NORTHSTACK

WHAT ARE WE FUNDING?

WHITEPAPER

Analysis of technologies and industries funded by the Technology Development Fund 2004-2024

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Northstack

Northstack is an Iceland-based independent think tank, focusing on the cross-section of policy, private funding and actors, and economic trends in innovation, technology, and IP-intensive sectors.

Northstack was founded in 2015 as the first outlet focused on startups, innovation, and tech in Iceland, and has since then maintained coverage, data collection, and analysis of the ecosystem in Iceland, with periodic reports.

The stated goal of Northstack is to provide insights based on data and analysis to drive better understanding of the innovation, tech and startup sectors, leading to the best possible policy outcomes.

About this report

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Executive Summary

With the government's renewed focus on industrial policy and rising investment in innovation, **understanding which industries and technologies benefit from public R&D funding has become increasingly critical**. This analysis, the first of its kind in Iceland, offers new insights into the allocation of R&D grants.

Using publicly available data, we **analyzed funding patterns and trends in Tækniþróunarsjóður over the past two decades**. Our objective was **not** to evaluate the Fund's impact, but to assess **whether allocation patterns align with Iceland's economic structure, broader policy priorities, and international technology trends**. To enable systematic analysis and meaningful comparisons, we pioneered an **automated classification approach** using generative AI to categorize projects by industry and advanced technology based on their descriptions.

Findings

- **Software dominates funding while marine technology funding declines.** Software projects have consistently claimed 40–60% of grant funding since 2011, rising to 63% in 2023. By contrast, marine technologies' shares have fallen from 20–34% at their peak to around 8% in recent years. Deep tech fields such as nanotechnology and robotics capture only a small share. Without data on unsuccessful applications, it is unclear whether these patterns reflect the supply of applications or demand by the funder.
- Northstack's experimental industry classification process suggests **manufacturing-related projects consistently attract the largest grant share,** reflecting the sector's economic weight. Health care and ICT projects receive high levels of support relative to their GDP contributions, while projects in agriculture, aquaculture, and fishing show declining shares over time.
- **Disconnect from trends and policy priorities.** Technology funding patterns do not seem to align with either broad technology trends or government policy priorities. AI funding has risen relatively modestly despite a surge in global interest, while VR funding remains steady. Similarly, despite increasing policy emphasis on sustainability in recent year, the share of clean technology projects funded remained steady.

Recommendations

- **Re-think project classification in the published data.** Revise the project categories used by the Fund to better reflect Iceland's economy and growth trajectory, especially in light of industrial policy plans focused on resource-based and IP-intensive industries. Distinguish clearly between technologies (e.g. AI, robotics) and their applications (e.g. health care, fisheries, tourism).
- **Publish data on unsuccessful applications.** Aggregate information on rejected proposals would enable more complete analysis of sectoral and technological patterns by showing the entire funding funnel from application to award.
- **Clarify the Fund's role.** Position the Technology Development Fund more clearly within the wider landscape of government support for R&D and innovation, particularly as cross-cutting industrial policy develops.

Reflections

The Technology Development Fund is mandated to **support technology development and innovation broadly** across Icelandic industries. While it can prioritise specific initiatives, the data suggests it has followed a **generalist course,** largely reflecting the mix of applications received, most notably the dominance of software in recent years. Policy priorities such as clean technologies, climate solutions, or language technologies do not appear to be systematically targeted through the Fund, but rather addressed through other instruments.

Tækniþróunarsjóður 2004-2024

The Technology Development Fund (Tækniþróunarsjóður) has played a pivotal role in supporting research and development in Iceland over the past two decades. Administered by Iceland's innovation agency, Rannís, it has been the main instrument for direct government funding for R&D. While its relative importance has declined compared to R&D tax incentives, it remains a cornerstone of the Icelandic innovation ecosystem.

Highlights 2004 - 2024

Total grant amount	Number of grants	Number of awardees
ISK 49b	**~1900**	**~1200**
Over this period, the total amount of grants paid out exceeded 49 billion ISK in today's money.	The total number of grants awarded across the various grant types is close to 2000.	These grants were awarded to approx. 1200 unique applicants (organizations and individuals).

According to the Technology Development Fund's website, its role is to ***"support research and development activities, which aim towards innovation in Icelandic industry."*** The Fund's latest impact assessment (published in late 2022, covering the period 2014-2018) employed questionnaires and grantee interviews to establish that the Fund's grants had a significant impact on the progress of funded R&D projects, often serving as a prerequisite for projects to begin or continue.

Figure 1 shows the evolution of annual grant funding over the past two decades (all amounts in today's money). Funding levels remained relatively modest through the early 2000s, averaging around 1.2 billion ISK annually until 2014. A **notable expansion occurred** from 2015 onward, with funding more than doubling to consistently exceed 2.5 billion ISK per year in real terms. **Peak funding in real terms occurred in 2018** at roughly 3.8 billion ISK in today's money, followed by some decline but generally sustained higher levels compared to the pre-2015 period.

