Tesi

# Defence

## Market study on Finnish military product and dual use companies

2024

# Foreword

In light of the return of war to Europe, the notion of robust defence capabilities has resurged. This has sparked increased activity in the business sphere, including the rise of new defence technology firms and heightened investor interest.

Tesi has been actively investing in defense firms for years, though a consolidated view of the industry and key trends has primarily resided in the minds of specific individuals. At the same time, the defence industry and its stakeholders have traditionally been conservative in publicizing their activities.

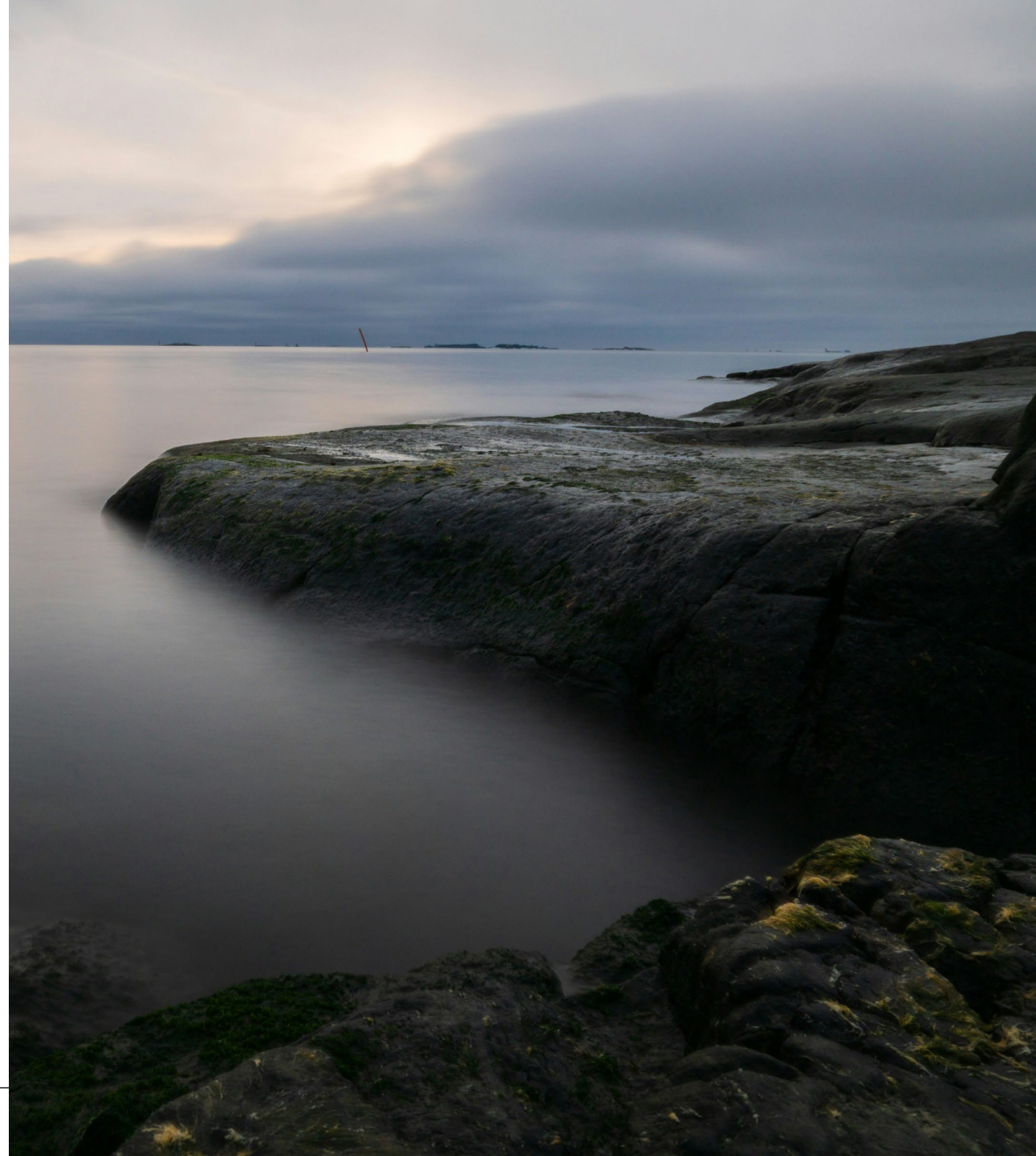
In response, we have now conducted the first Tesi Defence market study. This review offers an overview of the current state and historical development of the Finnish defence industry, with a particular emphasis on investment opportunities in emerging ventures. The study provides a detailed snapshot of defence firms in Finland, categorized by firm type, key technologies, and customer segments.

As part of our mission to promote economic growth, innovation, and investment, Tesi has decided to release select insights from this study to engage investors and other relevant stakeholders.

The analytical work behind this study was made possible through collaboration with a wide range of internal and external partners. Special thanks to Iina and Lauri for their dedication and thorough data collection over the summer months. Your contributions were essential to the success of this study.

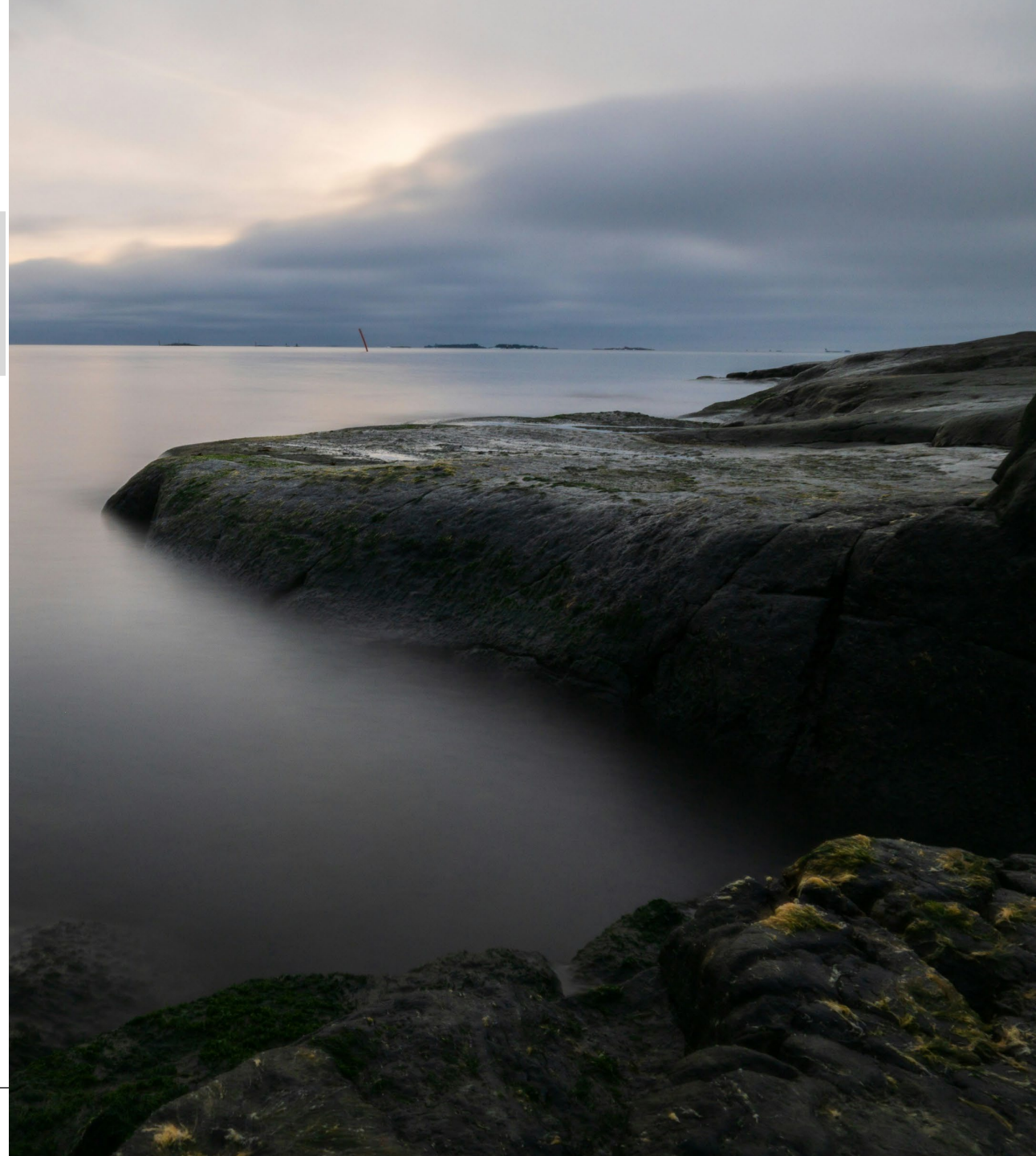
Jakob Sandell

Research Manager



# Agenda

- Executive summary
- Background and context
- Market overview
- Financial development
- Funding and ownership



# The Finnish Defence industry is a mix of well-known traditional manufacturing firms and emerging startups – AR/VR and robotics quickest growers

## Executive summary – market overview

- The interest in the Defence industry has grown significantly due to geopolitical tensions around the world, and Finland is no exception. Despite media attention, rising sales levels and increased investments, the European defence industry as a whole is still underfunded. Thus, we have set out to navigate the Finnish Defence industry by categorizing firms according to their activities and diving deeper into their financial development, funding structure and data on decision makers and owners.
- We have aimed at establishing a comprehensive view on the Finnish Defence industry, yet focused on the emerging growth firms most relevant for Tesi's investment activities.
- We have identified 368 Defence firms in total, with some 144 of them being high-growth firms focused on either military technologies or dual use applications. The remainder of firms are typically established firms with long track records or primarily provide professional services to military forces (and other customers). Although 50% of Defence firms are in Uusimaa, they are generally quite scattered around the country with many of them in small municipalities.
- Although the oldest Defence firms are from the 19th century, the industry as a whole is quite young with the peak in founding activity in 2016. In addition to new firms being founded, established ones are maturing to larger sizes. The most notable verticals within Defence as a whole are information technology and manufacturing, whereas niche verticals such as AR/VR and robotics display the highest revenue growth figures among emerging miltech/dual use ventures.
- There are only a handful of pure miltech startups in Finland, and most emerging ventures are dual use firms whose applicability is mostly in support, logistics and C4I[1] activities. The most prominent subcategory of startups is Sensing, connectivity and cybersecurity.
- Although the Finnish Defence Forces are experienced in arctic warfare, arctic knowledge isn't visible in most Defence firms' offering. The clear exception is firms targeting Naval customers, where over 60% of the identified firms possess significant arctic experience.
- Defence firms in general seem to be open for exports, with most of them having their online presence either both in Finnish and foreign languages, or only foreign languages. The multiplication in granted export licenses for military equipment between 2022 and 2023 indicate significant growth in future exports.



1) Command, control, communications, computers and intelligence

# Geopolitical instabilities translate to growing revenues and investment needs – the role of domestic investors is significant especially in early stages

## Executive summary – financials, funding and ownership

- The five different categories used in this report have very different financial characteristics: the dual use technology category has by far the highest revenue growth rates around 30-40%, whereas Established defence, basic manufacturing and professional services are profitable but mostly lack double-digit growth rates. Miltech firms, by far the smallest category, typically display moderate growth rates and positive but weak profitability.
- Dual use technology and miltech firms' sales development has been strong, and accelerating, in recent years. With total sales around €235m in 2022, they have grown at a median CAGR of 5-8% in recent years. VC investments in these emerging firm categories have similarly grown, with a peak year in 2022 due to large investment rounds in a few notable dual use technology firms.
- Most Defence firms are privately held by Finnish owners, and VC funding is notable only in Dual use technology and Miltech firms. The Finnish government is also a notable investor through its' investment firms.
- Most board members are Finnish males. The share of newly appointed foreign board members increased gradually between 2014-22, but retracted in 2023. The current share lies at 21% (with a further 2% being dual citizens). The share of female board members has also increased in recent years, with 18% of current Defence firm board members being female.
- Investor syndicates are typically quite diverse in terms of investor nationalities. Deals below €2m are typically done solely with Finnish investors, but in later rounds cross-border syndicates are the norm.



1) Command, control, communications, computers and intelligence

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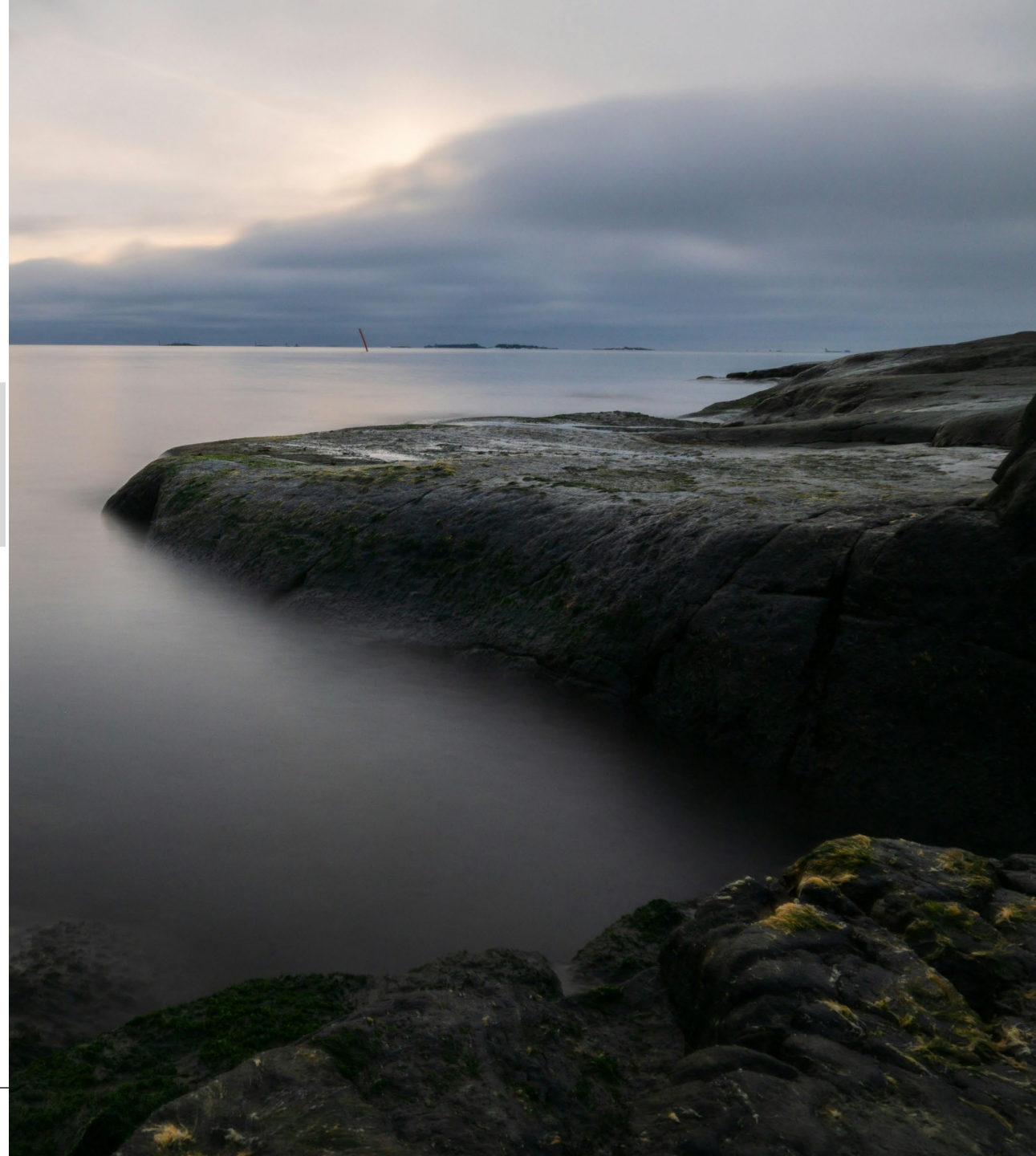


# Given the rising global interest in Defence and skyrocketing VC investments, we have set out to map the Finnish Defence landscape

## Background and objectives

### Global perspective[1]

- The global security environment has undergone significant changes over the past years, profoundly impacting the defence industry. The Russian invasion of Ukraine and tensions between China and Taiwan have led many countries to reassess their strategic defence landscapes.

