

## **Executive Briefing of a Study on the Concept of An Estonian Center for Applied Research**

February 2019

This study was commissioned by the Estonian Chamber of Commerce and paid for by over 30 of its members who are committed to helping the Estonian economy evolve and improve.

This executive briefing is a summary of the presentation given at the Estonian Chamber of Commerce in Tallinn on 13 February 2019, with over 40 people present. The attendees included representatives of government, academia, and enterprises. The slides for the presentation and a video recording of the presentation can be found at [https://youtu.be/YqLq\\_w9NtW4](https://youtu.be/YqLq_w9NtW4).

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As a country, Estonia has done a great job since regaining independence in 1991. It has dramatically improved the standard of living for its citizens, joined the EU and the Euro-zone, become part of NATO, and established a reputation as the best of the Baltic states for doing business.

But Estonia's GDP per capita is still not yet at the EU average, and the widely shared goal of the country is to get there or to surpass that level.

According to the World Economic Forum's stages of economic development – this means transitioning the Estonian economy to be more “innovation-driven”, and not as dependent on either exploiting natural resources or lower-cost labor.

Unfortunately based on multiple recent measurements and assessments, Estonia still lags the EU average in terms of innovation and technology-driven products and performance.

To remedy that situation, developing and creating innovation and technology-driven products requires R&D and the application of that R&D to develop new products and services.

Part of the challenge has been that as a country, Estonia spends less than the EU average on R&D as a percentage of GDP. This is definitely true for government funded R&D activities. The good news is that the various political parties in Estonia have now agreed that in the new government, the government spending level on R&D will be increased to 1% of GDP. This is very encouraging, and a big step in the right direction. And there is a public debate going on now about how to allocate this increase in R&D funding.

To provide a perspective on this question of how to allocate the increase in R&D funding, it's useful to understand the R&D process and the different types of R&D. The EU uses TRL (Technology Readiness Level) terminology to describe the different stages.

- Activities at TRL 1 to 3 are usually described as basic research, and this is where most universities conduct their research.
- Activities at TRL 4 to 6 are usually described as applied research, taking the basic research and applying it to solve a particular problem.

- Activities at TRL 7 to 9 are usually described as product development, and are often conducted by companies.

In many countries, while the universities are active at TRLs 1 to 3, and companies are active in TRLs 7 to 9, there's a gap in between – at TRLs 4 to 6, the applied research area. We found that this is also true in Estonia.

One way to solve this is through an applied research center. (We presented some examples from other countries – both in the EU and the US.) A recent study from EARTO (European Association of Research and Technology Organizations) was summarized which shows the clear economic benefits/returns from investing in research organizations, and how this is true across countries.

So, this study was commissioned to see if a Center for Applied Research in Estonia could make a difference.

To provide context and perspective on that question, we met with over 40 people representing over 30 institutions including 5 universities, various government ministries, some of the TAKs, and 8+ companies, and subsequently a team interviewed over 40 additional companies.

These interviews and conversations confirmed that the universities are doing a good job of educating their students and conducting primary/basic research. But their research focus is on TRLs 1 to 3, and there is little university-industry cooperation. And with their current charter and funding levels it would be difficult for the universities to shift their focus to applied research.

We found that the TAKs in general have not been successful, with the notable exception of TFTAk which is doing a good job. The organizational rules, funding structures, and governance methodology have made it hard for the TAKs to succeed in doing applied research.

We also confirmed that companies want/need applied research & technical services – and they have a wide variety of needs based on their industry, their company size, and their levels of internal expertise.

And in conversations with the Ministry of Education and the Ministry of Economic Development and Communication, and the ETAG, we confirmed that existing government measures were not designed to address this challenge – specifically encouraging applied research activities.

So, the net result is that the interviews and meetings confirmed that the applied research gap exists in Estonia, there is not much activity in TRL levels 4-7. This needs to be solved to help drive the Estonian economy to the next level. Estonia can choose to ignore this problem/challenge, but it will mean that the economy transitions more slowly (if it makes the transition) to being innovation-driven.

And through this process, we also found that VTT in Finland is interested in helping and exploring the possibility of partnering with Estonia to set up an applied research center in Estonia (which they like to call ETT).