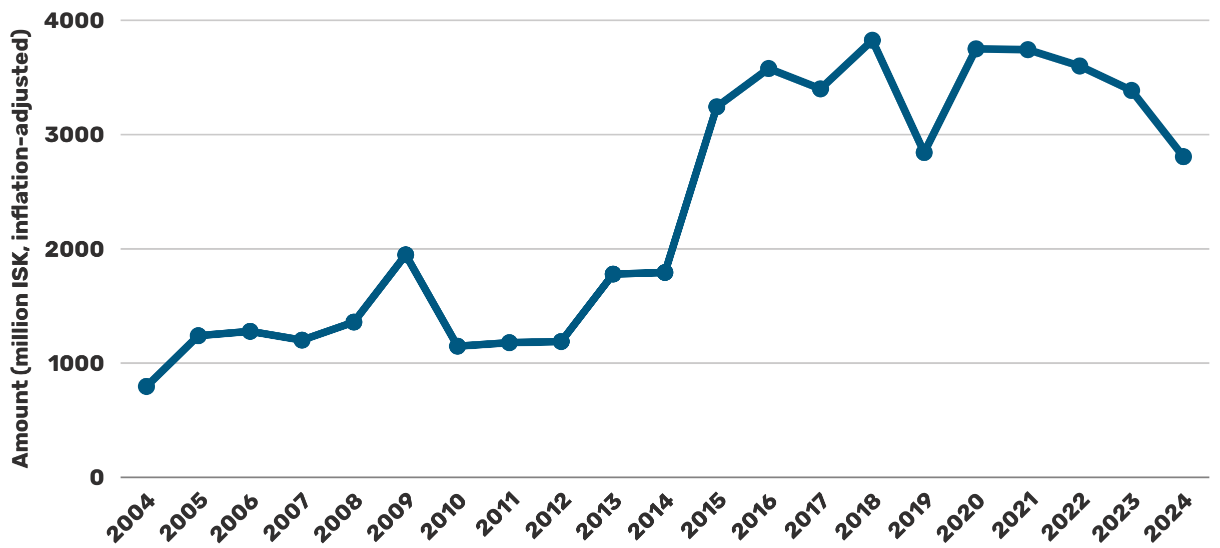

Figure 1: Annual awarded grant amounts (in 2024 ISK values), 2004 - 2024
Includes the following grants: Brúarstyrkur, Einkaleyfisstyrkur, Forverkefnisstyrkur, Fræ, Frumherjastyrkur, Hagnýt rannsóknarverkefni, Markaðssókn, Markaðsstyrkur, Markaðsþróun, Öndvegisstyrkur, Sproti, Verkefnisstyrkur, Vöxtur and Þróunarfræ. Source: Source: Gagnatorg.is and Ríkisreikningur.is

What can we learn from the existing sector classification?

Publicly available data on previous successful R&D grants from Tækniþróunarsjóður include the following project information: **their title and description, amounts received to date, as well as two project categories ("yfriflokkur" and "undirflokkur") that loosely correspond to sector and technology classes**. The current sector classification system, displayed in Table 1 below, has a number of advantages: it is tailored to the Icelandic economic and innovation context, and it has been applied consistently over the observation period, facilitating longitudinal analysis. However, it also suffers from issues **limiting internal and external comparisons.**

1. **Mixed classification logic:** Categories combine economic sectors (e.g. Almenn verslun og þjónusta), technologies (e.g. Heilbrigðistækni og lækningatæki), and natural resource inputs (e.g. Hagnýting auðlinda lífríkis sjávar og ferskvatns)

2. **Category ambiguity:** Similar projects could fall into multiple categories (e.g. Heilbrigðistækni og lækningatæki vs. Heilbrigðis- og velferðarþjónusta), making interpretation and comparison difficult.

3. **Uneven category specificity:** Some categories are rather broad (e.g. Orkunotkun og hagnýting orkuauðlinda), while others are very narrow (e.g. Öryggisþjónusta), leading to large differences in size: broader categories have received on average 11–17% of total funding over the period 2004-2024, while niche ones get just 1–2% or less.

4. **Misalignment with (inter)national standards:** There is no clear correspondence between these categories and either Hagstofan ÍSAT sectors or Horizon Europe Pillar II Clusters.

CATEGORY ("YFIRFLOKKUR")	FUNDING SHARE
Heilbrigðistækni og lækningatæki	**17%**
Hagnýting auðlinda lífríkis sjávar og ferskvatns	**15%**
Almenn verslun og þjónusta	**14%**
Orkunotkun og hagnýting orkuauðlinda	**11%**
Menning, hönnun og afþreying	9%
Fræðslu- og menntatengd þjónusta	6%
Fjarskiptaþjónusta og samgöngur	6%
Heilbrigðis- og velferðarþjónusta	5%
Almenn matvælatækni	4%
Hagnýting auðlinda lífríkis á landi	4%
Umhverfis- og skipulagsmál	3%
Vinnsla lífrænna og ólífrænna efna	2%
Bygginga- og mannvirkjagerð	2%
Ferðaþjónusta	2%
Annað	1%
Öryggisþjónusta	<1%

Table 1: Existing sector categories ("Yfirflokkur") and their average share of funding paid out over the period 2004-2024

What can we learn from the existing technology classification?

The existing technology classification ("undirflokkur") has been applied largely consistently since 2004, offering a valuable basis for tracking long-term trends despite the following challenges for interpretation:

- **Inconsistent detail and category design:** The classification mixes industries (e.g. Fiskveiðar og meðhöndlun sjávarafurða), technology domains (e.g. Hugbúnaðargerð), or product attributes (e.g. Hönnunarvörur), leading to overlap and ambiguity.
- **Limited flexibility for emerging technologies:** The classification doesn't allow us to identify fast-evolving technologies such as AI and machine learning, clean or climate tech, or deep tech such as nanotechnology or robotics. As a result, the system may not fully support horizon scanning or strategic foresight.