1. An unprecedented boost in revenue expected for the defence industry as many countries increase their military budgets.
2. The rise in military spending can drive innovation by implementing commercial technologies in defence applications and increasing the use of private capital in defence.
3. The private funding for defence innovations is still limited. GP-LP agreements, ESG considerations, and other factors are posing challenges.

### Finnish perspective[2]

- The escalating geopolitical tensions and NATO membership have led us to reevaluate our strategic defence landscape.

1. The geographic position as a NATO border country sets an even more critical need for increasing domestic production and technology development.
2. Finnish domestic market is relatively small, but the new era of increasing NATO and EU collaboration presents a unique opportunity for the industry. The average export level (~40% in 2022) of the defence sector is expected to rise.
3. Finland is dedicated to meeting NATO two-percent guideline, with an estimated defence budget of 6.2 billion in 2024. Additional resources can be directed for the procurement of new capabilities and increasing and updating material and ammunition stocks.

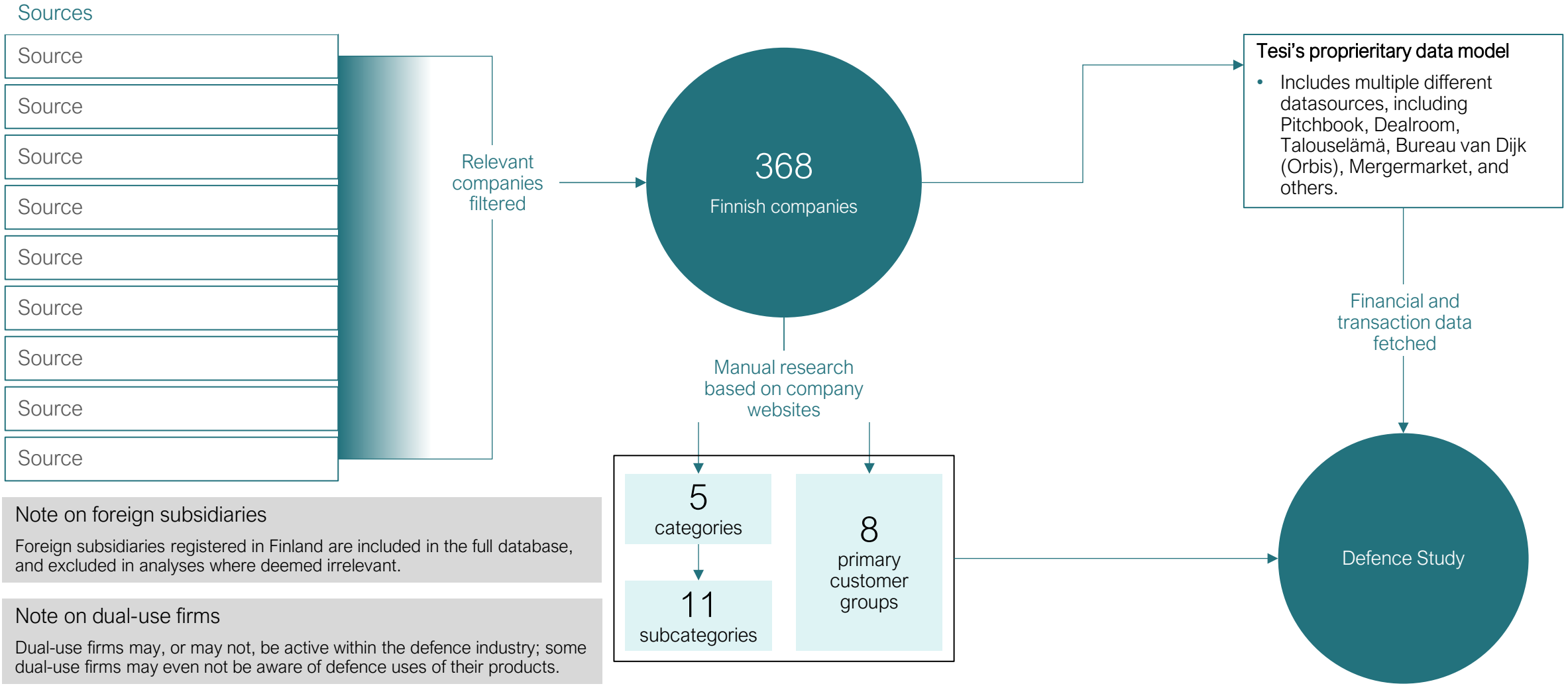
### Tesi's objectives

- To support our investment activities and understanding of the market, we have set out to provide an overview of the current state and historical development of the Finnish defence industry with a focus on investment opportunities in emerging ventures.
- Tesi has an industry-focused mission aimed at promoting economic growth, innovation, and investments. Given this mission, we have decided to publish select elements of our study to showcase the industry to investors and other relevant stakeholders.



Source: Deloitte; PwC and Jones Group International

# Defence firms have been identified from industry sources a handful of industry associations and other sources, and then vetted by high-level desktop research



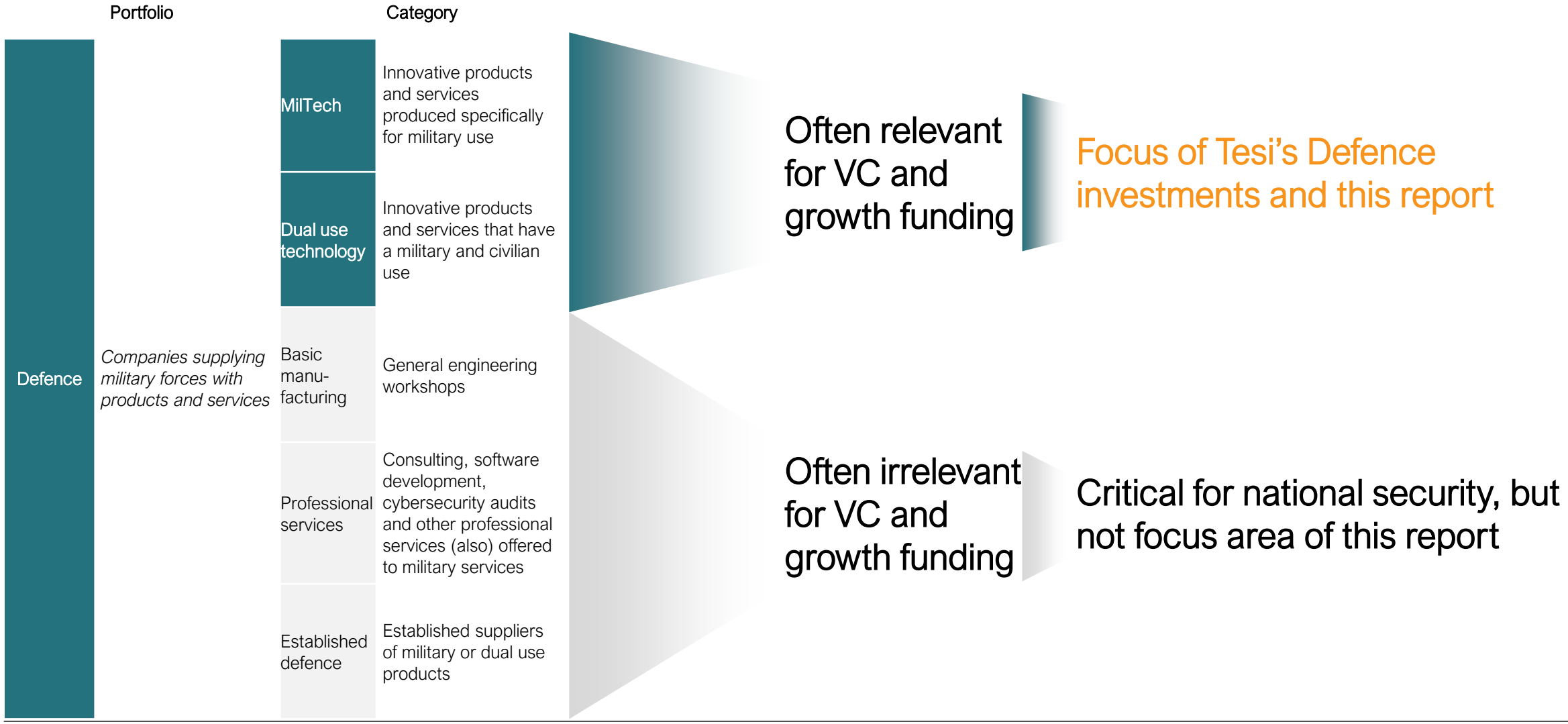

**Note on foreign subsidiaries**

Foreign subsidiaries registered in Finland are included in the full database, and excluded in analyses where deemed irrelevant.

**Note on dual-use firms**

Dual-use firms may, or may not, be active within the defence industry; some dual-use firms may even not be aware of defence uses of their products.

# We have looked at the entirety of Finnish Defence contractors, but focused on emerging growth firms in focus of Tesi's investment activities






Although we have aimed for a full view of the defence industry, we note that e.g. retailers and catering firms are missing from the mapping.

# In addition to a five-category division of firms, we have viewed firms through a tech-based subcategorization

| Portfolio | | Category | |
|---|---|---|---|
| Defence | *Companies supplying military forces with products and services* | MilTech | Innovative products and services produced specifically for military use |
| | | Dual use technology | Innovative products and services that have a military and civilian use |
| | | Basic manu-facturing | General engineering workshops |
| | | Professional services | Consulting, software development, cybersecurity audits and other professional services (also) offered to military services |
| | | Established defence | Established suppliers of military or dual use products |

| Subcategory | |
|---|---|
| Biotechnology | Living systems to produce a wide range of technologies and capabilities, from fighting global pandemics and avoiding surprises to reducing logistics and sustainment costs and increasing energy efficiency. |
| Quantum | Study of physical properties at small, even atomic, scales. Defense applications include atomic clocks, quantum sensors, quantum computing, and quantum networks. Quantum sensors promise the ability to provide unprecedented accuracy in position, navigation, and timing |
| Advanced materials & manufacturing | Innovative new materials and novel manufacturing techniques that can dramatically improve many capabilities. Materials that have higher strength, lighter weight, higher efficiency, and can handle more extreme temperatures will have the potential to better protect service members and enhance their ability to accomplish their missions. |
| Space | Space technologies include space flight, Space communication and other technologies needed to maintain space operations. |
| Human machine interfaces | Human-machine teaming & augmented and virtual reality. Highly immersive realistic training environments provide real-time feedback to enhance warfighter performance. Intuitive & interactive human-machine interfaces enable rapid mission planning and command by providing a common picture to geographically distributed operations. |
| Sensing, connectivity and cybersecurity | Next-generation wireless networks, advanced sensors, electronic warfare & information security |
| Energy generation and storage | Includes solar wind, bio-based and geothermal technologies, advanced energy storage, electronic engines, and power grid integration. From more efficient batteries to diversifying energy sources & reduced fuel transportation risks, renewable energy generation and storage add resilience and flexibility in a contested logistics environment. |
| Advanced computing and software | Advanced computing and software technologies include supercomputing, cloud computing, data storage, computing architectures, and data processing. |
| Semiconductors & microelectronics | Microelectronics are circuits and components that serve as the "brain" to human-made electronic functional systems. Virtually every military and commercial system relies on microelectronics. |
| Autonomous Systems | Expanding capabilities of software applications to perform tasks that currently require human intelligence. Autonomy is the engineering discipline that expands robots' abilities to perform tasks while limiting the need for human interaction. Includes unmanned aerial vehicles. |
| Other | All other industries that have a direct military use, but do not fit into the above categories |



Although we have aimed for a full view of the defence industry, we note that e.g. retailers and catering firms are missing from the mapping.

