

Innovation Lifecycle of Latvia's Defence Industry: From Idea to Adoption in the Armed Forces

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Defence innovation can create a significant force-multiplier effect by shaping military effectiveness, operational concepts and technological sovereignty. However, in small states, the pathway from an initial idea to adoption by the armed forces is often constrained by governance frictions, limited market scale, and weak transition mechanisms between development and deployment. This study examines the defence innovation lifecycle in Latvia and aims to identify the barriers and enabling factors experienced by defence-industry firms across different stages of innovation progression, as well as the ecosystem-governance conditions associated with slower or faster movement toward end-user adoption. The study combines an innovation ecosystem perspective with the Quadruple Helix framework and uses Technology Readiness Levels (TRLs) as a stage-based lens for analysing progression from idea to military use.

Empirically, the study is based on a cross-sectional survey of 25 Latvian defence, security, and dual-use firms. The results show that the main bottlenecks emerge not in early-stage invention, but in later transition stages related to testing, validation, certification, procurement, and adoption. The most significant barriers were linked to small domestic market size, demand uncertainty, lack of funding for TRL development, bureaucratic inertia, procurement inflexibility, and unclear decision-making criteria. By contrast, industry partners, investors, and sectoral associations were perceived as the most supportive actors, while state policymakers were viewed as the least enabling part of the ecosystem. The findings suggest that the main challenge of the Latvian defence innovation ecosystem lies in converting promising solutions into adoption outcomes. The study contributes an empirical mapping of Latvia's defence innovation lifecycle and offers evidence-based implications for improving ecosystem governance, public-sector coordination, and innovation absorption mechanisms in small-state defence contexts.

Keywords: defence innovation; innovation ecosystem; defence innovation lifecycle; technology adoption; defence industrial base; small states; Latvia

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