Despite these limitations, the classification still reveals important patterns (see Figure 2 below):

- **Software-related projects** (including hugbúnaðargerð, hugbúnaðar- og vefþjónusta, and tölvuleikir og stafræn afþreying) experienced dramatic growth**,** consistently accounting for 40-60% of combined total funding received from 2011 onwards, with a peak of 64% in 2023.
- **Marine-related technologies** such as sjávar- og ferskvatnslíftækni and fiskveiðar og meðhöndlun sjávarafurða claimed a significant share of funding in early years, reaching a combined 20-34% between 2004-2008, but declined sharply to under 8% consistently from 2017 onwards.
- **Biotechnology and pharmaceuticals show variable funding patterns:** lyfjaþróun og -framleiðsla reached peaks of 8.6% in 2009 and 10.8% in 2018, while líftækni funding shares fluctuated between <1% and 17%.
- **Small categories with individual average funding shares below 5%** (combined into the "Annað" group in Figure 2) together represents a significant portion of funding, accounting for 11-34% across most years.

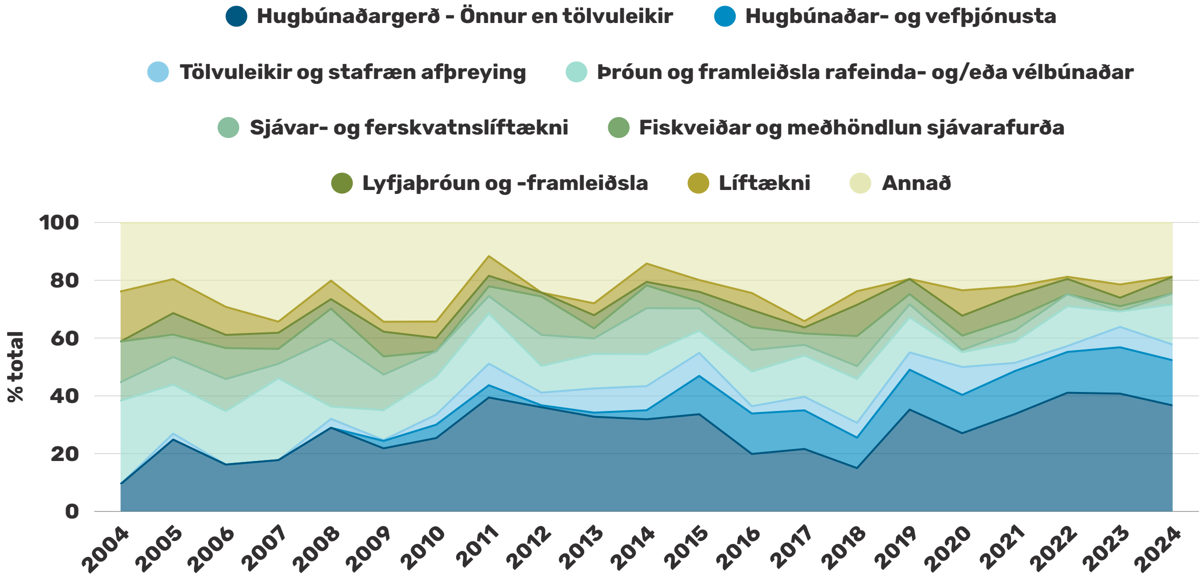

Figure 2: Share of funding by project subcategories ("Undirflokkur') and year, 2004 - 2024
Note: the 'Annað' category combines Efnistækni, önnur en líftækni; Matvæla- og drykkjaframleiðsla; Efnaframleiðsla, önnur en lífefnaframleiðsla; Eldi á sjávar- og ferskvatnslífverum; Hönnunarvörur; Nýting og vinnsla landbúnaðarafurða, annað en matvælaframleiðsla; Framleiðsla landbúnaðarafurða (þ.m.t. skógrækt)

Piloting a new approach to measuring sectoral impact

To address the limitations we previously identified, we piloted an **automated classification approach using generative AI to sort projects into ÍSAT/NACE industry sectors (see Table A1 in the Appendix) based on their ultimate economic impact.** Rather than focusing solely on the technology being developed, our methodology asks which industry will see the primary economic benefits from the funded projects.

- For example, a project developing new aquaculture techniques would be classified under "A. Agriculture, forestry and fishing," while a project creating automated equipment for preparing fish into consumer products would fall under "C. Manufacturing" (as it relates to Food processing, a subcategory of Manufacturing).

More information about our approach is included in the Methodology section of the Appendix.

Funding patterns based on expected sectoral impact:

- **Manufacturing** consistently receives the largest share of funding, though it has seen a notable decline from close to 30% pre-2020 to 20% in recent years.
- **Health and social work-related projects have** maintained a stable second position at around 15-17% throughout the period.
- **Information and communications technology** shows growth from 2010 onwards, regularly receiving 10-18% of funding compared to minimal shares in the early 2000s.
- **Agriculture, forestry and fishing** shows a notable decline over time, falling from 25-35% of funding in the mid-2000s to around 6-14% in recent years.

