significant barriers to industrial scaling in a wartime environment: uncertainty and capital scarcity. The provision of a stable, predictable, and creditworthy stream of orders shortens the critical feedback loops between the battlefield and the factory, enhancing firms' sensing capabilities. It de-risks investment in new capacity and standardises best practices in contracting and quality assurance, thereby strengthening firms' ability to seize opportunities. Finally, by providing the financial stability needed to move beyond ad-hoc improvisation, it drives the transformation of the industrial base from a state of reactive bricolage towards one of proactive, scalable, and resilient architectural design. The measurable gains in the production of critical systems like the 2S22 Bohdana howitzer, the expansion of the drone ecosystem, and the strategic deepening of the supply chain through co-production initiatives like the Fire Point facility in Denmark are not simply procurement wins; they are the tangible outcomes of this underlying process of organisational learning and system-level capability building.

6.2 Theoretical Implications

This study makes a salient contribution to the literature on dynamic capabilities by providing a unique and compelling case study of capability development under conditions of existential threat. Much of the existing literature examines these processes within a commercial context, where the pressures of market competition, while intense, are not comparable to the life-or-death imperatives of a full-scale war. The Ukrainian case demonstrates how the core principles of sensing, seizing, and transforming are not only applicable but are in fact amplified in such a high-velocity environment. It also highlights the critical role that external actors and novel institutional arrangements, such as the Danish model, can play in

shaping the trajectory of capability development. The analysis offers a set of testable propositions linking specific procurement model features to capability outcomes, which can inform future research in this area (summarised in Figure 3). For instance: *P1: Allied-implemented direct-purchase models increase the frequency and reliability of frontline demand signals reaching manufacturers, reducing product iteration cycle times (Sensing). P2: When donor diligence standardises vendor qualification and contracting, firms adopt 'best-practice' scaling routines that raise throughput without proportional defect growth (Seizing). P3: Locating critical upstream input production on allied soil reduces variance in delivery schedules and increases total factor productivity for downstream assembly plants (Transforming).*

The figure provides a high-level map of how Denmark's direct-procurement mechanism translates donor funding into wartime capability inside Ukraine's defence industry. Reading left to right, predictable finance and governance standards flow through Danish contracting to Ukrainian firms, where the three dynamic capabilities—Sensing, Seizing, and Transforming—do the heavy lifting. Sensing links frontline feedback and market scans to identify needs; Seizing converts those insights into resources, partnerships, and production lines; Transforming institutionalises change through codified processes, modular designs, and distributed manufacturing. A feedback loop from battlefield performance tightens the cash-to-capability cycle, while performance monitoring and QA keep the system aligned. The rightmost outcomes—higher output, resilient supply chains, and competitiveness—signal system-level capability building, not just isolated procurement wins.

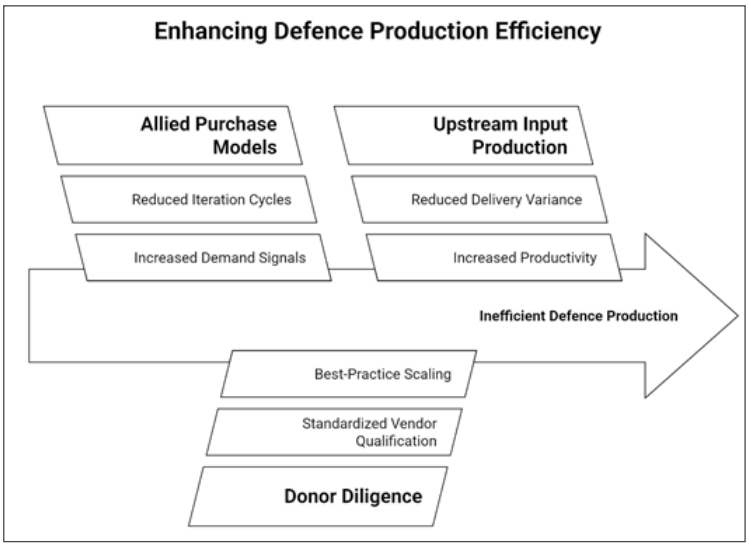

Figure 2. *From Procurement to Capability: The Danish Model's Dynamic-Capability Pathway in Ukraine*

6.3 Policy Implications

The findings of this paper offer several clear policy implications for Ukraine and its international partners as they seek to build a sustainable, long-term strategy for European security. First, the primary advantage of the model is its cadence and predictability. To maximise its impact, partners should seek to lock in this rhythm through multi-year funding commitments, ideally linked to stable EU-level mechanisms, to provide the long-term planning horizon that industry needs. Second, the Fire Point co-production agreement provides a powerful template for replicating upstream nodes. Partners should actively identify other critical bottlenecks in Ukraine's supply chain—such as for composites, optics, or RF components—and explore hosting their production in secure allied jurisdictions. Third, to reinforce good governance and drive continuous improvement, partners should work with Ukraine to publish performance dashboards, tying future funding tranches to transparent reporting on metrics such as delivery times, defect rates, and unit costs. Finally, the model provides a unique opportunity to plan the post-war export glidepath. The diligence criteria and quality standards imposed by the model can serve as a proto-export compliance regime, helping Ukrainian firms to exit the war with the certifications, QA pedigrees, and interoperable designs needed to compete on the global market.

6.4 Limitations and Future Research

This analysis is subject to several limitations, primarily related to the constraints of conducting research on a sensitive topic during an active conflict. The reliance on publicly available data means that a full, granular picture of production figures, costs, and performance

is not possible. The attribution of specific outcomes solely to the Danish model is also challenging, as output growth is driven by a confluence of factors, including domestic reforms, other donor programmes, and private capital. A more definitive causal analysis would require access to non-public procurement micro-data and firm-level interviews, which may only become possible after the cessation of hostilities.

These limitations, however, point towards a rich agenda for future research. Comparative studies analysing the relative effectiveness of different aid models (e.g., direct procurement vs. in-kind donations vs. foreign military financing) would be highly valuable. As data becomes available, quantitative analysis of the metrics proposed in this paper could provide robust evidence of the model's impact on firm performance and industrial capacity. In the long term, the evolution of Ukraine's defence industry will provide a compelling case study on the dynamics of post-conflict industrial transformation and its integration into the global defence market. The Danish model, in conclusion, offers more than just a blueprint for supporting Ukraine; it provides a new paradigm for how allied nations can collaboratively build industrial capabilities, foster innovation, and enhance collective security in an increasingly turbulent world.

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