# Most firms can be assessed to serve one primary military branch

| Primary user | Land | Sea | Air | Space | C4I | Support and Logistics | Multi-use |
|---|---|---|---|---|---|---|---|
| Example customers | Maavoimat | Merivoimat | Ilmavoimat | | Pääesikunta | Logistiikkalaitos | |
| Description | Military operations and capabilities related to ground forces. It includes the equipment, personnel, and infrastructure required to conduct land-based warfare. | Naval operations and maritime defense. It includes the fleet, submarines, and maritime surveillance systems used to control and defend sea territories. | All aspects of aerial warfare and defense. It includes aircraft, unmanned aerial vehicles (UAVs), and air defense systems that support air superiority and ground support operations. | Military operations in outer space and space warfare. Countries with nascent military space capabilities usually organize them within their air forces. | Centered around the systems and infrastructure that facilitate command and control, communication, data processing, and intelligence gathering. It is essential for strategic planning, real-time decision-making, and effective coordination of military operations. | Practical aspects of maintaining and supporting military operations. It includes the management of supplies, equipment maintenance, transportation, training & simulations, and other services that ensure military readiness and sustainability. | Multi-domain operations that clearly span across more than one branch of military service and where a primary user cannot be clearly defined. |



C4I= Command, control, communications, computers, and intelligence

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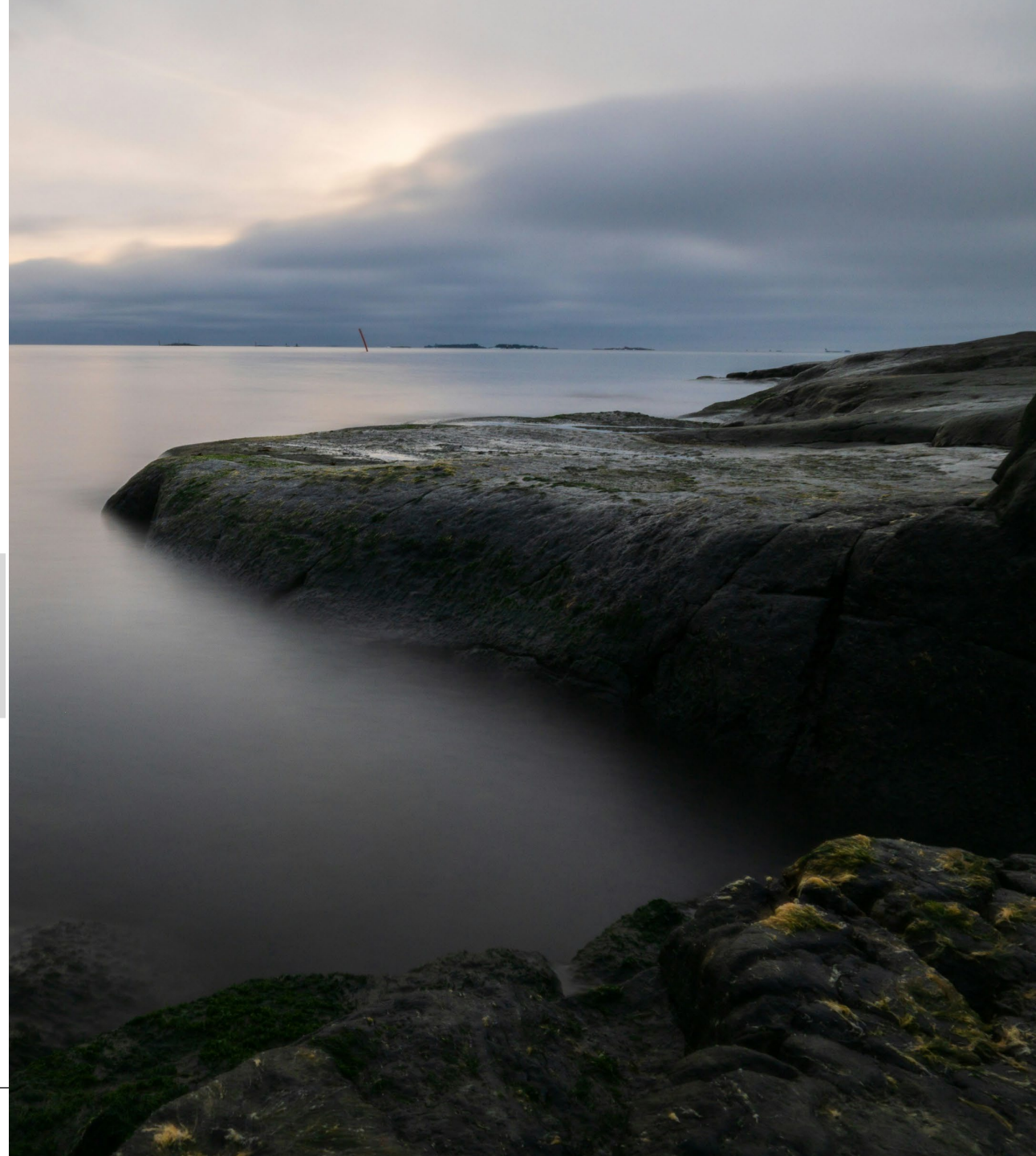
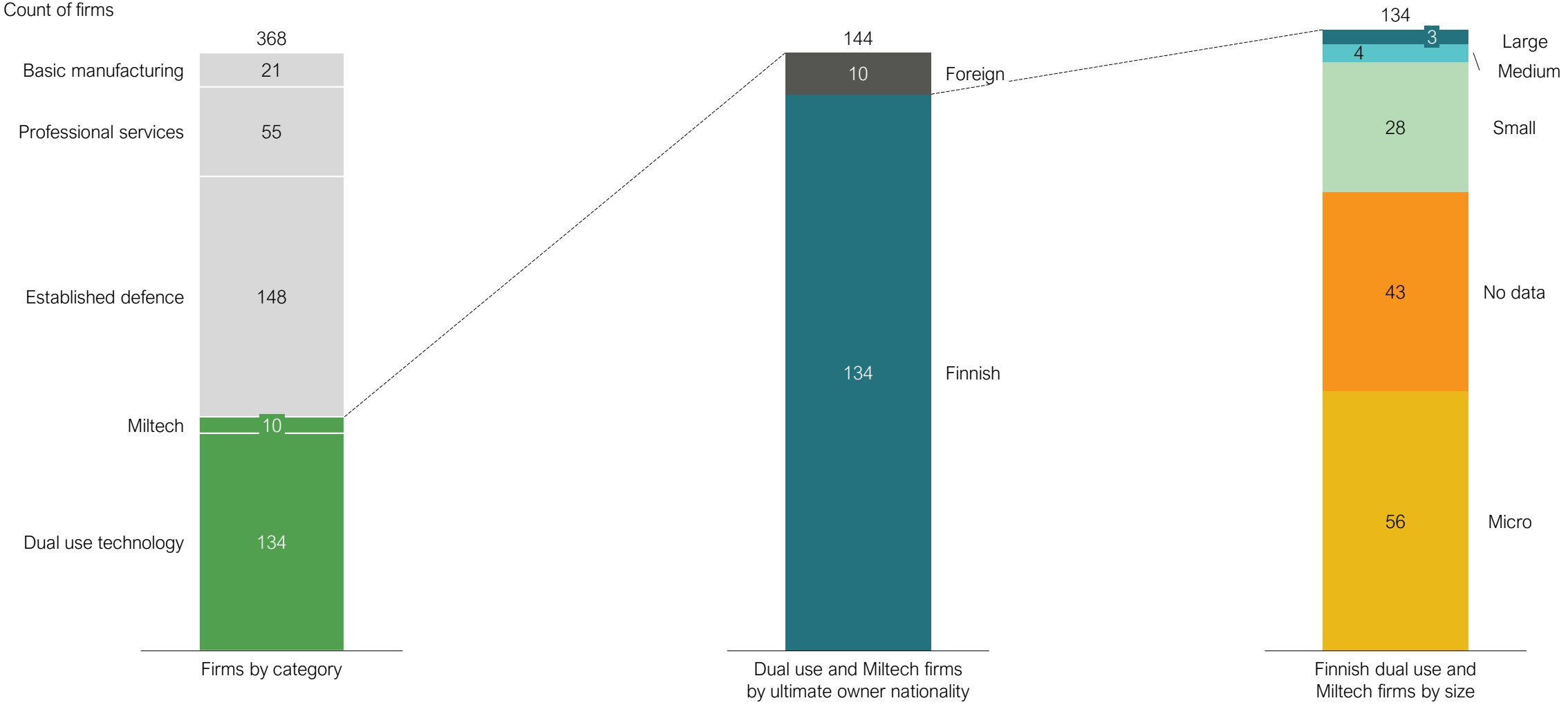


# There are 300+ firms active in Defence in Finland, with 130+ of them being innovative startups in Finnish ownership

## Firms by category, ownership and size





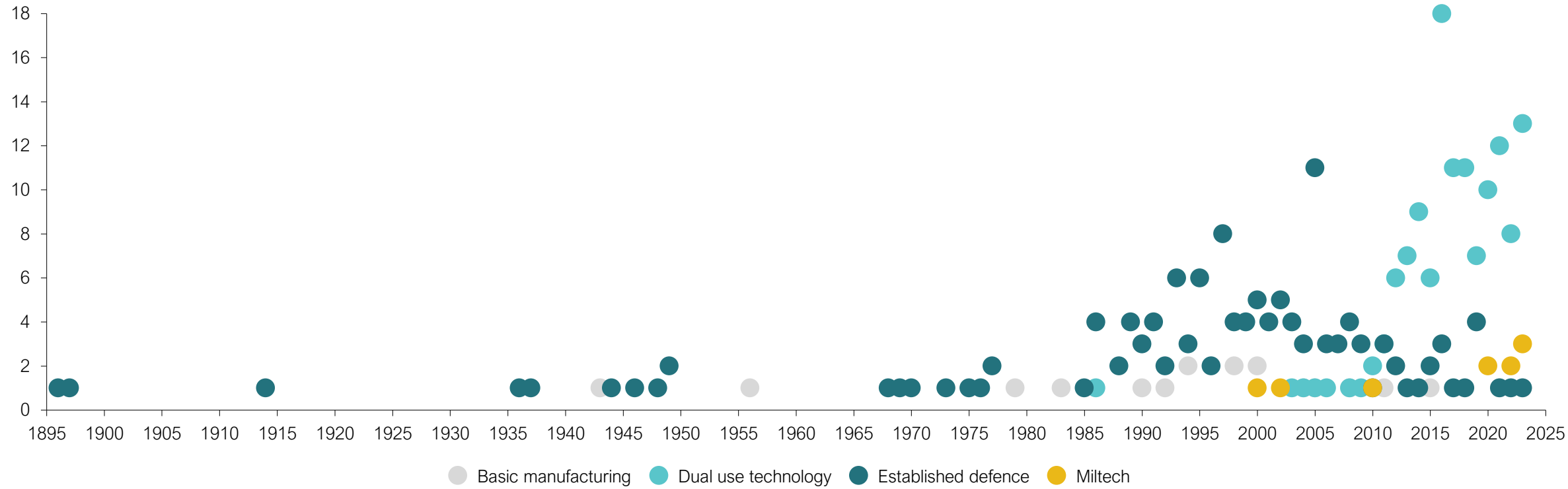

Size according to OECD definitions: Micro < 10 FTEs; Small 10-49; Medium 50-249; Large 250 FTEs and above