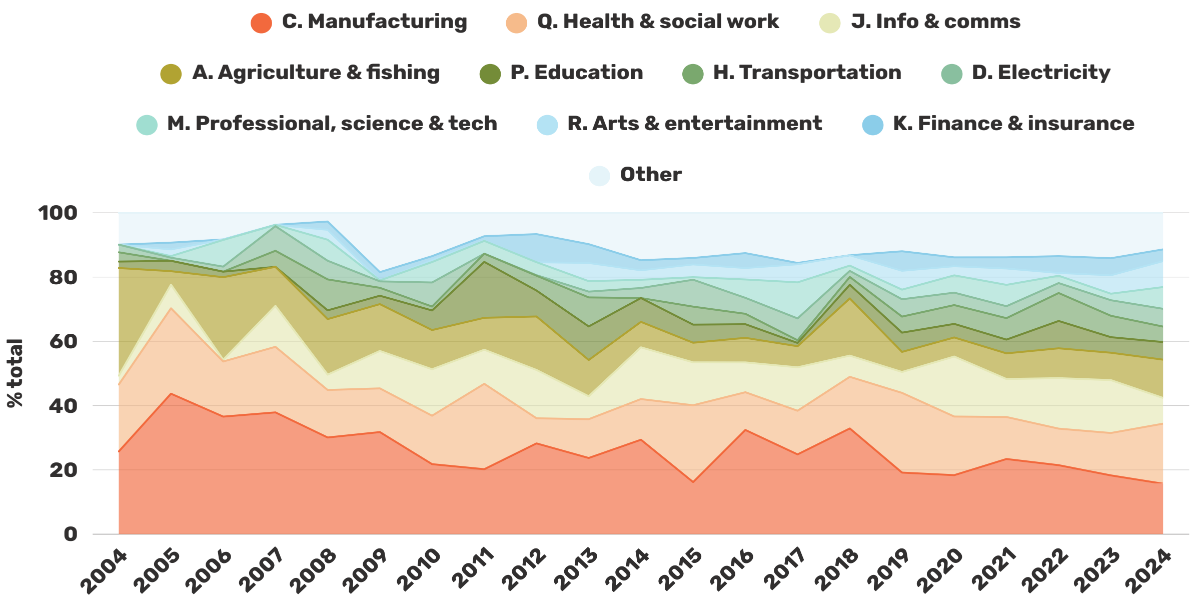

Figure 3: Share of funding by ÍSAT codes (sectors of impact) and year, 2004 - 2024
Note: The 'Other' category combines N. Administrative and support service activities; G. Wholesale and retail trade; repair of motor vehicles and motorcycles; E. Water supply; sewerage, waste management and remediation activities; F. Construction; I. Accommodation and food service activities; O. Public administration and defence; compulsory social security; B. Mining and quarrying; L. Real estate activities; S. Other service activities; T. Activities of households as employers

Is funding aligned with the structure of the economy?

Using our newly developed sectoral classification, **we matched Tækniþróunarsjóður funding data with Icelandic GDP figures from Hagstofan to explore how funding patterns align with the structure of the economy.**

Caveats

Our sectoral classification is based on the expected impact of funded projects, that is, the sectors in which the proposed R&D is anticipated to drive productivity gains or broader benefits. **This approach differs from classifications based on the economic activity of the applicant organization.**

- For example, Kerecis is categorised under *C. Manufacturing* by Hagstofan, reflecting its core business activities. However, according to our classification, most of the grants awarded to Kerecis are expected to deliver benefits in the healthcare sector, and are therefore assigned to *Q. Health care and social work activities.*

As such, compared to the GDP data, our classification likely **undercounts** grants for *C. Manufacturing, J. Information and communication, and M. Professional, scientific and technological activities.*

Additional differences in sectoral accounting approaches prevented us from performing a comparison with export data.

These caveats notwithstanding, Figure 4 facilitates interesting **structural comparisons** over the period:

- **Manufacturing** is both the largest GDP contributor (11.3%) and top funding recipient (25.2%).
- **Information & communication** receives a disproportionately high share of funding, reflecting its perceived innovation potential.
- **Healthcare-related projects** attract nearly double their GDP share, highlighting a strong HealthTech focus.
- **Construction and Real estate** receive minimal funding despite their economic size, suggesting limited focus on R&D-led transformation in these sectors.

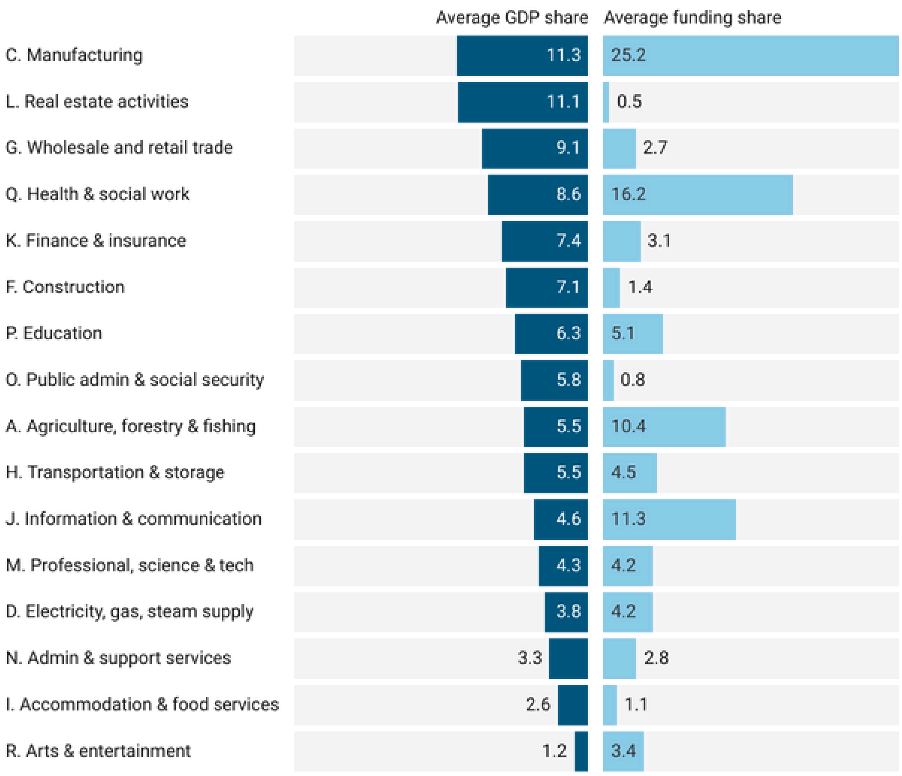

Figure 4: Average GDP shares vs. average funding shares (%) by sector, over the period 2004-2024
(Note: See text above for caveats related to discrepancies in sector classification between the GDP and funding data)

What technologies get funded?

