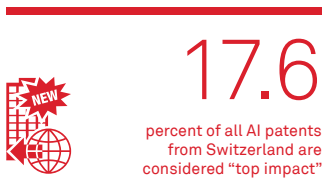




KEY FIGURES



Source: EconSight, 2019; Asgard VC for Artificial Intelligence, 2017; BAK Economics, 2019

SWITZERLAND – A HUB FOR ARTIFICIAL INTELLIGENCE (AI)

AT A GLANCE

Switzerland is home to world-renowned universities and research institutes in the area of AI, including ETH Zurich, EPF Lausanne, the University of St. Gallen, and the IDSIA in Lugano. This proximity to cutting-edge research is one important reason why renowned tech giants such as Google, IBM or Microsoft run their AI research from here. Thanks to its traditional strength in the area of life sciences, Switzerland also drives AI developments in healthcare. In relation to its population, the country boasts the highest number of AI patents worldwide, which emphasizes its great potential for innovation. Companies based here benefit significantly from efficient technology transfer, sustainable software systems and unbureaucratic support from cantons and the government.

AI Switzerland: Top research companies
in terms of patent portfolio size

HEALTHCARE

- Roche
- Philip Morris
- Sonova
- Health Discovery Corp
- Novartis
- Histide
- IBM
- Myotest SA
- Codexis
- Nestlé

INDUSTRY 4.0

- ABB
- Alphabet
- Amazon
- Belimo
- Cisco
- Endress+Hauser
- GE
- Siemens
- SICPA SA
- Georg Fischer AG

MOBILITY











- Cisco
- Aptiv
- Swiss Re
- Alphabet
- Amazon
- Bosch

Sources: BAK Economics/Swiss Federal Institute of Intellectual Property, 2019

RESEARCH AND DEVELOPMENT (R&D)

- According to the Times Higher Education rankings, Switzerland is seen as leading the way in AI research, since its publications are most frequently cited internationally (even though most publications come from China and the USA). What's more, most of the AI patents registered here are considered top-impact patents.
- Swiss companies are particularly strong in the area of AI patents for healthcare, with Roche alone notching up 41 AI patents in 2018. This reflects Switzerland's traditional strength in the area of life sciences. Novartis is also pursuing the further development of new technologies and AI in order to be able to offer patients more individual solutions. Both Roche and Novartis are headquartered in Basel, where there is a strong ecosystem in life sciences and healthcare.
- The **Dalle Molle Institute for Artificial Intelligence (IDSIA)**, based in Lugano, Canton Ticino, was founded in 1988. It has gained international recognition through the development of algorithms which are now used by Google, Facebook and Apple for speech recognition. IDSIA also cooperates with the major bank UBS, which opened a Business Solution Center in Lugano in 2018 specializing in AI, analysis and big data.

Publications in AI research, 2011–2015

| Country | # Publications | Citation impact |
|---|----------------|-----------------|
|  Switzerland | 1,685 | 2.71 |
|  Singapore | 2,432 | 2.24 |
|  Hong Kong | 2,205 | 2.0 |
|  USA | 25,471 | 1.79 |
|  Italy | 6,221 | 1.74 |
|  The Netherlands | 2,458 | 1.71 |
|  Australia | 5,227 | 1.69 |
|  Germany | 7,957 | 1.66 |
|  Belgium | 1,537 | 1.64 |
|  United Kingdom | 10,120 | 1.63 |