# The Finnish defence industry is seeing a new renaissance – majority of new entrants are dual use firms

## Defense firms by subcategory and year of founding

Excluding professional services

Count of firms founded each year



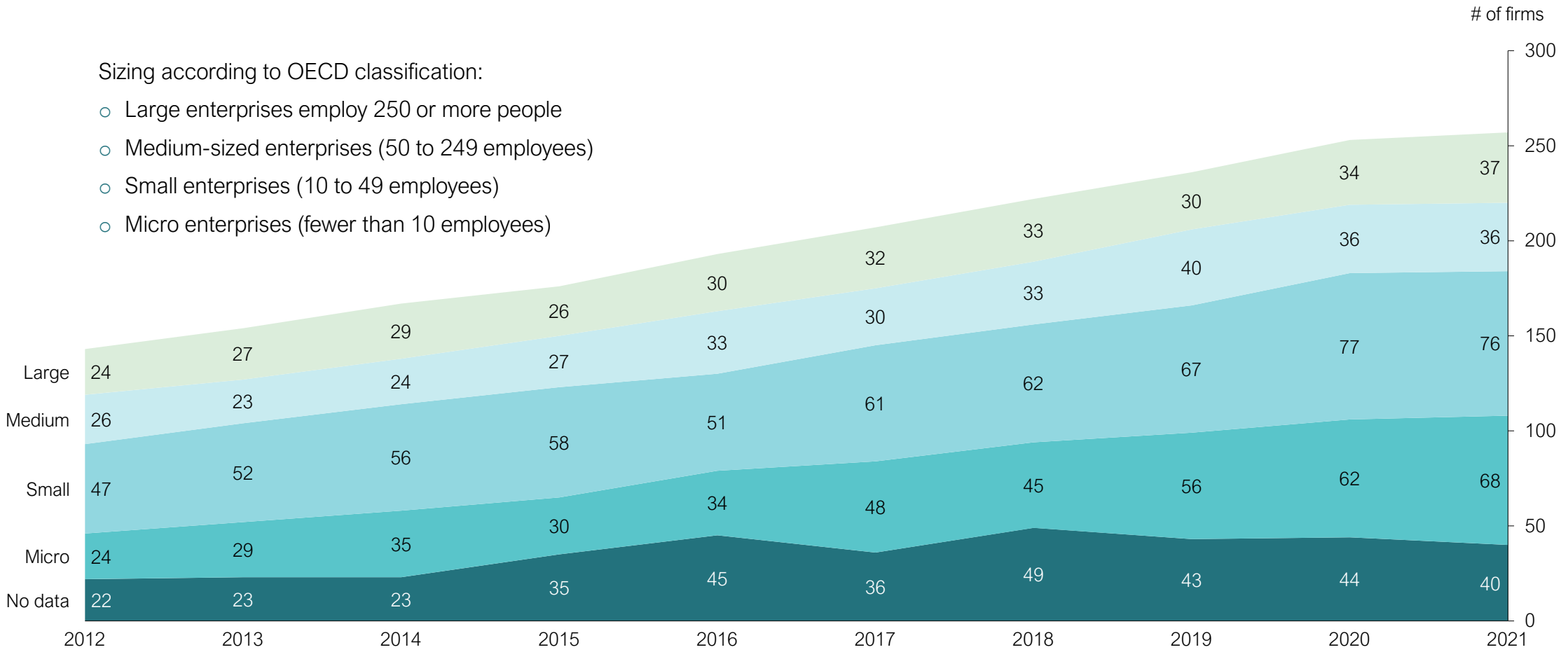

Note: Includes only currently active firms

# In addition to new firms popping up, previously established are growing to the next size class

## Defence firms by size class

Excluding professional services

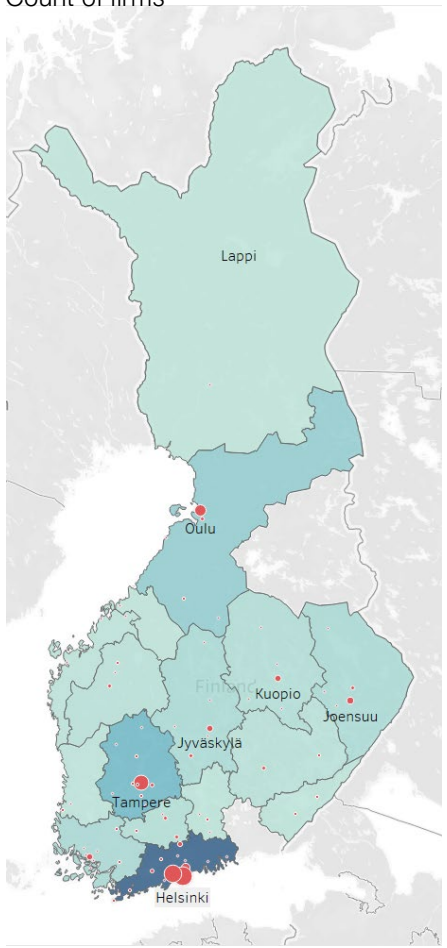
Count of firms

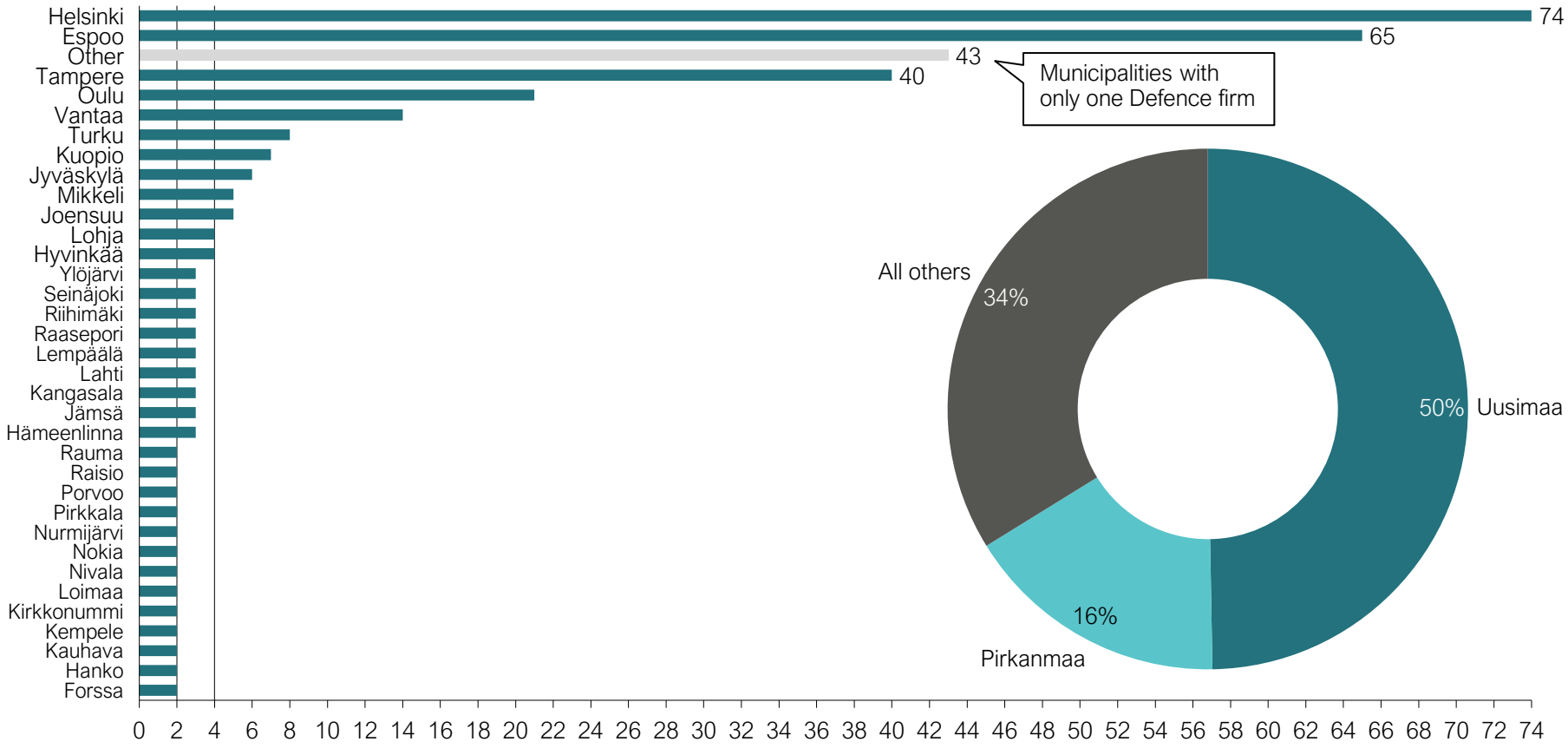


# The Helsinki region and Tampere are the largest Defence hubs in Finland, but firms are spread across the country

## Firm headquarters by city and county

Count of firms



# Industrial manufacturing and software are some the most notable verticals within Finnish Defence firms

## Key verticals within the Finnish Defence ecosystem


Note: Based on TOP5 verticals for each firm, as analyzed by Vainu

# Most Finnish defence firms focus on support activities

## Firms by category and primary customer

Count of firms

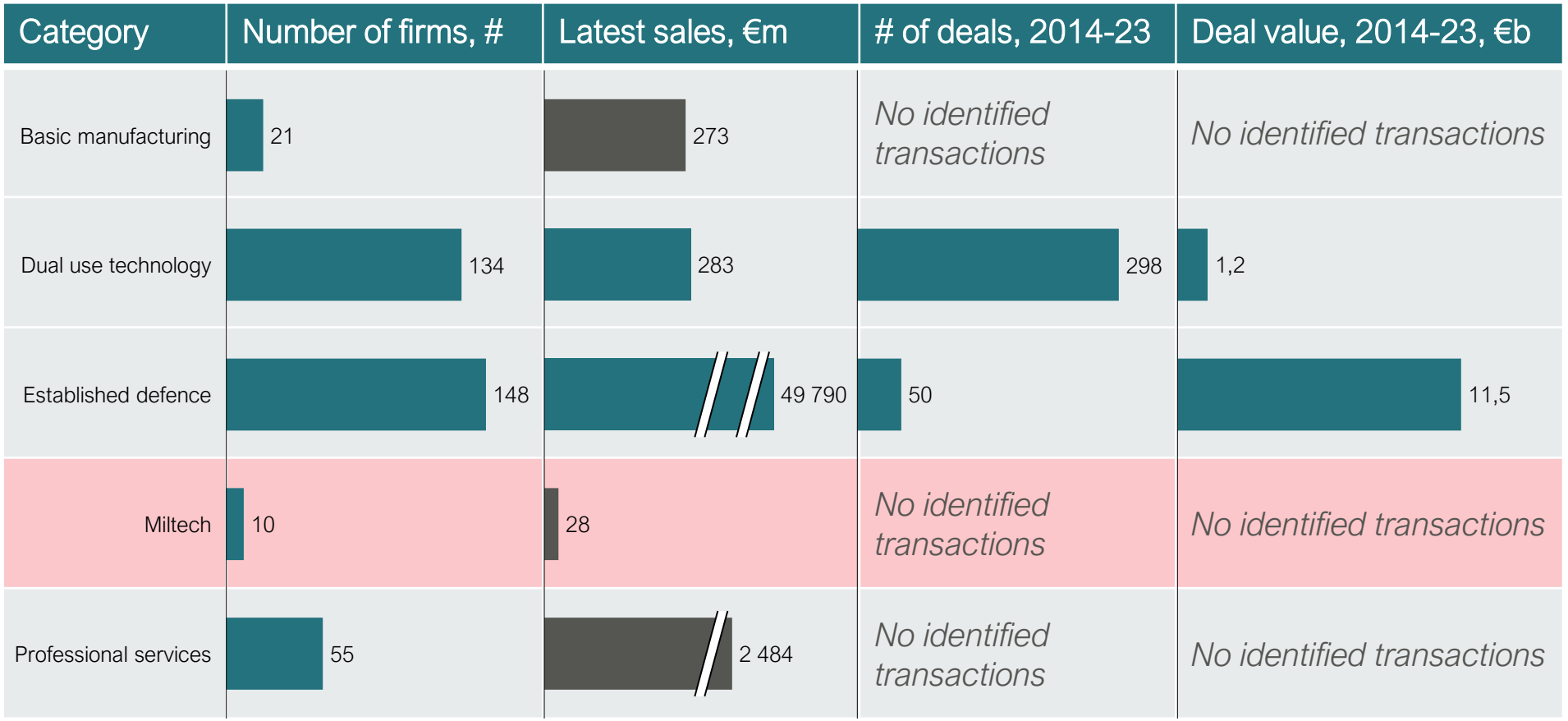
| | Land | Sea | Air | Multi | Space | Support & logistics | C4I | Total |
|---|---|---|---|---|---|---|---|---|
| Miltech | 7 | | | | | 2 | 1 | 10 |
| Dual use technology | 3 | | 6 | | 4 | 86 | 35 | 134 |
| Basic manufacturing | | | | | | 21 | | 21 |
| Professional services | | 1 | | | | 49 | 5 | 55 |
| Established defence | 10 | 12 | 4 | 5 | | 88 | 29 | 148 |
| Total | 20 | 13 | 10 | 5 | 4 | 246 | 70 | 368 |

S&L=Support and logistics, C4I= Command, control, communications, computers, and intelligence

# There are very few pure miltech startups in Finland

## Categories by count of firms, latest sales, count of transactions, total transaction value

Count of firms in #, €m, #, €m




**Bottlenecks in the Miltech market?**

- Very few companies focus solely on defence equipment and are clearly innovative
- The large number of sources and significant overlaps in them (DIANA applicants also on PIA's lists, etc.) suggest a limited number of defence-focused startups
- Possible obstacles include the size and difficulty of the target market, the limited activity of the Finnish Defence Forces in the startup scene, and GP's restrictions on investments to military startups

Note: Many firms within the categories Basic manufacturing, Established defence, and Professional services generate most revenues beyond defence purposes. Talouselämä estimates the total Defence industry's revenues at approx. €1,9b in 2021.

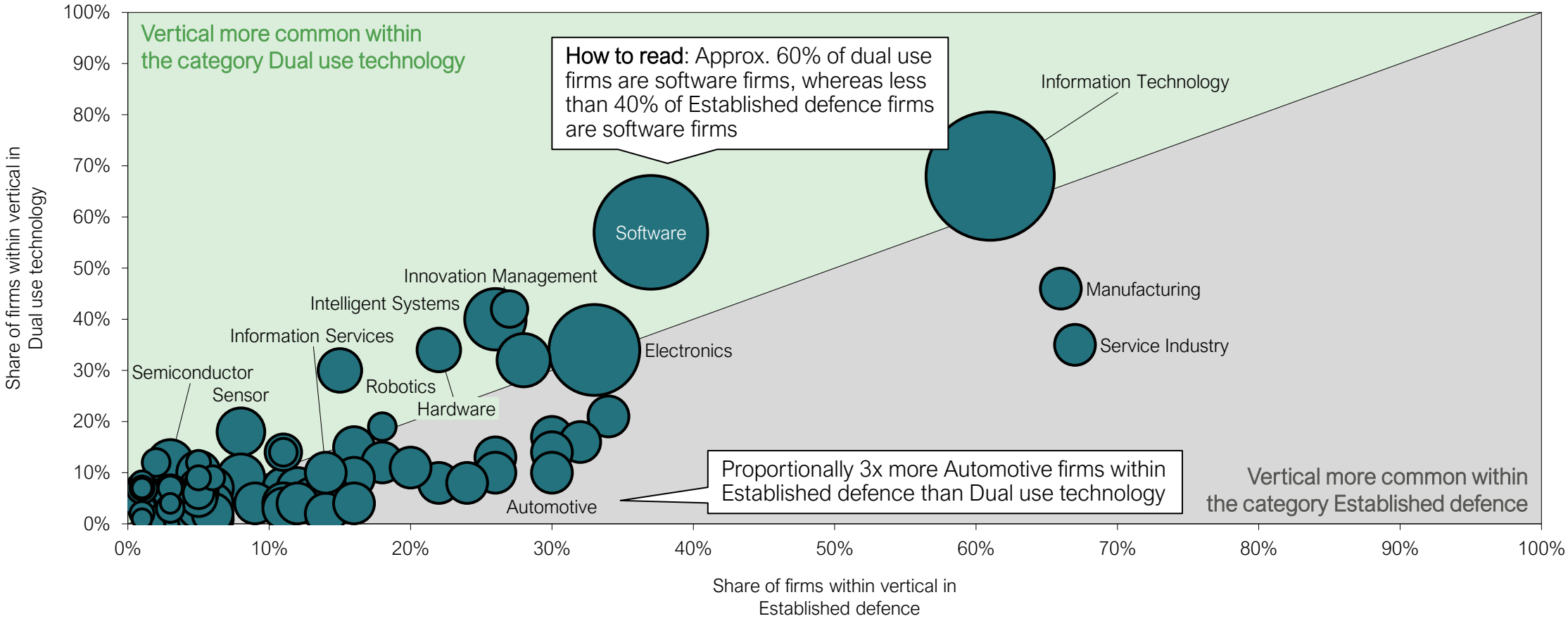


Size according to OECD definitions: Micro < 10 FTEs; Small 10-49; Medium 50-249; Large 250 FTEs

# Dual use technology firms are likelier to be in emerging industries such as software and semiconductors, compared to the more traditional firms in Established defence

## Verticals comparison, Dual use technology vs. Established defence

Share of firms within vertical (%)



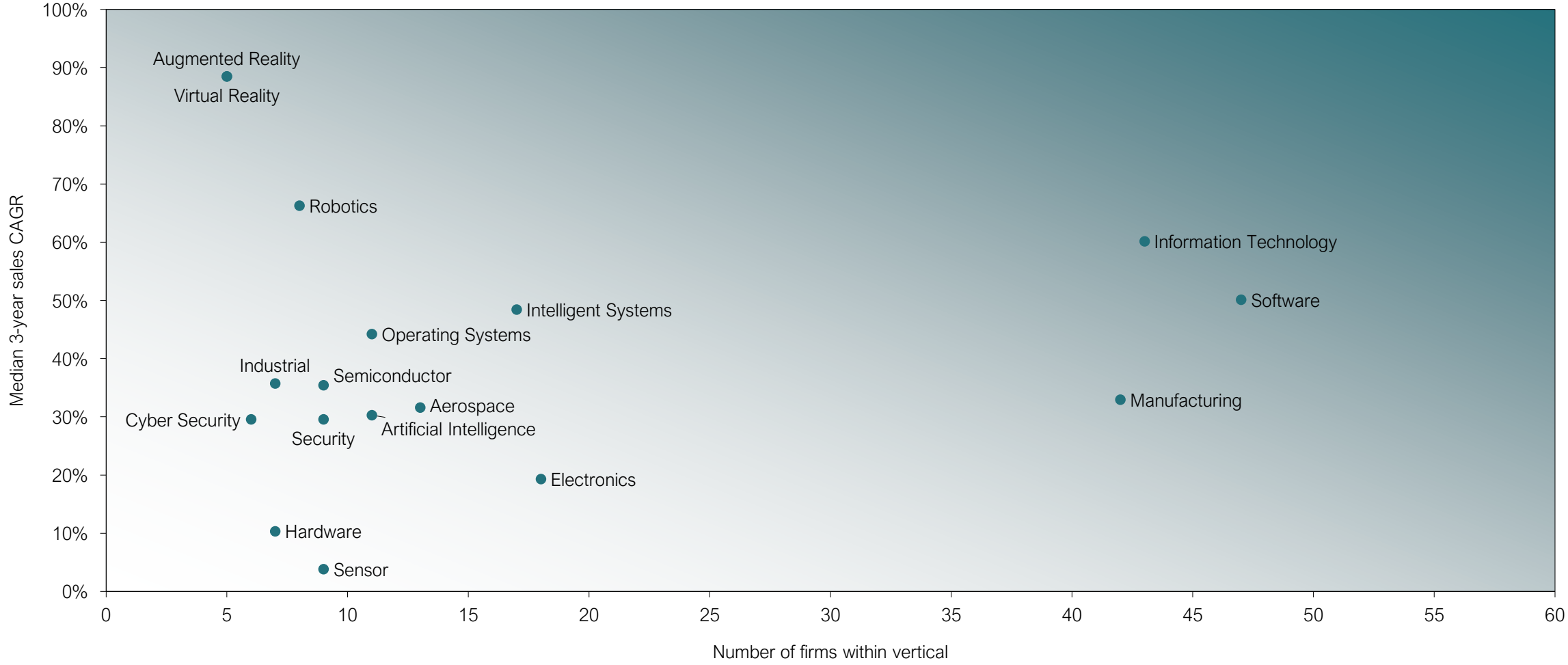

Bubble size represents number of firms within vertical among Dual use technology and Established defence firms
Based on TOP5 verticals for each firm, as analyzed by Vainu

# AR/VR and robotics are some of the highest growth verticals in emerging Defence firms

## Key verticals in Dual use technology and Miltech

Dual use technology and Miltech only

Number of firms within vertical; Median 3-year sales CAGR (%)




One firm typically belongs to multiple verticals, meaning that the verticals are overlapping rather than mutually exclusive.
Only top 5 verticals per firm included; only verticals with at least 5 firms with revenue growth figures included.