Using a similar automated classification approach as for sectors, we sorted projects into technology categories based on Statistics Canada's Advanced Technology survey, with each project assigned to maximum two technologies categories (see the Methodology section and Table A2 in the Appendix).

Clean tech (e.g. renewable energy, waste management), **advanced business intelligence** (e.g. data processing, streaming, infrastructure, security software)**, and biotech** (across human health, agriculture, food processing, natural resources, etc.) projects dominate funding. **Clean tech and biotech, medical devices and biotech, and advanced processing and clean tech frequently appear together.**

Deep technology sectors such as nanotechnologies, robotics, and geospatial technologies **received relatively limited funding,** with none of these categories making the top 10 funding list in Table 2. Meanwhile, **Software-as-a-Service solutions* attracted more than twice the funding of nanotechnologies and robotics *combined*.**

**Note that SaaS was included in our analysis due to its high frequency in the data, even though it was not part of Statistics Canada's original advanced technology categories.*

TOP 10 TECHNOLOGY CATEGORIES	FUNDING SHARE
Clean technologies	27%
Advanced business intelligence technologies	24%
Biotechnologies	18%
Internet-connected smart devices or systems	18%
Advanced medical devices for human health	17%
Artificial intelligence technologies	16%
Advanced design and information control technologies	10%
Advanced processing and fabrication technologies	9%
Software as a Service	8%
Virtual reality, augmented reality or mixed reality technologies	8%

Table 2: Top 10 technologies and their share of all funding paid out over the period 2004-2024
Note: because the list only contains the 10 most popular technologies, and because one project could be assigned to more than one technology category, these shares do not add up to 100%.

Is funding aligned with policy priorities?

To explore the extent to which TDF funding patterns reflect evolving policy priorities, we analyzed whether **key policy developments** (i.e. relevant legislative or regulatory changes) or announcements (i.e. coalition government platforms) affected **subsequent R&D grant funding to connected technologies**.

Specifically, we decided to focus on an area with pronounced and increasing policy importance over our observation period: **climate and sustainability**, testing whether funding for **clean technology projects** responded to key policy milestones, including:

- the passing of the climate act (Act 70 / 2012),
- the passing of the carbon neutrality act (Act 95 / 2021), or
- proclamations of support for climate-related innovation in the coalition government platforms of 2017 and 2021.

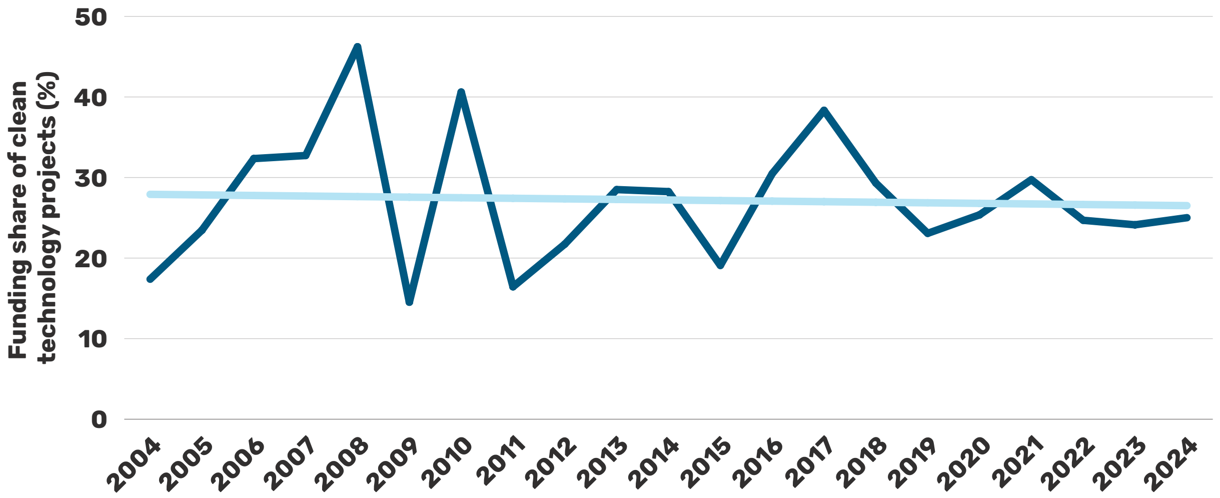

Figure 5: Evolution of "clean technology" funding (actual funding shares and fitted linear trend), 2004 - 2024

Figure 5 plots the share of funding over time received by projects we classified as using or developing "clean technology." While clean tech's funding share varies year-on-year, the overall trend line is remarkably flat at around 27% of total funding. This suggests that **interest in clean technologies preceded, and has not been conditional on, the growing importance of sustainability** in Icelandic government policies.

This finding need not come as a surprise given the **broader funding landscape.** The bulk of climate-related investments have happened in infrastructure and as such, have been funneled through the dedicated "energy fund" (Orkusjóður). Additional targeted funding was provided through a special program related to societal challenges (Markáætlun um samfélagslegar áskoranir), which included sustainability among its focus areas.

Despite this context, we find it interesting that a clear policy focus on sustainability has not led to an increase in clean tech-related R&D through a **supply-side channel**, that is, that it did not spur more interest in the innovation ecosystem to submit proposals related to clean technology development.

