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Defense Research – Can Expectations Hold?

There is broad support within the Danish research and innovation system for increased engagement in defense research.[1] DFiR perceives that public research environments expect that the prioritization of defense research will be achieved through the allocation of new funds, rather than at the expense of other research areas. If the prioritization of defense research displaces investments in other research fields, there is a risk that public knowledge environments' support for defense research will erode. DFiR recommends that defense research be enhanced through an increase in the public research and development budget. In light of increasing global polarization, prioritizing defense research will necessitate heightened security in Danish knowledge environments, which must be done with respect for standard research practices and procedures.

Before the summer break, the government and a broad majority in the Danish Parliament agreed on a defense settlement for the period 2024-2033. The agreement includes investments of 143 billion DKK in the Danish defense sector and aims to strengthen defense-related research and development. This development is not surprising. In the spring and summer of 2023, the Danish Council for Research and Innovation Policy (DFiR) hosted a series of debates on the potentials and risks of increased prioritization of defense and security in the Danish research and innovation ecosystem. The debates were held in collaboration with the Ministry of Defense, the Royal Danish Academy of Sciences and Letters, the Danish Society of Engineers, and CenSec – Center for Defence, Space & Security. This DFiR brief summarizes key observations from these debates.

Support is Conditional on Nominal Increase

There is broad support in the Danish research and innovation system for prioritizing defense research. This is evident in the establishment of the National Defense Technology Center, which brings together all eight universities and five GTS institutions. Within research environments, there is also a widespread belief that ethical issues in defense research can be managed within existing frameworks. At the same time, there is increased interest among Danish companies in contributing to the development of solutions for the Danish defense sector.

However, in public research and innovation environments, there is an expectation that funds for defense research will not be deducted from funds for other research areas. This expectation contrasts with current policy, where defense research is included in the goal of public research budgets amounting to 1% of GDP. Additionally, defense research funded through the EU is counted in the public research budget. Danish research environments are expected to increase their acquisition of EU funds for defense research, such as through the European Defense Fund. An increased acquisition of EU funds for defense research and a heightened national prioritization of defense research will, under current policy, displace investments in other research areas, such as quantum technology, InnoMissions, and talent programs. DFiR recommends a policy shift where investments in defense research are not counted towards the public research investment goal of 1% of GDP. DFiR anticipates that the broad support for defense research among knowledge environments will diminish unless the prioritization of defense research results in an increase in the public research budget.

Decentralized vs. Centralized Capacity Building

There is consensus among key defense and knowledge environment stakeholders that a significant portion of defense research should be conducted in a decentralized manner at universities, GTS institutions, and companies. This contrasts with a centralized approach where military laboratories conduct research and development themselves. This approach is known from countries like Sweden and Norway, where the military has large research and development units. The Danish consensus is based on the assessment that it is more resource-efficient to adopt a decentralized model where knowledge environments can simultaneously work on both civil and military applications.

A prerequisite for a successful decentralized strategy is that the Danish defense sector builds capacity to engage in dialogue with the innovation ecosystem. In the future, the defense sector must focus on the maturation and development of technologies and knowledge environments. This requires technical and organizational insight and necessitates long-term capacity building. It was emphasized in DFiR's debate series that the dialogue between the defense sector and innovation system actors should be based on the development of

[1] *Forsvarsforskning* anvendes som et fællesbegreb for forsknings- og udviklingsaktiviteter inden for sikkerhed, forsvar og rumområdet.

both a needs and an opportunities catalog. In the needs catalog, the defense sector should present future needs that Danish knowledge environments can align with. Additionally, Danish knowledge environments should contribute to the development of an opportunities catalog to inspire the defense sector's future development areas. It should be noted that the defense sector should have a broader perspective than just technological aspects. Significant gains can be made in knowledge and capacity building in the humanities and social sciences. For example, parts of psychology, such as intelligence testing and crisis psychology, have found applications in the military.

Enhancing Security Culture

An overall increased prioritization of defense research will necessitate an enhancement of the security culture in Danish knowledge environments, particularly due to Denmark's focus on a decentralized approach where defense research is conducted in broader and more diverse environments than in a centralized approach. This increases the risk of unintended knowledge transfer and requires environments to be vigilant about the risk of espionage. As highlighted in one of the debates, most researchers, like people in general, have an unbreakable bond with their homeland. At the same time, Danish research is conducted within global networks, so any enhancement of security at Danish universities must respect international collaborations. In the future, a security approach should be developed based on a nuanced conceptual framework that considers key differences, for example, between applied research and basic research. In applied research, there is an immediate risk of industrial espionage and IP theft. Public knowledge environments and industry must protect themselves by conducting background checks and limiting access to laboratories. In contrast, basic research, which investigates general principles and phenomena, is fundamentally different. It requires publication in international journals, where results and processes are shared in great detail. For basic research, global exchange is crucial for maintaining and developing a competitive environment, and the risk from such exchanges is limited since research ideas and methods are published anyway. It is vital that Danish knowledge environments have access to collaborations with leading global environments in basic research. It would be a mistake to assume a one-way knowledge transfer from Danish to foreign environments. Denmark benefits from exchanges with researchers abroad, including those from countries with differing values.

In enhancing the security culture, the potential for increased compartmentalization of research activities should be explored. This can be supported through the establishment of a new funding body focused on defense research, which imposes specific security requirements on the projects it finances. This could help separate defense research from the rest of researchers' project portfolios and make it easier to enhance security on individual projects without it affecting the entire research portfolio. One possibility is the establishment of a Defense Technology Development and Demonstration Program (FUDP). This would be a natural addition to the Danish research and innovation system, which already includes the Green Development and Demonstration Program (GUDP), the Energy Technology Development and Demonstration Program (EUDP), and the Environmental Technology Development and Demonstration Program (MUDP).

DFiR assesses that enhancing security will inevitably be an administrative and financial burden for Danish institutions. Increased compartmentalization will also place new demands on research institutions' processes and infrastructure. The council believes that a nuanced approach to security is necessary for support for an enhanced security culture. If there is no perceived alignment between goals and means, support will diminish.

Individual Responsibility

There will also be a need for individual researchers to actively consider their boundaries for participating in defense research. It is not a binary choice between contributing to defense research or not. Military applications can involve the development of offensive and defensive weapons or knowledge and technologies that support strategy, organization, logistics, or other auxiliary operations. It must be up to each researcher to determine where their boundaries lie. Additionally, the concepts are further complicated by the fact that most defense research will have both military and civilian applications – so-called dual-use. University leadership must protect academic freedom, allowing individual researchers to set their own boundaries.

Next Steps

It is certain that Danish research and innovation policy in the coming years will need to address geopolitical and defense issues. DFiR will continue to monitor the agenda and is open to dialogue with stakeholders on potential future analyses.

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