# Manufacturing and IT-related innovators are the spearhead of Finnish Miltech and Dual Use technology firms

## Miltech and Dual use technology firms by subcategory and primary customer

Miltech and Dual use technology firms only

Count of firms

| | Land | Air | Space | S&L | C4I | Total |
|---|---|---|---|---|---|---|
| Advanced computing and software | | | | 15 | 7 | 22 |
| Advanced materials & manufacturing | 5 | 1 | | | 25 | 31 |
| Autonomous Systems | 3 | 3 | | | 2 | 8 |
| Biotecnology | | | | | 1 | 1 |
| Energy generation and storage | | | | | 12 | 12 |
| Human machine interfaces | | 1 | | | 5 | 6 |
| Other | | 1 | | | | 1 |
| Quantum | | | | 3 | 1 | 4 |
| Semiconductors and microelectronics | | | | | 3 | 3 |
| Sensing, connectivity and cybersecurity | 2 | | 1 | 14 | 32 | 49 |
| Space | | | 3 | 4 | | 7 |
| Total | 10 | 6 | 4 | 36 | 88 | 144 |

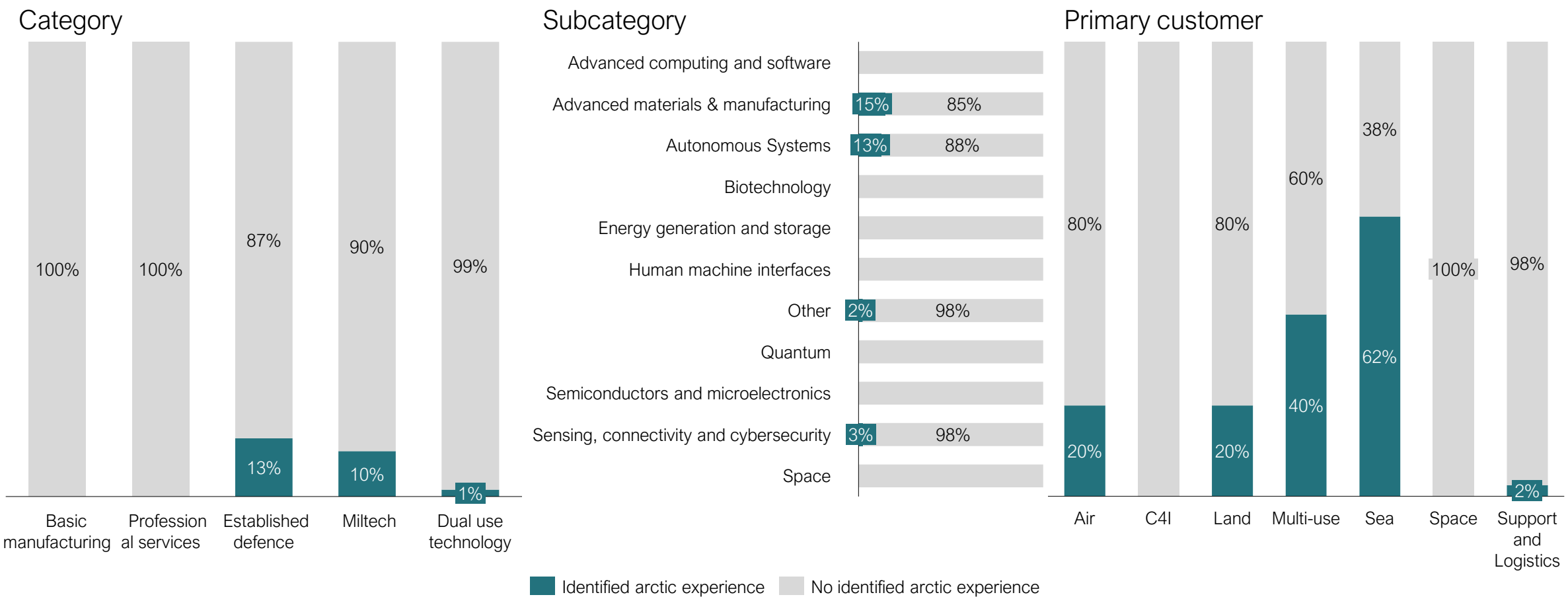


C4I= Command, control, communications, computers, and intelligence

# There aren't too many Finnish firms focused on naval products and services, but the ones that do, often have an specialized arctic focus

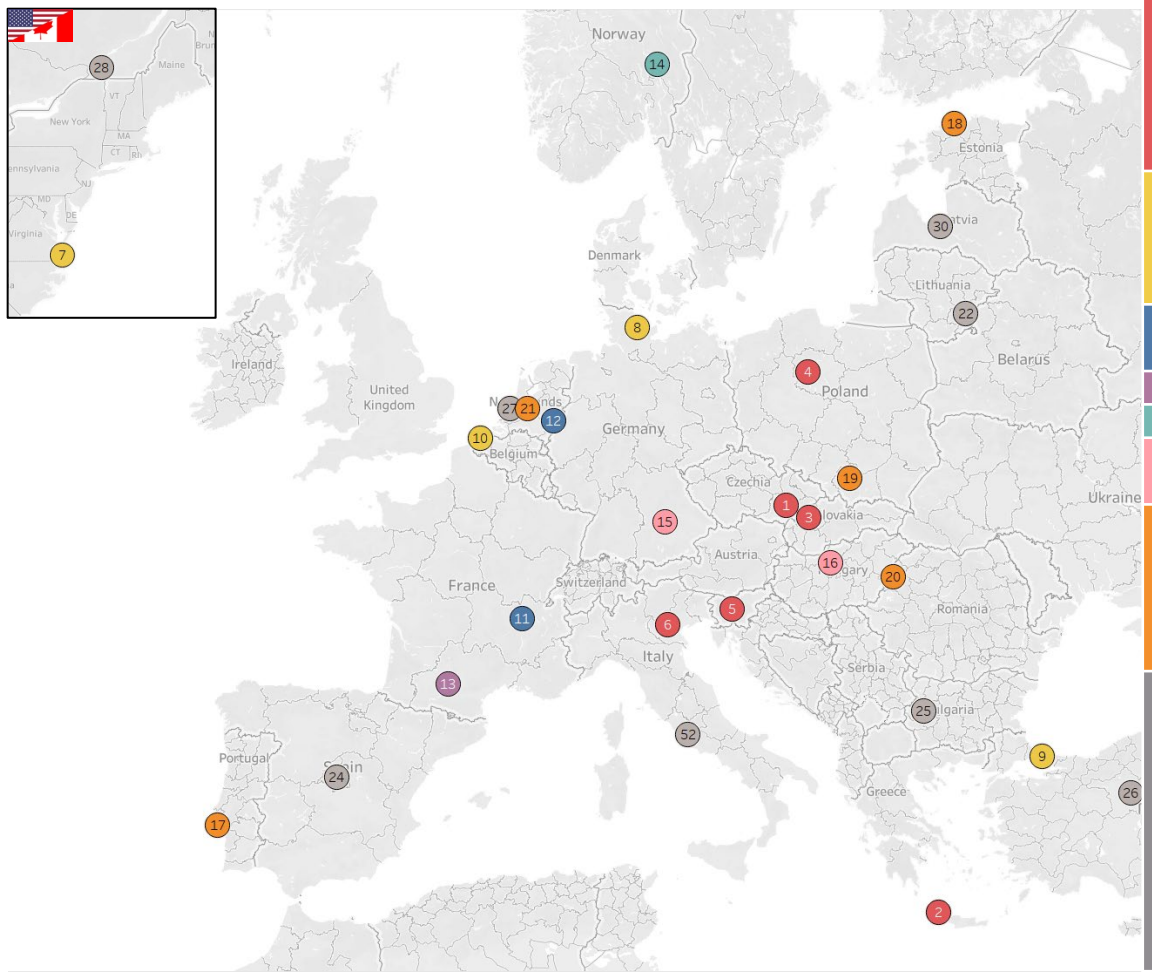
## Firms with identified arctic experience

Share within category, subcategory and primary customer



# Existing NATO Centres of Excellence are a varied mix of niche knowledge areas – most cannot be easily tied to a specific technology area

## NATO Centres of Excellence




| Customer | # | Centre of Excellence | Technology area |
|---|---|---|---|
| Land | 1 | Chemical, Biological, Radiological and Nuclear Defence | Biotechnology |
| | 2 | Integrated Air & Missile Defence | n.a. |
| | 3 | Explosive Ordnance Disposal | |
| | 4 | Military Police | |
| | 5 | Mountain Warfare | |
| | 6 | Stability Policing COE | |
| Sea | 7 | Combined Joint Operations from the Sea | |
| | 8 | Confined and Shallow Waters | |
| | 9 | Maritime Security | |
| | 10 | Naval Mine Warfare | |
| Air | 11 | Air Operations | |
| | 12 | Joint Air Power Competence Centre | |
| Space | 13 | Space | Space |
| Multi-domain | 14 | Cold Weather Operations | n.a. |
| Support and Logistics | 15 | Military Engineering | |
| | 16 | Military Medicine | |
| C4I | 17 | Maritime Geospatial, Meteorological & Oceanographic | Sensing, connectivity and cybersecurity |
| | 18 | Cooperative Cyber Defence | |
| | 19 | Counter-Intelligence | n.a. |
| | 20 | Human Intelligence | |
| | 21 | Command and Control | |
| n.a. | 22 | Energy Security | Energy gen. and storage |
| | 23 | Modelling & Simulation | Human machine interfaces |
| | 24 | Counter Improvised Explosive Devices | n.a. |
| | 25 | Crisis Management and Disaster Response | |
| | 26 | Defence Against Terrorism | |
| | 27 | Civil-Military Cooperation | |
| | 28 | Climate Change & Security* | |
| | 29 | Security Force Assistance | |
| | 30 | Strategic Communications | |



* Under accreditation process
Note: Allocation to customers and technology areas for illustrative purposes

# The Finnish Defence Forces are a critical part of the Finnish Defence ecosystem, and their activity could be enhanced to better support critical innovations

## Role of the Finnish Defence Forces

### The Finnish Defence Forces are a critical customer for Defence innovations

"The Finnish Defence Forces are known in these circles to be an extremely demanding customer, and then they know that if a company has been able to sell something to the Finnish Defence Forces, it is a very desirable reference. It has value in this market."

CEO, Finnish Defence and Aerospace Industries

"A Finnish defence company is not taken seriously in the international market if it does not supply its products extensively to the Finnish Defence Forces and is also their official partner."

Finnish Defence company
in Hirvensalo (2020)

### .. but they lack formal processes to support the development of innovations

The Finnish Defence Forces are not a very interesting customer in product development. The company cannot be sure whether the product development project will continue into production with the same company, or whether the project will be put out to tender after the prototype. In this case, there is a chance that the company that carried out the development work will not receive the actual project.

Hirvensalo: Puolustusvoimat PK-yritysten asiakkaana (2020)

### .. and feedback is typically centered around quality control rather than end-customer feedback

"The companies mentioned that they do not receive any feedback on the quality or functionality of the product. After delivery, there will [only] be a mention of the approval of the quality of the product batch.

The lack of end-user feedback was an important observation from companies. [Many] companies identified the lack of end-user feedback as the biggest flaw in FDF's feedback system. Some companies had no idea how and in what environment the product they manufactured would be used. This affected the design and functionality of the product's features."

Hirvensalo: Puolustusvoimat PK-yritysten asiakkaana (2020)



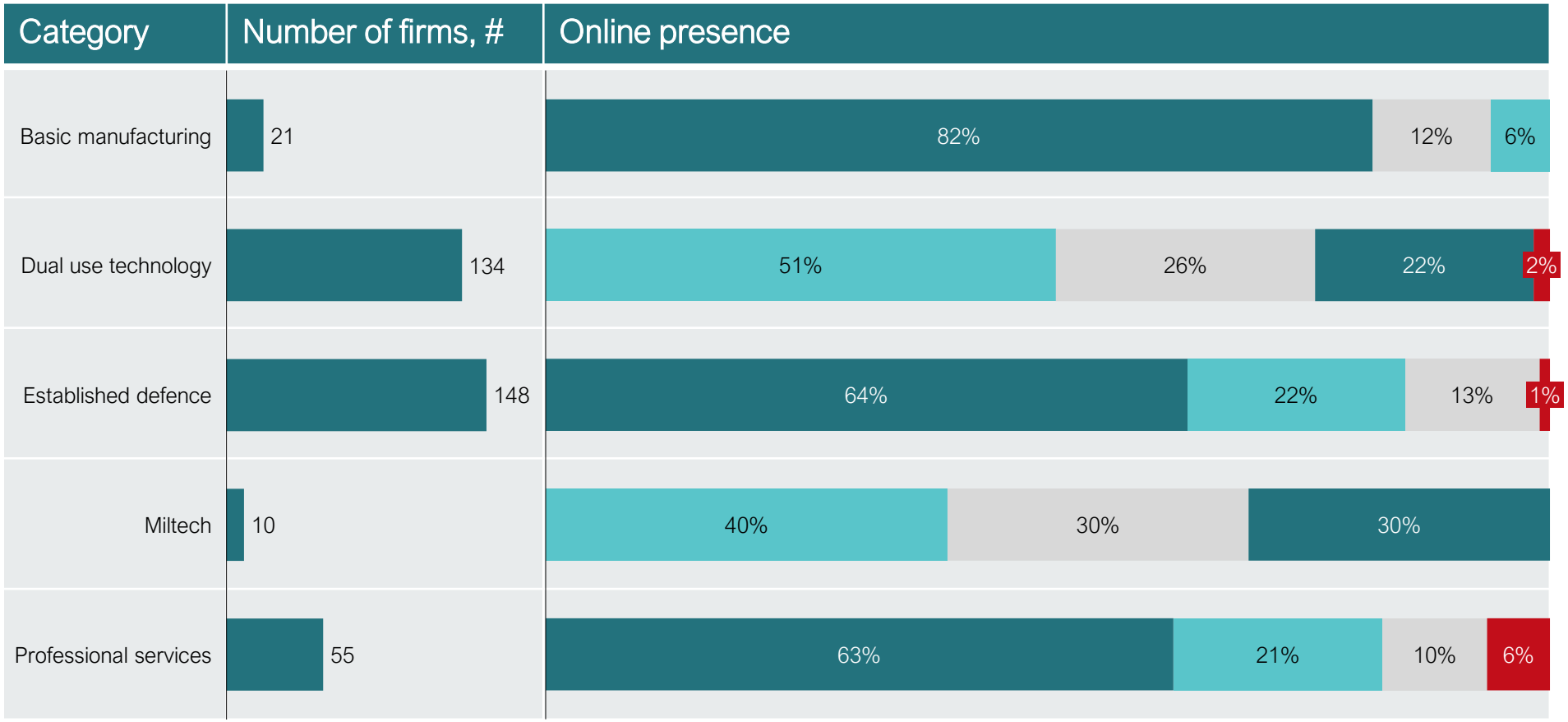
Source: Kauppalehti, Hirvensalo: Puolustusvoimat PK-yritysten asiakkaana (2020)