Is funding aligned with tech trends?

To assess whether funding patterns align with technological trends, we use Google Trends as a proxy for global public interest in different technologies. Google Trends data reflects the relative popularity of search terms over a period, providing insight into when technologies capture widespread attention and enter mainstream discourse. While search volume doesn't directly measure commercial importance or research merit, it offers a useful **indicator of shifting technological zeitgeist and might signal potential misalignments between funding priorities and emerging opportunities.**

Tækniþróunarsjóður has been consistently funding artificial intelligence projects since before the current AI boom – but the rise in grant funding for AI projects hasn't kept pace with the steep increase in public interest in AI since ChatGPT's launch in November 2022. While the share of funding going towards projects using artifical intelligence increased from 21% of all grants in 2022 to 36% in 2024, this growth appears modest compared to the explosive surge in global AI interest shown in Google Trends data.

This disconnect becomes even more pronounced when comparing AI to virtual reality. VR has not experienced a similar recent surge in public interest; indeed, Google Trends shows interest in VR worldwide has remained stable or even declined since 2022. Yet VR projects continued to receive substantial funding throughout this period, averaging roughly 1 ISK for every 3 ISK paid to AI projects post-2022. In 2023, VR received 13.5% of technology funding compared to AI's 35%, a ratio that seems misaligned with their respective trajectories in public consciousness.

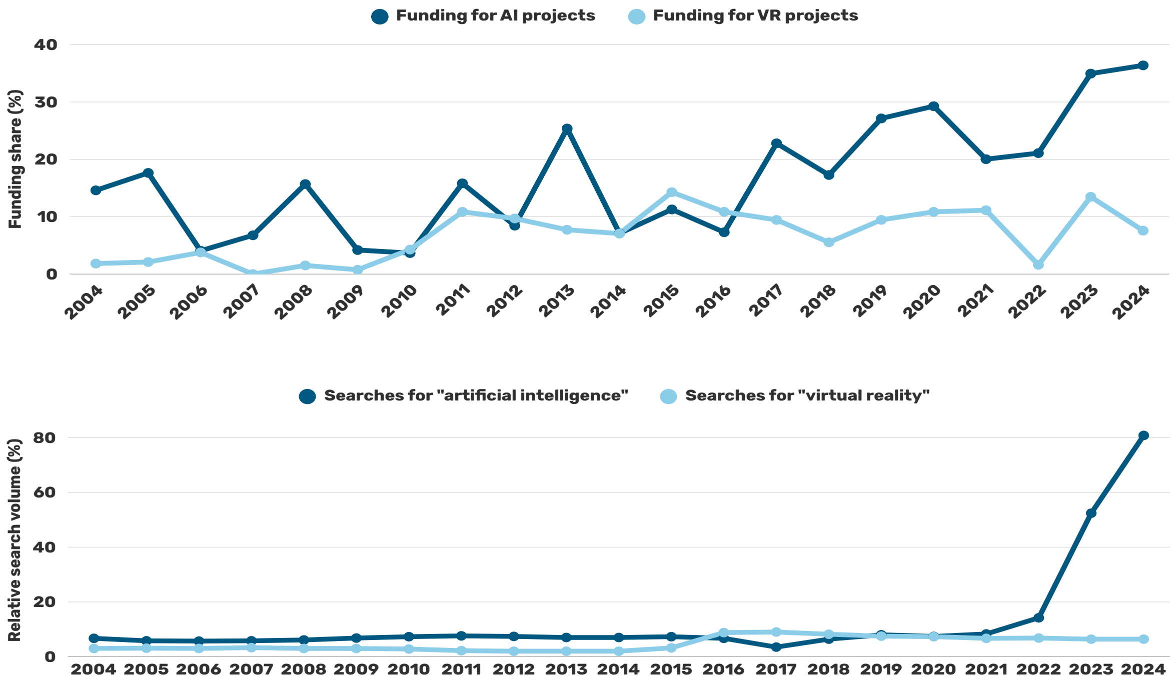

Figure 6: Relative popularity of AI vs. VR projects:
Funding shares (top panel) and worldwide Google searches (bottom panel), 2004 - 2024

Enabling future analysis

Our analysis of Tækniþróunarsjóður funding patterns offers a useful starting point for understanding where public R&D grants have been directed in Iceland over the past two decades. However, several **limitations** constrained the depth and scope of our findings:

Project categories

Published project categorization does not follow ÍSAT industry codes or Horizon Pillar II Clusters, **preventing meaningful comparison with national economic data or other R&D funding sources**. Technology categories are also inconsistent with investment and adoption data, **limiting insights into the role of advanced technologies**. Our AI-based re-classification could only partially address these gaps.

Strategic & policy priorities

The **Fund's stated role is too general to serve as a benchmark** for analysis. It remains unclear how different potential aims (e.g. advancing priority policy areas, supporting *capital-intensive* R&D, boosting exports, etc) are weighed. The **Fund's position in relation to other public innovation instruments** (such as R&D tax credits and targeted initiatives) also needs better articulation.

Unsuccessful applicants

Without information on applications that were not funded, we can't determine **whether observed funding patterns are driven by the supply of proposals** (who applies and with what ideas) **or by demand-side decision-making** (selection criteria and preferences). This limits our ability to assess whether certain sectors / technologies face disproportionate barriers to public R&D support.

