**ASML vs Nokia: What Can the Netherlands Learn from the Nokia Effect?**

Investments in R&D are crucial for achieving a resilient economy and society. However, [the Netherlands struggles to meet its ambitions regarding R&D expenditures](https://vector.tno.nl/en/articles/netherlands-what-lessons-can-we-learn/). In fact, the results of [the recently updated TW Top-30](https://vector.tno.nl/en/articles/top-30-companies-investing-most/) show that R&D expenditures in the Netherlands are concentrated among a limited group of companies, with a very dominant position for ASML and the machinery sector. ASML has thus acquired an important [control point](https://repository.tno.nl/SingleDoc?find=UID%204dc9c58d-a624-469e-a229-428c4d62d60a) in the Dutch innovation landscape.

Such concentration of R&D expenditures brings both opportunities and risks. Companies with high R&D investments are beneficial for the economy, business activity, productivity, and the international position of the countries where they are located. The risks of a narrow concentration of R&D investments arise when such companies or sectors encounter difficulties or cannot adapt to market changes. For example, what happens if the market for chip machines and high-tech equipment is severely disrupted - for instance, by geopolitical influences?

This is a potentially realistic scenario, as evidenced by European innovation history. A prime example of a high R&D-intensive company in a specific sector that encountered problems with significant consequences is Nokia in the ICT sector in Finland. The rise of Nokia in Finland in the 1990s, but also the downfall of the same company in the 2010s, had a major impact on the Finnish economy and society. Although the Netherlands is a different country, and ASML is a very different company in a different sector than Nokia and currently not facing a downward market dynamic, the Nokia case does provide insights into the consequences of too much dependence on one company and sector for the national economy and innovation landscape. ASML, too, remains sensitive to technological changes, geopolitical tensions, and market disruptions. The central question I pose in this piece is therefore: What lessons can the Netherlands learn from Finland's experiences?

**ASML's Control Point**

In the Netherlands, ASML develops a unique and economically valuable business activity within the semiconductor industry, giving the company a control point. The technological complexity and high costs of developing machines create significant entry barriers for competitors, giving ASML a unique and influential position within the semiconductor industry.

This power position is reinforced by the strong dependence of leading chip manufacturers, who rely on ASML's machines for their chips. Geopolitically, ASML's machines are also crucial for other states to meet their public interests.

**Changes in Finland's Innovation Landscape**

From a historical perspective, the dynamics of Finland's R&D and innovation landscape are interesting, as they are characterized by the rise and fall of a specific sector and a company that dominated the innovation landscape: the ICT sector with Nokia.

Nokia is one of Finland's largest and most influential technology companies and was the world leader in mobile phones for a long time. During its heyday, the company significantly contributed to Finland's GDP and was a driving force behind Finland's technological and economic progress. The company invested heavily in research and development (R&D), significantly contributing to Finland's total R&D expenditures. Much of the technological expertise Nokia developed was passed on to other Finnish companies, strongly influencing the broader innovation ecosystem. However, Nokia's dominant market position was undermined around 2010 by the rise of other companies like Apple and Samsung, which introduced new operating systems linked to smartphones. [This led not only to massive layoffs and factory closures but also to a reduction in R&D expenditures](https://www.oecd.org/en/publications/targeting-r-d-intensity-in-finnish-innovation-policy_51c767c9-en.html).

The influence of the ICT sector and Nokia creates an interesting dynamic in Finland's R&D and innovation landscape. This dynamic begins in the 1990s, during Nokia's rise in Finland, leading to a growing share of the ICT sector in R&D expenditures. By the 2000s, the ICT sector accounted for 27% of all R&D expenditures in Finland. Under Nokia's success, this share steadily grew until the ICT sector's share of R&D expenditures peaked at around 40% around 2010. Thus, Nokia and the ICT sector dominated Finland's R&D innovation landscape. When the rise of other tech companies undermined Nokia's dominant market position, it resulted in a historic deep dive in R&D investments, and the ICT sector's share of R&D investments fell back to around 20% (2018). Additionally, a growing gap emerged between Finland's goal of spending 4% of GDP on R&D and the actual percentage of R&D investments, [which even fell below the 3% R&D target](https://www.oecd.org/en/publications/targeting-r-d-intensity-in-finnish-innovation-policy_51c767c9-en.html) (2019). To date, Finland has not been able to achieve the intended R&D target of at least 3% again.

The rise and fall of Nokia has thus become the prime example when warning of the dangers and vulnerabilities of a country regarding such economic dependence on a company or sector with a control point.