# Finnish defence firms seem to be open for exports – very few have their webpages only in Finnish, whereas many emerging champions are only in English

## Categories by count of firms and share of webpages in Finnish or other languages

Excluding foreign subsidiaries

Count of firms in #, share of firms within each language category




### Online presence

- We've leveraged Vainu's website tracking to evaluate language versions of each firm's webpage to assess their geographical focus areas

Pages only in Finnish
Pages **only** in English or other foreign language
Pages in **both** Finnish and foreign language(s)
No information

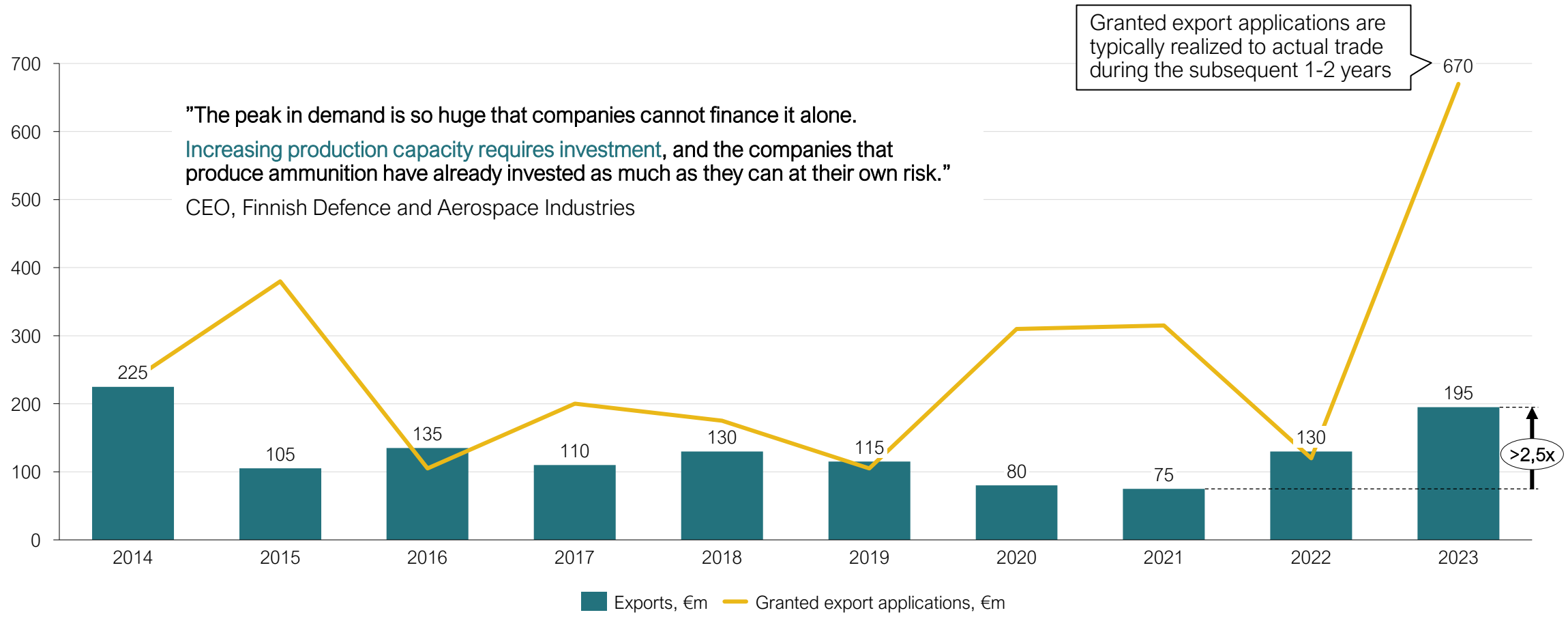
- The results indicate that most firms are open for business beyond Finnish borders – very few have their webpages only in Finnish.

# Exports of military equipment are skyrocketing, but the industry needs further investments to continue growth trajectory

## Exports of military equipment, 2014-23

Statistics do not include dual use equipment

€m






Source: Ministry of Defence, Talouselämä

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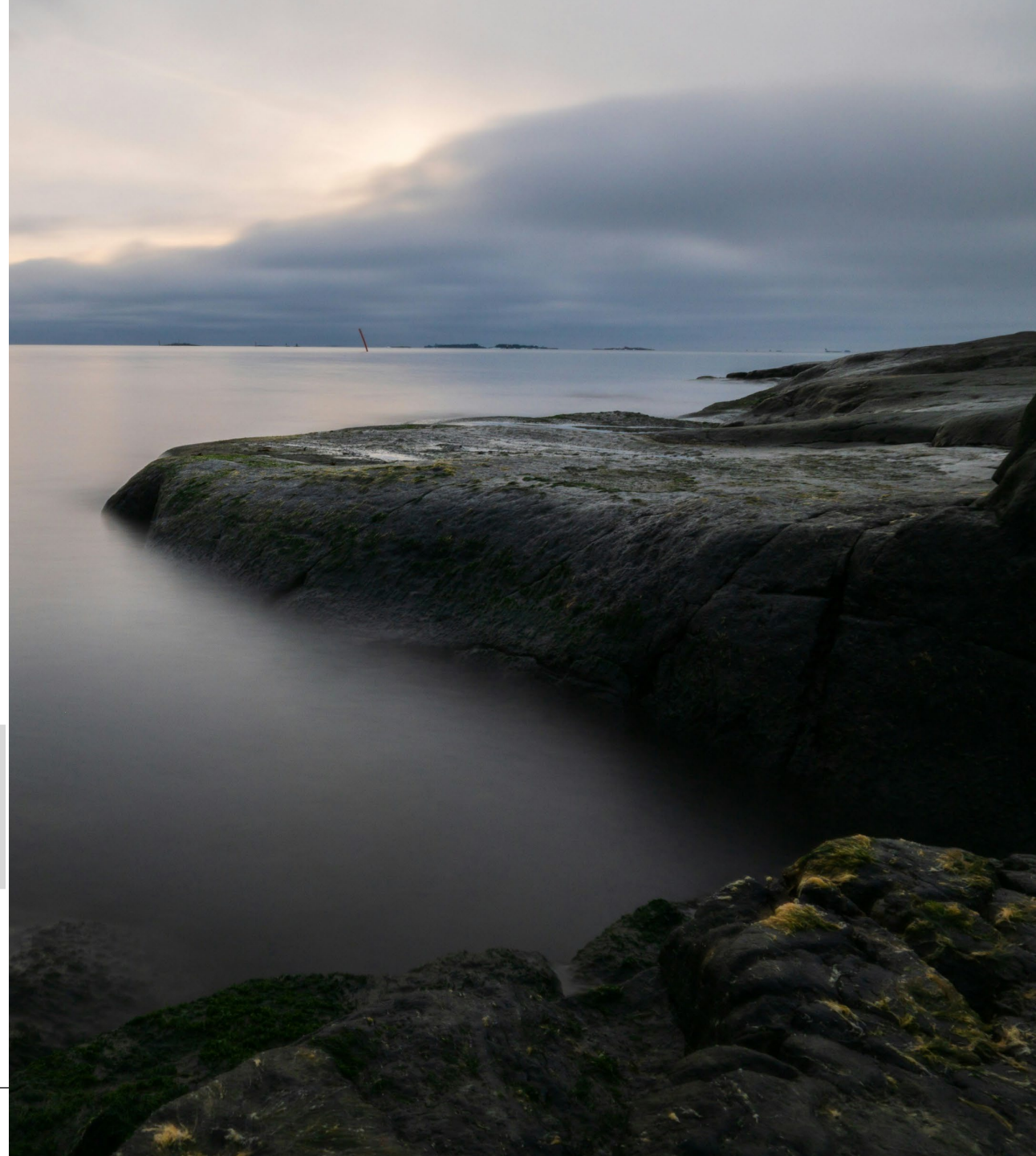
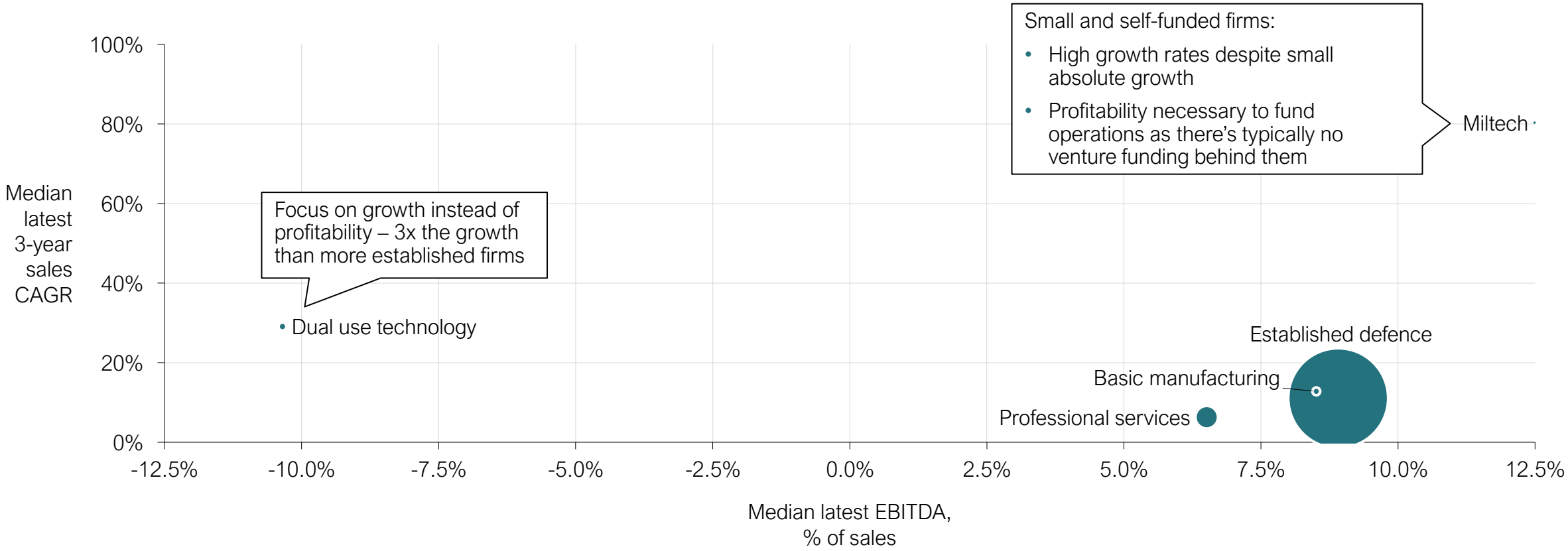


# Firms have been mapped based on characteristics displayed on their website; very different growth and profitability prospects per category

## Categories by sales development, profitability and total sales

Latest sales corresponding to bubble size



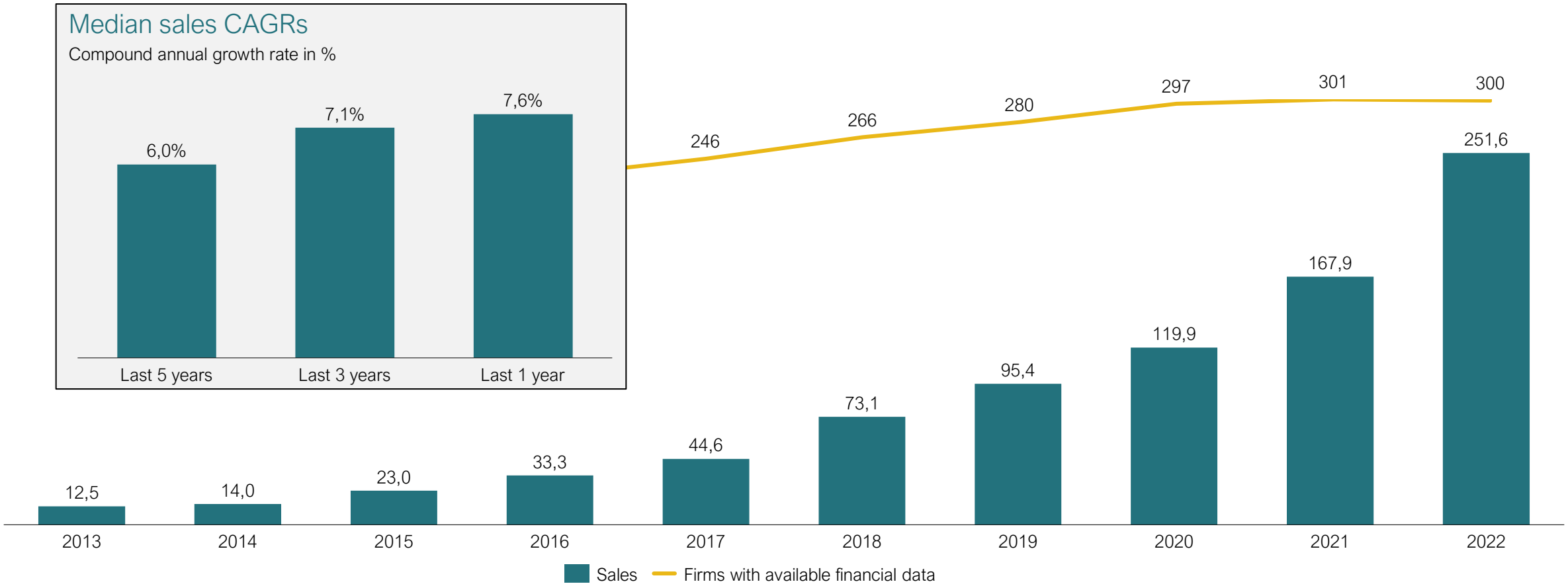



Note: The category "Established defence" includes several major firms with a limited share of their business stemming from defence