We believe the following **actions** would enable more robust, policy-relevant analysis of public R&D funding in Iceland going forward:

Revising the classification

Instead of, or in addition to, the current sector and technology categories, develop a system for reporting on grants that captures:

1. **sector / industry based on economic activity**, in line with ÍSAT codes
2. **sector / societal challenge area based on the expected impact of the project,** following Horizon Europe Pillar II Clusters
3. **technology used / developed**, following a clear taxonomy that aligns with data on investment or other funding sources

Clarifying purpose & aims

Publish **measurable, time-bound policy objectives** for the Fund, clearly positioning it within Iceland's long-term innovation and industrial strategy and ensuring complementarity with other support mechanisms.

Track performance against these objectives and benchmarks and regularly communicate the findings.

Connecting the dots

Publish data on unsuccessful applicants in aggregate form to allow examination of both supply- and demand-side drivers of funding patterns.

Integrate Tækniþróunarsjóður grant data with broader economic and innovation datasets to enable benchmarking against private investment flows, productivity trends, and international R&D support patterns.

In this study, we have made meaningful progress in **describing where public R&D funding has flowed** and in **identifying bottlenecks** that make such analysis unnecessarily complex. However, assessing whether allocations align with the structure of the Icelandic economy, broader policy priorities, and international technology trends will require **improved data, sharper strategic guidance, and a more transparent policy framework**.

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APPENDIX

Methodology:
Data sources;
Details of our classification (approach;, sector and technology descriptions, sense-checking our results).

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Methodology

Data sources

Grant data	We use data publicly available via Gagnatorg on Technology Development Fund grant recipients, amounts paid out to date, project descriptions and categories.
Economic statistics	We use Statistics Iceland data (accessed on their website) on sectoral GDP shares band exports (turnover in the 0% VAT category), and CPI for financial indexation.
Technology trends	We use Google Trends data to capture interest (proxied by normalized Google search volumes) in certain technologies over time both globally and in Iceland.

Approach to automated classification

We experiment with automating the classification of R&D projects using Claude Sonnet 4, a large language model from Anthropic. Our approach automatically sorts projects into industry sectors (in line with the ÍSAT system used by Statistics Iceland) and advanced technology categories (adapted from Statistique Canada's Survey of Advanced Technology, 2022).

Classification Process

We send each project's title, description, existing category labels) to Claude through an API connection.
Sector Classification: We implemented a two-step methodology where Claude first conducts an impact analysis, asking "Where will this project have its biggest real-world impact?" rather than focusing solely on the technology being developed. It considers who will use the innovation, where productivity improvements will occur, and which industry will see primary economic benefits. Claude then uses existing project categories to refine its assessment and adjust confidence levels.
Technology Classification: Claude analyzes project descriptions to identify which advanced technologies are being used or developed, scanning for specific keywords and concepts while prioritizing abstract information when available. It can assign up to two technology categories per project and distinguishes between established categories and other commonly mentioned technologies that don't fit the Statistique Canada framework (e.g. SaaS).

Quality Control

Each classification includes a confidence rating (High, Medium, Low) and brief explanation. Projects with insufficient descriptions are flagged for manual review, and those that don't fit existing categories are marked as "Other" rather than forced into inappropriate classifications. We conducted random spot checks to verify the validity of assigned categories, and sense-checked them against Rannís-assigned categories (see Figure A1). The share of projects which our approach failed to classify (incl. due to network errors) remains below 10%.

Overview of sectors

CODE	NAME AND DESCRIPTION
A	**Agriculture, forestry and fishing** - Crop and animal production, hunting, forestry, logging, and fishing activities
B	**Mining and quarrying** - Extraction of coal, crude petroleum, natural gas, metal ores, stone, sand, clay, and other minerals
C	**Manufacturing** - Physical or chemical transformation of materials into new products, including food processing, textiles, chemicals, machinery, and electronics
D	**Electricity, gas, steam and air conditioning supply** - Generation, transmission and distribution of electricity, gas, steam, and air conditioning
E	**Water supply; sewerage, waste management and remediation** - Water collection and distribution, sewerage, waste collection and treatment, environmental remediation
F	**Construction** - Building construction, civil engineering projects, and specialized construction activities like electrical and plumbing installation
G	**Wholesale and retail trade; repair of motor vehicles** - Sale of goods without transformation, including automotive sales and repair, wholesale and retail trade
H	**Transportation and storage** - Passenger and freight transport by land, water, air, warehousing, and support activities for transportation
I	**Accommodation and food service activities** - Hotels, restaurants, catering, bars, and other short-term accommodation and food service provision
J	**Information and communication** - Publishing, telecommunications, computer programming, information services, and broadcasting activities
K	**Financial and insurance activities** - Banking, insurance, securities trading, fund management, and other financial intermediation services
L	**Real estate activities** - Buying, selling, renting, and operating real estate, including residential and commercial property management
M	**Professional, scientific and technical activities** - Legal services, accounting, consulting, architecture, engineering, research, advertising, and veterinary services
N	**Administrative and support service activities** - Office administration, facilities management, travel agencies, security services, cleaning, and employment services
O	**Public administration and defence; compulsory social security** - Government administration, defense activities, justice, public order, and mandatory social security programs
P	**Education** - Primary, secondary, higher education, and other educational services including vocational training and educational support
Q	**Human health and social work activities** - Hospital services, medical and dental practice, residential care, and social work without accommodation
R	**Arts, entertainment and recreation** - Creative arts, libraries, museums, sports, amusement parks, gambling, and other recreational activities
S	**Other service activities** - Personal services like hairdressing, repair of personal goods, religious organizations, and membership organizations
T	**Activities of households as employers** - Domestic personnel employment and undifferentiated goods and services production by households for own use
U	**Activities of extraterritorial organizations and bodies** - Activities of international organizations, foreign embassies, and other extraterritorial entities