Lastly, we presented some models for where an Estonian Center for Applied Research might focus, and encouraged the audience to think about how to select from these different models, what criteria to use and how to measure the impact of such a center. At a high level, the three models were:

- To focus on providing technical services to existing Estonian companies/industry – to boost their ability to add-value to their products in the near future
- To focus on the ICT area (broadly defined including robotics) to both:
  - Encourage the formation of more new start-ups, and
  - To assist existing Estonian companies with digitalizing their companies
- To invest on a strategic basis on a long-term megatrend that has relevance to the Estonian economy – with an objective of creating new technical competencies and industry leadership opportunities in the 5-10+ year time frame.

As part of this discussion, we presented the current data from the EU about where they are going to focus their R&D funding post Horizon 2020, and encouraged Estonia to think about how these interest/research areas match with Estonian capabilities, so as to leverage your strengths and maximize the amount of R&D funding Estonia can get from the EU and how this should impact your economy. And we also suggest that Estonia look at global megatrends more broadly than just the EU perspective – as an input to choosing the focus areas for ECAR.

### **Significant Conclusions:**

There is widespread agreement that the Estonian economy needs to become more innovation and technology product driven.

There is an understanding that to make this happen, Estonia needs to spend more on R&D and applied R&D in particular.

And the conclusion from our interviews and conversations is that the universities and TAKs in Estonia are not in a position to address the applied research gap. There are structural and behavioral obstacles that prevent this from happening.

There is an opportunity now, given both the elections and the commitment from all parties to increase government spending on R&D – to create a focus on applied research.

An Estonian Center for Applied Research is a proven concept, that has already been adopted in all the leading countries/economies in the EU. It can provide the focus on applied research, create the critical mass of product development and applied research skills and accelerate Estonia's development of technology and innovation driven products and services.

However, ECAR should not be created in isolation, it needs to be accompanied by other initiatives that will impact the Estonian innovation eco-system. Briefly, some of the other issues that were noted are:

- Innovation Ecosystem Management/Coordination – at a country level, there are multiple ministries and people who own various parts of the innovation eco-system, and they are not coordinated. This coordination needs to improve.
- Immigration – for Estonia to create more innovation and technology driven products, Estonia needs more workers with relevant skills, and the fastest way to get them is to encourage people with the rights skills to move to Estonia.
- Risk Capital – the risk capital industry in Estonia is still developing and the government can play a role in encouraging and accelerating this development, in particular for new ventures outside of the ICT arena.
- Capital Markets/Exit Opportunities – companies that are growing rapidly need capital, and the capital markets in Estonia are limited. We encourage Estonia to develop programs that make more growth capital available in the country.
- Government R&D Spending Level – we applaud the increase to 1% of GDP, and encourage the government to find a way to push this to 1.5% or even 2% over the next few years.
- Company R&D Spending Levels – while this will be difficult given Estonia’s tax structures, we encourage the government to think about creating incentives for companies to spend more on R&D.
- R&D Reporting by companies – and we believe it’s essential for the government to get better data on actual R&D spending from companies. Our interviews suggest that this is dramatically under-reported.
- ETAG R&D funding allocation methods – we encourage the Ministry of Education to assess how ETAG is currently allocating its R&D grants – and to think about how to modify this allocation method to better support Estonia’s economic development.
- STEM teacher shortage – it was noted that Estonia is facing an upcoming shortage of STEM teachers as many of the current teachers will be retiring in the next few years. This will be a big problem if it is not addressed.
- STEM education in secondary schools – while Estonia does very well on the PISA assessments at age 15, it was noted that STEM education participation falls off rapidly after age 15. If this is true, that’s also a problem and should be addressed.
- Compensation Levels in Universities – for both professors and graduate students are a challenge – that is inhibiting university recruitment and thus their ability to create more impactful research.

And I will emphasize that the various government ministries and institutions that control different parts of the innovation eco-system need to be better coordinated so that their measures are mutually reinforcing, rather than independent of each other.

Further studies to determine the specific focus areas for the Center for Applied Research and how it should be organized and managed are recommended. And partnership discussions with VTT should be continued.

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This study was performed by Innovation Perspectives, a consultancy based in Silicon Valley. More information about them can be found at [www.innovationperspectives.com](http://www.innovationperspectives.com).