**Changes in the Netherlands' Innovation Landscape**

This historical perspective on the dynamics of Finland's R&D and innovation landscape takes on a different meaning when compared to the current dynamics in the Netherlands' R&D and innovation landscape.

The influence of ASML and the machinery sector creates an interesting dynamic in the Netherlands' R&D and innovation landscape. This dynamic begins around 2016, when ASML's rise in the Netherlands takes off. This has led to a growing share of ASML in R&D expenditures: [from approximately 744 million to 2.8 billion euros in 2023](https://vector.tno.nl/en/articles/top-30-companies-investing-most/). Notably, in recent years, the Dutch innovation landscape has changed and is now characterized by a strong concentration of innovative companies in North Brabant, particularly in the Eindhoven region. The Netherlands now has one dominant sector linked to ASML and the innovation ecosystem around it: the machinery industry. Thus, ASML and the machinery sector currently dominate the Netherlands' R&D innovation landscape.

A related vulnerability in the Netherlands' R&D and innovation landscape is the structural gap between the 3% R&D target that the Netherlands sets for itself and the achieved percentage of R&D investments in the Netherlands: on average, this percentage has remained around 2.1% over the mentioned period (2016-2023) - despite the enormous rise in R&D investments by ASML and the ecosystem around it. Thus, ASML not only dominates expenditures; a significant dependence has also emerged, which increases every year. This dependence in the Dutch innovation landscape makes the Netherlands' innovation position very vulnerable.

**Discussion ASML vs Nokia: What Can the Netherlands Learn from the Nokia Effect?**

The rise and fall of Nokia can serve as a warning for the Netherlands, particularly regarding the vulnerabilities of a country that becomes increasingly dependent on a company or sector with a control point. Compared to Finland and Nokia, it can be said that the Netherlands is vulnerable in terms of innovation due to the dominant position of ASML and the linked machinery sector: the base is narrow and creates significant dependence. If ASML were to disappear, the Netherlands - like Finland in the 2010s - would suddenly become less innovative, the machinery sector would also face problems due to the interconnectedness of the innovation ecosystem, and the Netherlands risks losing its global position in innovation. Although the Netherlands and ASML are a different country and sector, with a different dynamic, the Nokia case does provide insights that can also be relevant for the Netherlands.

**Implications for Dutch Innovation Policy**

How can the Netherlands incorporate the implications of the Nokia case into shaping its innovation policy?

An important lesson from Finland's innovation history is the importance of diversification in the innovation landscape. When looking at other (EU) countries that do achieve the 3% target, it appears that they often have not one but at least two leading R&D-intensive sectors. The R&D top 30 list provides guidelines for building other, potentially future R&D-intensive sectors around, for example, pharma/biotech (Johnson & Johnson) or digital platforms (Booking.com). By investing in such sectors and providing opportunities for new players with potential future control points, such as R&D-intensive SMEs, startups, and scale-ups, an important step can be taken towards a resilient Dutch innovation system.

To build future control points, it is also often useful to build on activities where the Netherlands already has a specialty, such as with ASML in the semiconductor industry. From such specialties, diversification can be made to other industries and sectors [by leveraging already accumulated, complex knowledge](https://www.science.org/doi/10.1126/science.1144581). In this way, a current control point can be the driver for new players with potential future control points. The Nokia case confirms that this potential exists; the loss of Nokia in Finland also led to an [increase in startups and a shift of talent to other sectors and domains](https://www.oecd.org/en/publications/targeting-r-d-intensity-in-finnish-innovation-policy_51c767c9-en.html).

Another implication from Finland's innovation history is the importance of focusing innovation policy on maintaining and strengthening current control points. To maintain a control point like ASML's, it is, for example, interesting to keep the business and investment climate in the Netherlands favorable, as is happening through the recent '[Project Beethoven'](https://www.rijksoverheid.nl/documenten/rapporten/2024/04/02/bijlage-d-brief-asml-def). Additionally, investments can be made to strengthen the broader innovation ecosystem around ASML through (regional) innovation and ecosystem policies. It is also good to provide space for spin-offs and other ways to prevent lock-ins of a company.

**Conclusion**

With such directions for innovation policy, the economic resilience of the Netherlands can be strengthened. It is good to keep in mind that the above suggestions are based on the experiences of Nokia and the ICT sector in Finland; of course, there are also other initiatives and directions possible that can stimulate the growth of R&D and innovation in the Netherlands. By exploring those possibilities as well, new insights can emerge that can help strengthen the Netherlands' innovation power.