Table A1: NACE / ISIC codes and descriptions

Overview of advanced technologies

ADVANCED TECHNOLOGY	DESCRIPTION
Additional Advanced Software & Network Technologies	Automated identification systems, executive dashboards, Software as a Service, inter-company networks (EDI/Extranet), and advanced analytics platforms
Advanced Business Intelligence Technologies	Software for large-scale data processing, live stream processing technology or real-time monitoring, infrastructure as a service, and security or advanced authentication systems
Advanced Design & Manufacturing Control	Virtual product development, CAD/CAE/CAM software, computer integrated manufacturing, demand forecasting, and manufacturing resource planning systems
Advanced Material Handling & Logistics Technologies	Supply chain collaboration systems, automated storage/retrieval systems, RFID, business intelligence for logistics, and real-time monitoring technologies
Advanced Materials	Lightweight materials, advanced composites, and materials with enhanced properties for various industrial applications
Advanced Medical Devices	Sophisticated medical devices and technologies specifically designed for human health applications
Advanced Processing & Fabrication Technologies	Flexible manufacturing systems, laser materials processing, 4-9 axis CNC machinery, additive manufacturing (3D/4D printing), plasma sputtering, and micro-manufacturing including MEMS
Artificial Intelligence Technologies	Machine learning, natural language recognition, face/image/pattern recognition systems, and AI-enabled automation and decision-making systems
Autonomous Systems	Autonomous or driverless vehicles and related navigation/control technologies
Biotechnologies	Applied biotechnology across human health, agriculture, food processing, natural resources, environment, and construction sectors
Blockchain & Distributed Ledger Technologies	Asset transfer systems, register maintenance, smart contracts, cryptocurrency, and digital identity/authentication solutions
Clean Technologies	Air/environmental protection, waste management and recycling, water treatment, alternative fuels, renewable energy (solar/wind/hydro/nuclear), bio-products, smart grid, and energy storage
Energy & Resource Management	Energy management and efficiency systems, water management/recycling, sustainable agriculture/forestry, sustainable mining, energy-efficient transportation and appliances
Enterprise Software & Information Systems	Large-scale data processing software, Infrastructure as a Service, advanced authentication, ERP, CRM, transportation/warehouse management systems, and manufacturing execution systems
Extended Reality Technologies	Virtual reality, augmented reality, and mixed reality technologies for immersive experiences and applications
Geomatics & Geospatial Technologies	Geographic Information Systems, GPS, remote sensing, mobile geolocation, web/wireless sensors, spatial data infrastructure, and LiDAR processing software
Internet of Things (IoT) & Smart Technologies	Internet-connected smart devices, energy consumption management, premises security, wearable tech, industrial equipment monitoring, logistics management, and condition-based maintenance
Nanotechnologies	Nanomaterials (nanocomposites, nanoparticles, carbon nanotubes), nanodevices (sensors, NEMS), nanoelectronics, nano-enabled processes and products, nanomedicine, and nanobiotechnology
Robotics	AI-enabled robots with image recognition, physical movement capabilities, automated processing systems, and automated guided vehicles (excludes non-AI robots)

Table A2: Advanced Technology Categories and descriptions (based on Statistique Canada's classification)

Sense-checking our classification

We validated our automated classification process by comparing the categories we generated with existing Rannís labels. The strong overlap between our industry sectors and Rannís' 'yfirflokkur' categories supports our approach: for instance, 83% of projects we classified as impacting the Education sector are labeled as *Educational services ('Fræðslu- og menntatengd þjónusta')* by Rannís. **While our advanced technology category is less directly comparable with Rannís' 'undirflokkur' , the results align logically:** most of our AI-classified projects fall under Software development or services, and our biotechnology-classified projects cluster under *Marine and Freshwater biotechnology* or *Pharmaceutical development and production.*

	Manufacturing	Human health and social work activities	Information and communication	Agriculture, forestry and fishing	Education
Almenn verslun og þjónusta	3	0	33	2	1
Fjarskiptaþjónusta og samgöngur	3	0	13	1	2
Fræðslu- og menntatengd þjónusta	0	2	6	1	83
Hagnýting auðlinda lífríkis sjávar og ferskvatns	22	2	0	60	0
Heilbrigðis- og velferðarþjónusta	4	30	1	0	4
Heilbrigðistækni og lækningatæki	11	63	0	1	2
Menning, hönnun og afþreying	10	1	41	1	4
Orkunotkun og hagnýting orkuauðlinda	14	0	2	5	1
Annað	34	3	6	29	4

	Advanced business intelligence	Clean technologies	Biotechnologies	Artificial intelligence	Smart devices or systems	Advanced medical devices
Efnaframleiðsla, önnur en lífefnaframleiðsla	0	19	2	1	0	0
Efnistækni, önnur en líftækni	0	12	0	0	1	4
Hugbúnaðar- og vefþjónusta	25	0	0	18	10	4
Hugbúnaðargerð - Önnur en tölvuleikir	57	3	0	61	29	9
Líftækni, önnur en sjávar- og ferskvatnslíftækni	0	1	18	0	1	7
Lyfjaþróun og -framleiðsla	0	0	21	1	0	13
Matvæla- og drykkjaframleiðsla	3	7	12	0	2	1
Sjávar- og ferskvatnslíftækni	0	4	30	0	0	2
Þróun&framleiðsla rafeinda- og/eða vélbúnaðar	4	0	0	5	34	40
Annað	11	38	17	14	24	19

Figure A1: Sense-checking the results of our automatic classification process: 'yfirflokkur' vs. top ÍSAT sectors (top panel); 'undirflokkur' vs. top tech categories (bottom panel); % shares