# Dual use technology and Miltech firms are growing quickly, and their growth rate is accelerating each year

## Dual use and Miltech firms' sales development and availability of financial data

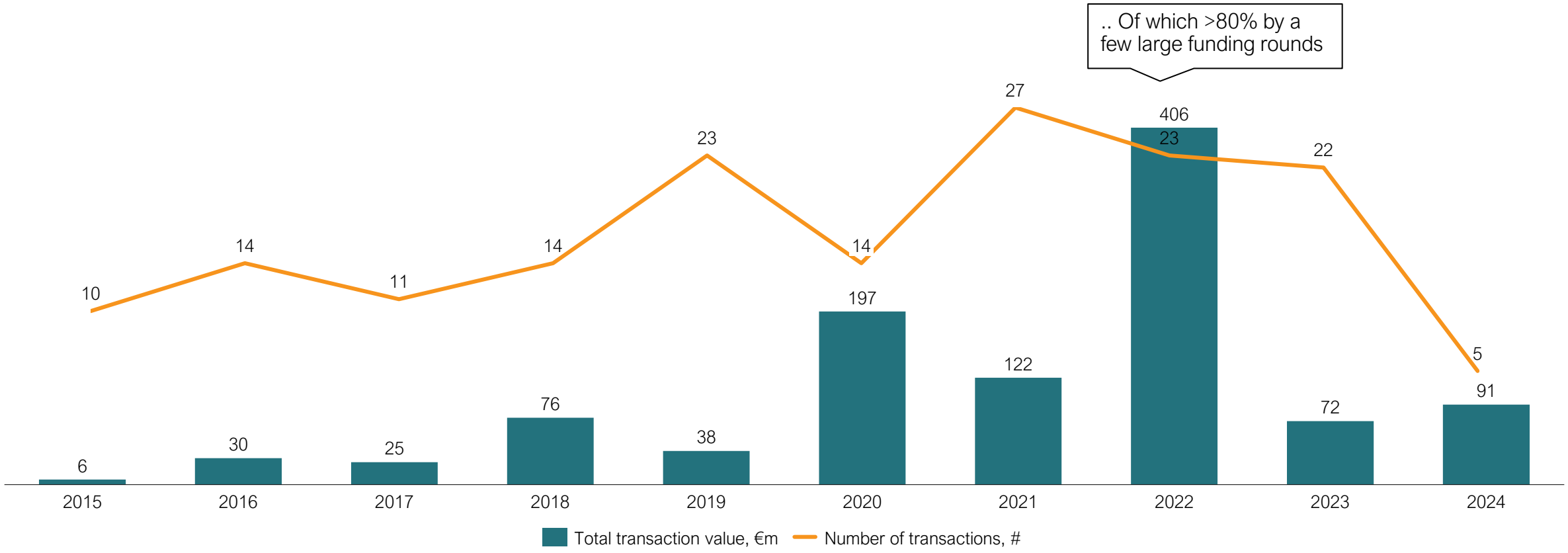
€m



# 2022 was the peak year in Defence VC investments due to large rounds by a few dual use technology firms

## VC investments in Defence, 2015-24YTD

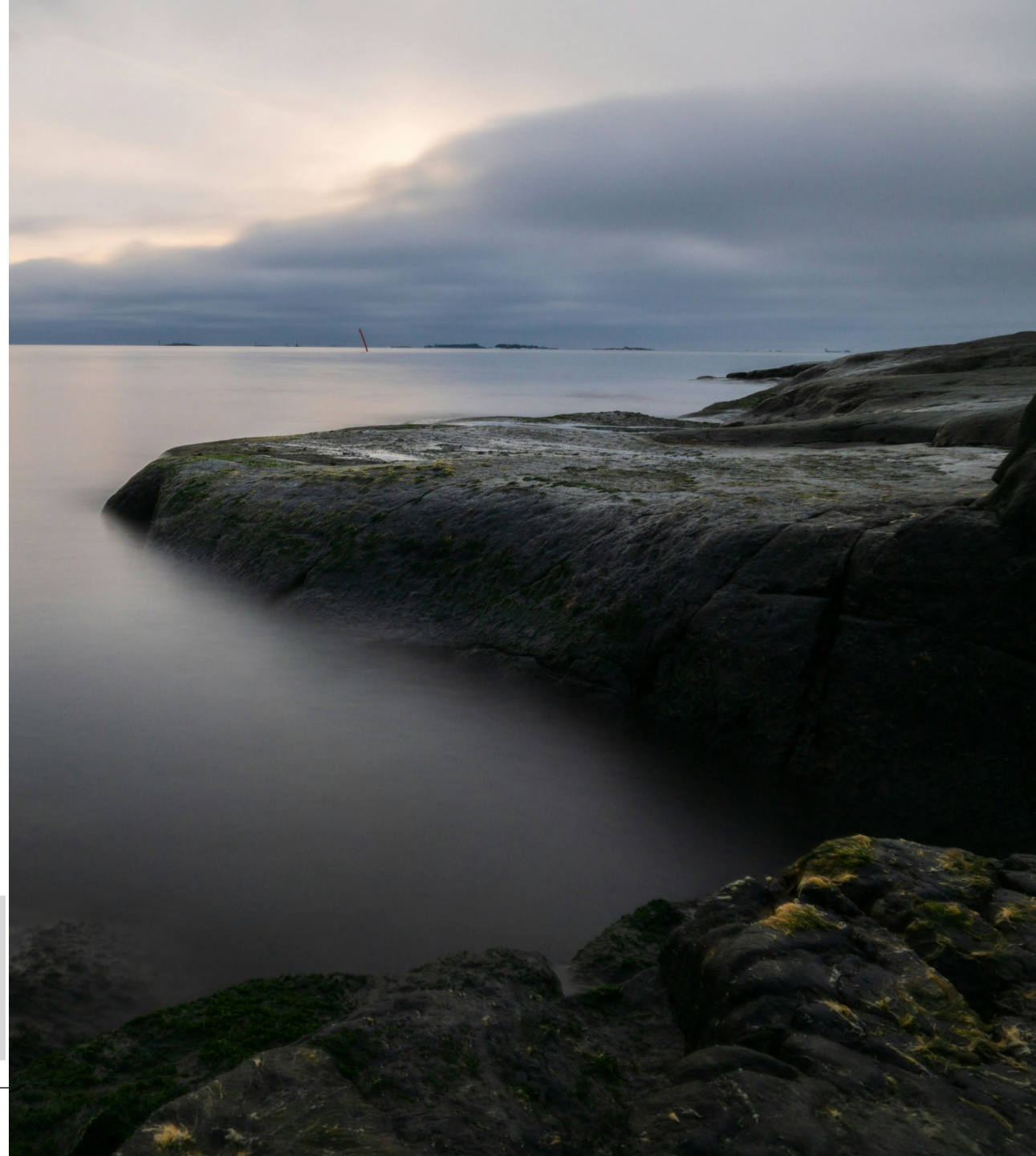
Total transaction value in €m; Count of transactions




Close to all VC investments in the Dual use technology category – none in Miltech

# Agenda

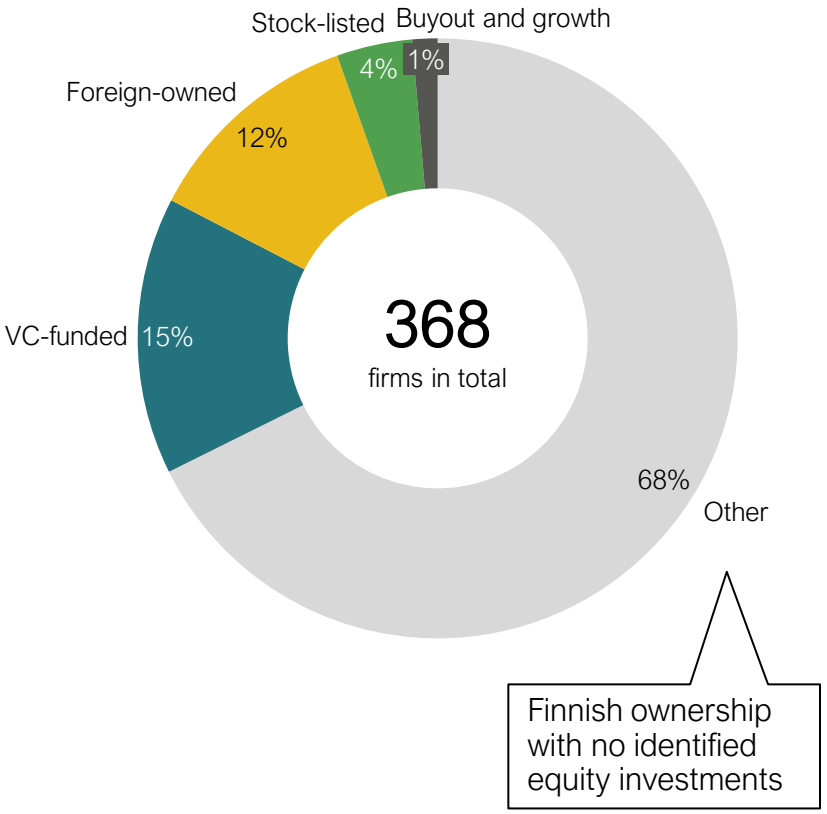
- Executive summary
- Background and context
- Market overview
- Financial development
- Funding and ownership



# Most Defence firms are in private Finnish hands – VC-funding notable only in Dual use technology ventures

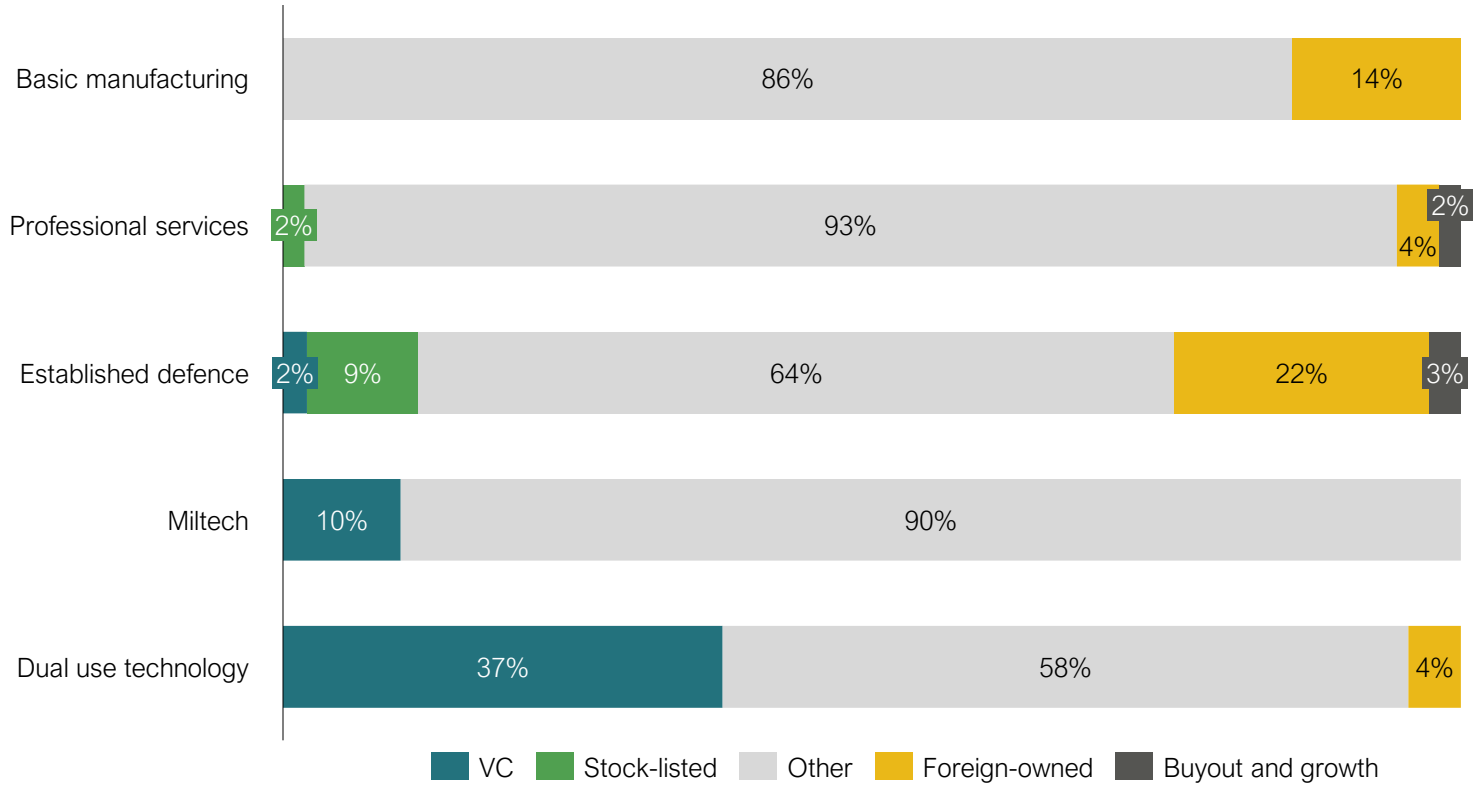
## Defence firms by funding

% share of total




## Funding by category

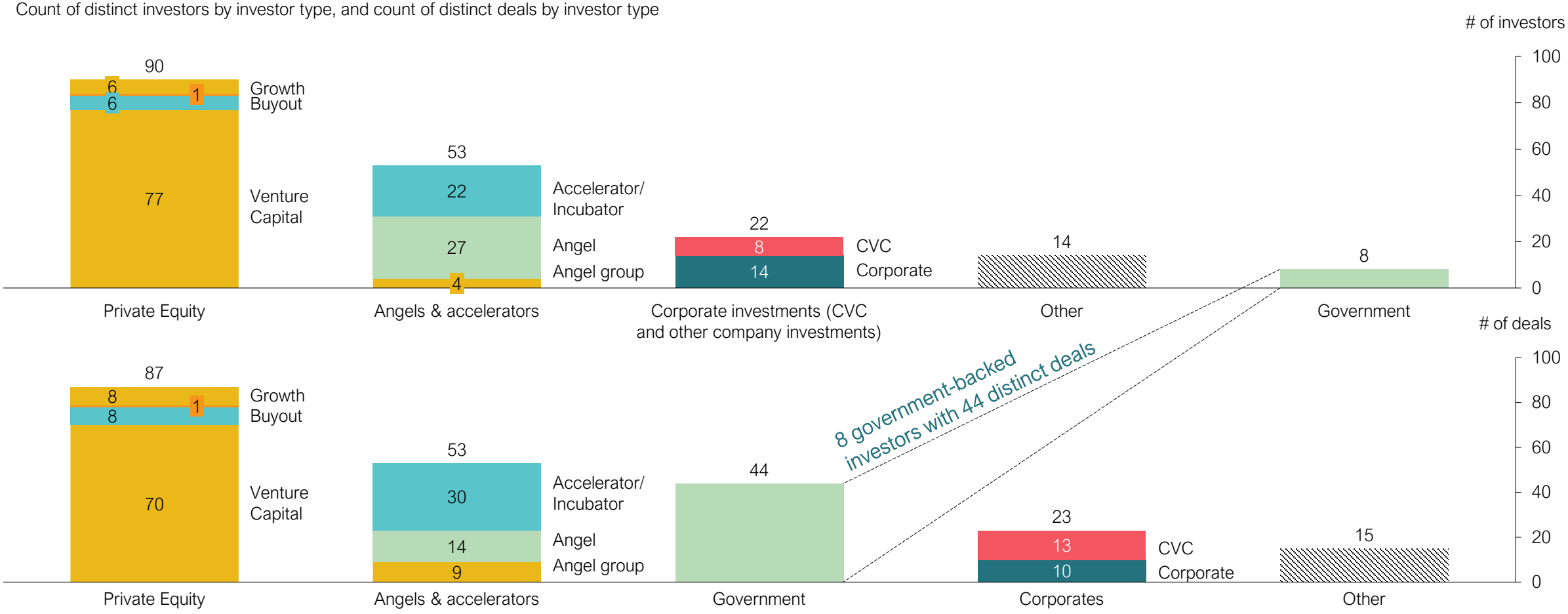
% share within category



# VC funds are the most prominent individual investor category among Finnish defence firms

## Investor types in Finnish Defence firms, 2010-23

Count of distinct investors by investor type, and count of distinct deals by investor type