Sources: Elsevier/Scopus; Times Higher Education, 2017

- The Swiss Federal Institutes of Technology in Zurich and Lausanne (ETHZ and EPFL) are hubs of both Swiss and international AI research:
 - According to the Times Higher Education subject ranking list for 2019, the **IT department at ETHZ** is the second-best in the world. Here, AI is firmly anchored as a sub-area of IT – for example at the Institute for Machine Learning.
 - Also known all over the world are the **Autonomous Systems Lab (ASL)** at ETHZ, whose director is robotics researcher Roland Siegwart, and the Artificial Intelligence Laboratory LIA at EPFL, under the management of Bo Faltings.
- The **Biotech campus** in Geneva, which was inaugurated in 2015, is developing into the CERN for brain research with a focus on technology transfer, where industry and universities work together side by side. This is also the base of the Human Brain Project, in which the EPFL is taking a leading role.
- AI competence is also one of the reasons why the drone ecosystem in Switzerland plays a leading role internationally. Hence, according to the AI Time Journal, the EPFL spin-off Gamaya is a leader among the Top 25 Artificial Intelligence Companies in 2018. The Lausanne-based startup develops drones for the area of agriculture.
- Since 1991, the independent research institute **IDIAP** in Martigny, Canton Valais, has been examining IT and AI topics and has developed an excellent reputation for itself in doing so. It maintains close links with EPFL. In cooperation with distance learning institution FernUni Schweiz, in 2018 IDIAP began offering the first master's degree with a focus on AI.
- The **University of St. Gallen (HSG)** is aiming to become a research hub for AI and in 2018 became the first Swiss university to acquire an NVIDIA DGX-2 supercomputer, considered to be the most powerful AI system in the world.
- Switzerland has made a name for itself among tech companies as a location for research and development relating to artificial intelligence.
 - **Google** has its biggest research operation outside of the USA in Zurich and tackles AI solutions through the “Google Brain” team that is based here.
 - US corporation **Microsoft** established a laboratory for mixed reality and artificial intelligence in Zurich in 2018. It is managed by ETHZ professor Marc Pollefeys, and the team here focuses primarily on research and development of machine vision.
 - It is also in Zurich that **Facebook** is working on the area of machine vision, and its Swiss team is being continually expanded. In 2016, Facebook acquired the ETHZ spin-off Zurich Eye.
 - The **IBM Research Laboratory** in Rüschlikon, Canton Zurich, works intensively on AI. It was founded in 1956 as the IT corporation's first laboratory outside of the USA and is now one of twelve IBM locations with its own research laboratory.
 - IT company **Acronis** is an international specialist in back-up software and recovery. At its base in Schaffhausen, global teams work on AI and blockchain. Acronis's AI-based protection solutions can be found in Microsoft products, among other things.
- The **Mindfire Foundation**, which was founded in 2017 by StarMind founder Pascal Kaufmann, is a **cross-border research program** that deciphers the principles of human intelligence and thus aims to drive forward the development of AI.

SUCCESS STORY: SOPHIA GENETICS

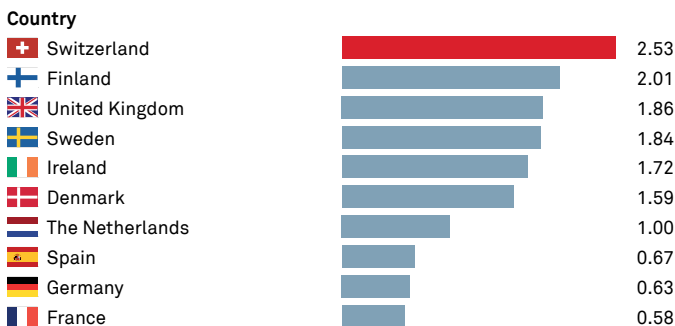
The startup Sophia Genetics was founded in 2011 as a spin-off of EPFL. With its AI platform Sophia, the company serves more than 800 hospitals in 77 countries. Since January 2019, its investors have included ex-US Vice President Al Gore, who supports the Lausanne-based unicorn through his investment fund. Since its foundation, the startup has already received 140 million US dollars in capital and is now planning to launch on the stock exchange.

COSTS AND FINANCING

- With its funding program “**Swisscom Venture**”, Swiss telecommunication company Swisscom is investing in innovative companies and startups. The focus of the investments here is on IT, cloud and telco infrastructure, as well as solutions based on AI. Annual investment amounts to around 30 to 40 million Swiss francs.
- In 2017, venture capitalist firm Asgard, which specializes in AI, calculated that Switzerland has **Europe’s highest density of AI startups** in relation to population. In absolute figures, Switzerland occupies fifth place.