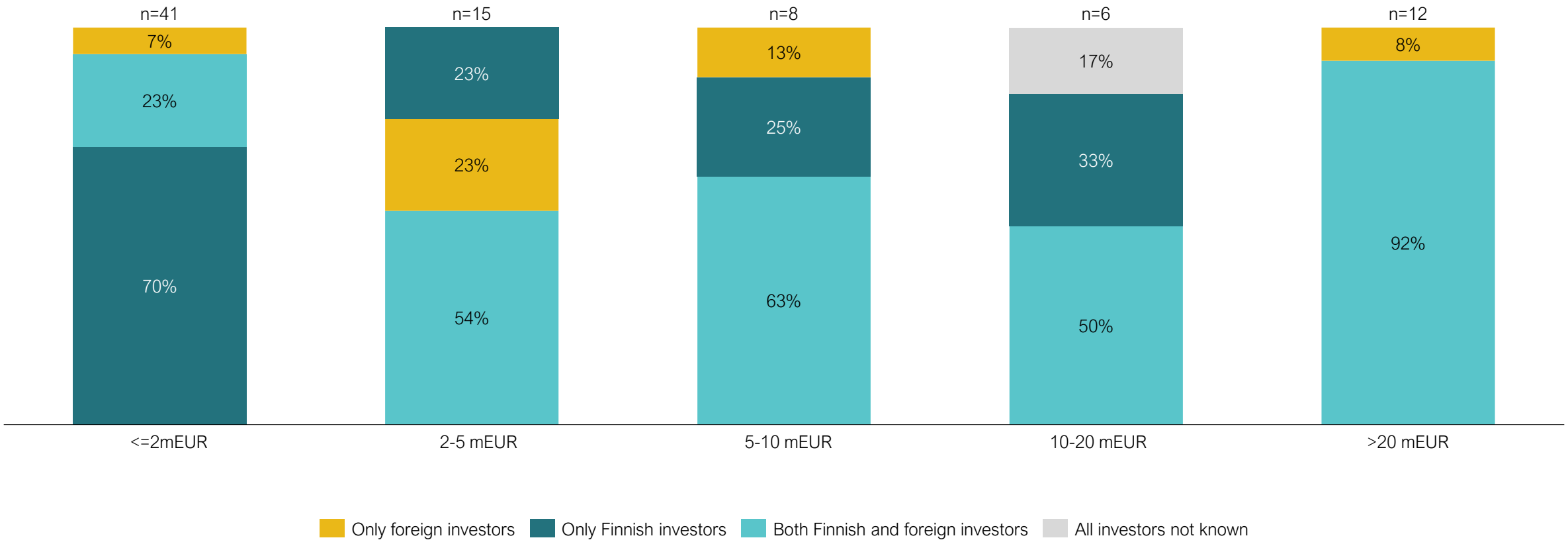


# Most early-stage deals are done by purely Finnish syndicates, but even small rounds may consist of only foreign investors

## Investor syndicate nationalities by investment size, 2010-23

VC, Growth and Buyout deals only

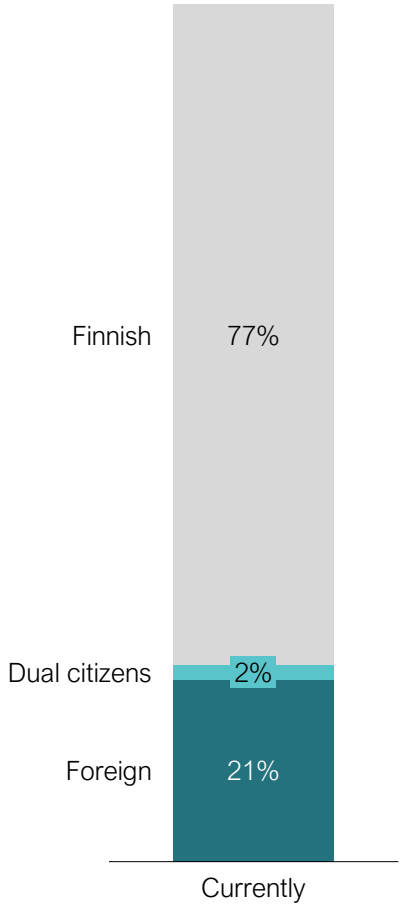
Share of transactions by types of investors involved, % of total



# Around a fifth of board of director members are foreign – the share of newly appointed foreigners was increasing until 2023

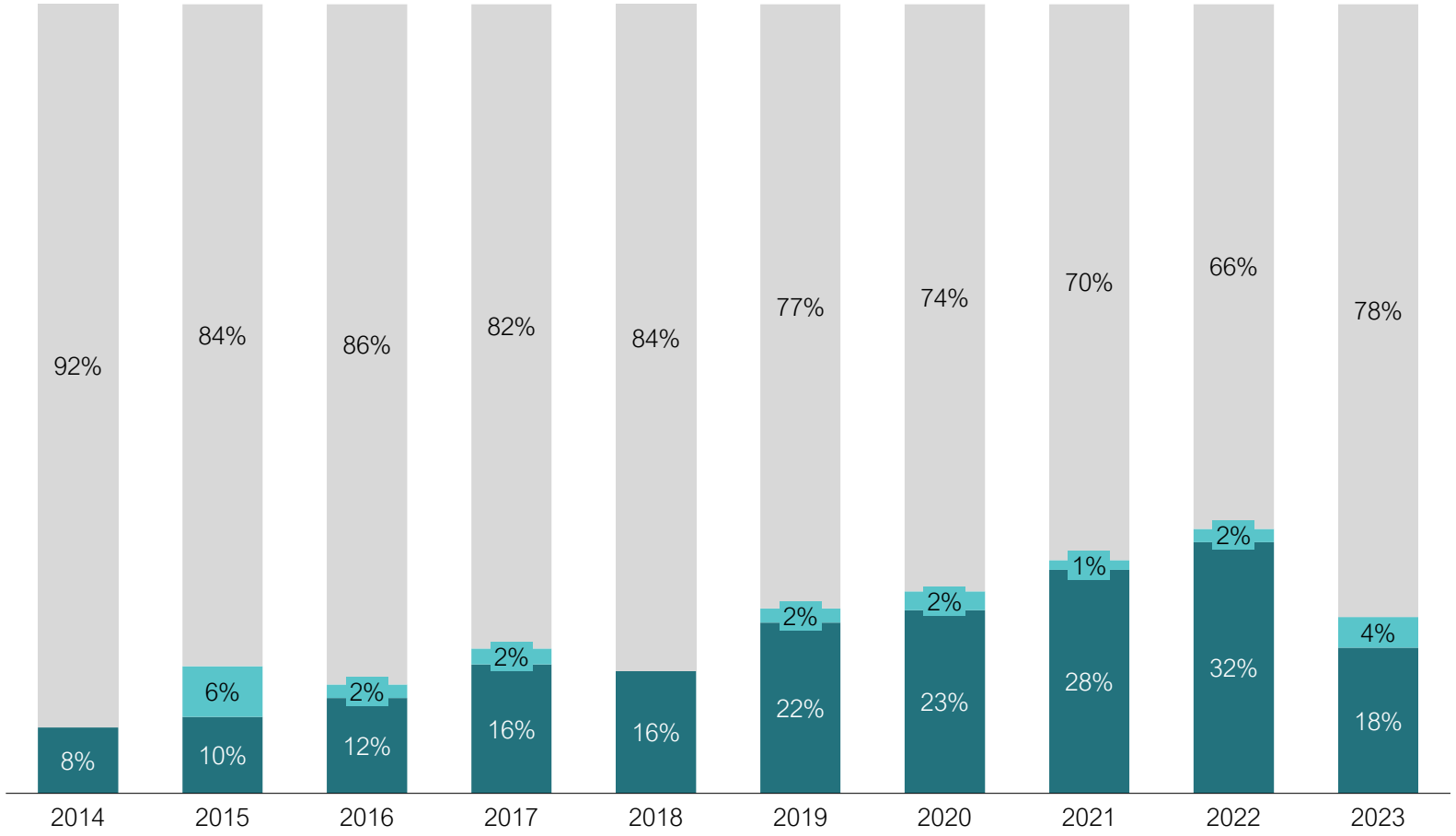
## Board members by nationality

% of total




## Newly appointed board members by nationality and appointment year, 2019-23

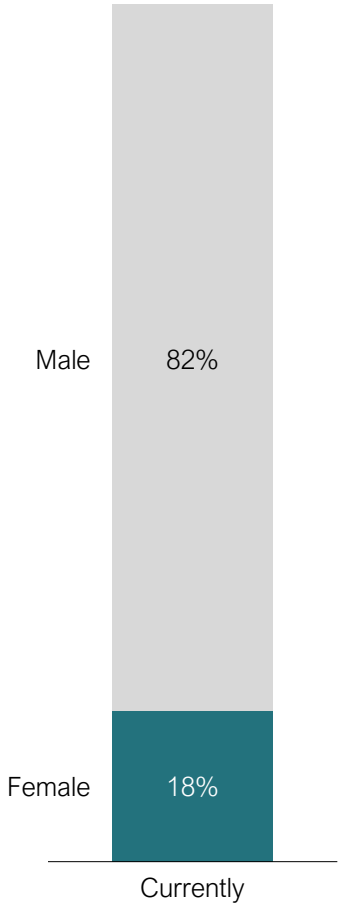
% of total in each year



# The share of female board members in Defence firms is around a fifth, and growing year by year

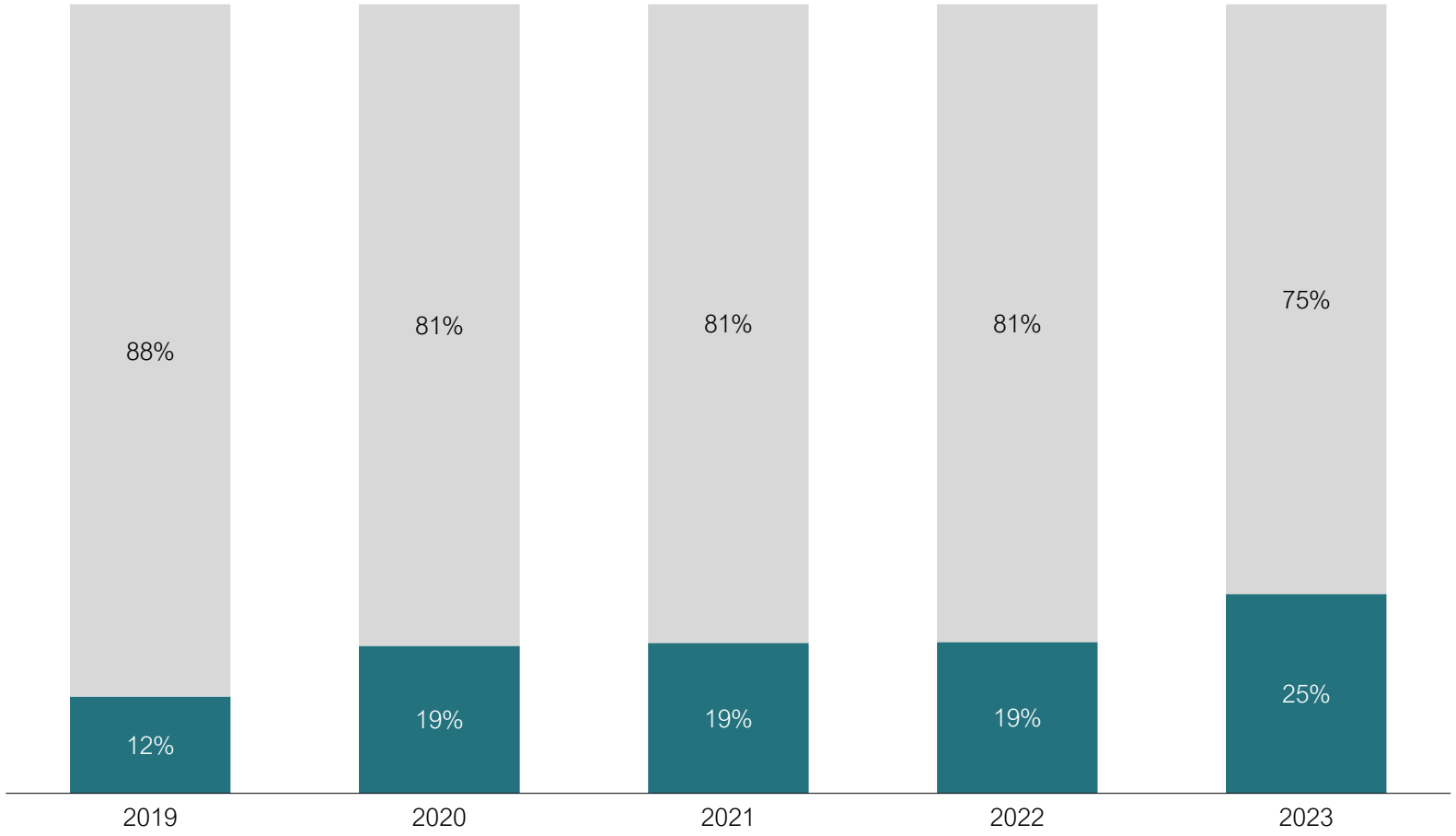
## Board members by sex

% of total




## Newly appointed board members by sex and appointment year, 2019-23

% of total in each year



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