Leading European Artificial Intelligence Nations

by population



Source: Asgard – Human Venture Capital for Artificial Intelligence, 2017

- The Swiss Innovation Agency **Innosuisse** specifically promotes cooperation between science and the market with innovation projects, networking, training and coaching. Innosuisse has an annual funding budget of around 200 million Swiss francs, the lion’s share of which goes to support innovation projects.
- From Switzerland, it’s not difficult to access EU funding and research projects. A look at the AI patents shows that Switzerland is even more intensively intertwined with the European research network than EU countries: Alongside the Human Brain Project under the management of EPFL, there are a number of other projects with AI use cases. Since 2018, the Institute of Business Informatics at the University of Applied Sciences of Western Switzerland (HES-SO Valais-Wallis) has been coordinating a European research project for the processing of large quantities of medical data with a budget of five million Swiss francs.
- **Kickstart** is one of the biggest cross-company accelerators in Europe and is operated by Impact Hub Zurich. The initiative fosters deep tech innovations from areas such as AI, blockchain or robotics and invites promising international startups to Switzerland to enable them to gain first-class access to the ecosystem.

FRAMEWORK CONDITIONS AND MARKET ENTRY

- AI is already included as a theme within the digitization action plan of the State Secretariat for Education, Research and Innovation. A total of 213 million Swiss francs were earmarked for its implementation in the years 2019 and 2020, with the aim being to strengthen IT as a fundamental science.
- The Swiss authorities makes data available for innovative projects as open public records via the portal opendata.swiss, where they are freely available for use. This is explicitly aimed at fostering the development of intelligent solutions and products.
- The Swiss Academy of Engineering Sciences, SATW, is the most important network of experts in the area of engineering sciences in Switzerland. SATW fosters new technologies, including AI, and connects leading specialists and organizations at a national and international level.
- The national initiative [digitalswitzerland](https://www.digitalswitzerland.ch), sustained by companies, universities and politicians, aims to position Switzerland as one of the world’s leading tech and innovation hubs. It works to create the best framework conditions at all levels within Switzerland.

Country comparison AI (Healthcare, Industry 4.0, Mobility)

Patents per 1 million inhabitants 2018

| Rank/Country | Patents per 1 m. |
|-------------------|------------------|
| 1 USA | 44.5 |
| 2 Switzerland | 34.6 |
| 3 Japan | 25.6 |
| 4 Germany | 21.9 |
| 5 United Kingdom | 14.2 |
| 6 France | 9.8 |
| 7 China | 5.7 |
| 8 Italy | 3.6 |
| 9 Russia | 1.2 |
| 10 India | 0.5 |

Sources: BAK Economics/Swiss Federal Institute of Intellectual Property, 2019

TESTIMONIAL



“As an AI company, technological innovation is at the heart of what we do. Our R&D center opened its doors in the Techno-Pôle technology park in Valais, Switzerland, at the end of 2017. Here we found a favorable operating environment and a profound pool of talent. We received great support with all administrative procedures, including finding office premises and facilitating introductions to relevant academic and R&D institutions such as the Idiap Research Institute and the HES-SO Valais-Wallis. Our team has since been working on a research project geared to innovate our technology around Natural Language Processing (NLP) and mobile.”

ULJAN SHARKA
CEO iGenius
igenius.ai

CURRENT DEVELOPMENTS

- Zurich-based startup StarMind has developed AI technology for knowledge conveyance, which is being used by the Red Cross (ICRC) and reinsurer Munich Re, among others.
- In a pilot project by UBS and Swiss startup nViso, based in Lausanne, AI is being used in meetings with customers. Here, a system analyses the emotions on customers' faces in order to create a risk profile.
- At the end of 2018, Lucerne-based startup Private Alpha developed the first Swiss investment fund based on a complex AI system. The fund makes use of an AI platform in order to predict trends, choose stocks and control risk.
- Recapp, a spin-off of research institute IDIAP, has the potential to become a leading provider in the area of multilingual automated speech recognition. The Swiss technology from recapp is based on AI and permits the development of efficient and adaptable automated speech recognition systems that adapt quickly to new dialects, languages and speakers.

CONTACTS AND FURTHER INFORMATION

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More fact sheets on

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