

R&D location Switzerland Success factors to boost R&D and digital innovation

Table of Contents

Introduction	03
Status of the Swiss R&D location	04
Indicators of innovation competitiveness	04
R&D expenditure trends of industrial sector	07
Twenty measures to boost R&D and innovation leadership	09
Framework conditions	10
Support and funding	12
Mindset	14
Collaboration	16
Skills and training	18
Expert interviews	20
Gerhard Salge, CTO at Hitachi Energy	20
Gian-Luca Bona, CEO at Empa	22
Stephan Mumenthaler, Director at scienceindustries	24
Robert Rudolph, Member of the Executive Board/Digitalisation & Innovation at Swissmem	26
André Muff, Head of R&D at Siemens Smart Infrastructure, Building Products unit (SI BP)	28
Endnotes	30
Contacts and authors	31

Introduction

In 2012, in the Deloitte study *Innovation Reinvented*, we analysed the strength and the weaknesses of Switzerland as a leading R&D and innovation hub.¹ Ten years later, many of the identified challenges for Swiss industrial companies remain or are more pronounced and additional areas of improvement for the Swiss R&D location have arisen.

One of the key findings of the Deloitte's *Power Up Switzerland* report of 2020 was that low productivity growth and declining competitiveness is placing Switzerland's model for success increasingly under pressure.² R&D and innovation have been identified as crucial elements to ensure ongoing Swiss competitiveness and prosperity. Even though Switzerland remains a leading research location with the highest number of patents per capita in Europe and clearly demonstrated strength in several R&D fields, it lags behind in digital technologies patents. Switzerland's advanced, high-cost economy can only continue to grow and prosper, remain attractive and maintain competitiveness in the future, through technological progress. This means focusing on R&D and innovation.

Together with experts from industry, academia and government, we discussed the success factors that will boost digital innovation and assessed the progress of Swiss industrial companies in the last decade. We also analysed the current challenges and new opportunities to continue developing Switzerland into a leading R&D location globally in the coming years.

From these discussions, we derived **twenty measures** – in the areas of framework conditions, support and funding, mindset, collaboration and skills and training – **to boost R&D and innovation leadership in Switzerland**. In addition, we identified which measures should have the highest priority and who should be among the main drivers to implement them – for example, government, education sector and/or industry/businesses.

We would like to thank all the experts who participated in these discussions for their views and contributions. Statements of experts that did not wish to be named or have statements attributed to them, have been anonymised. A selection of full expert interviews can be found at the back of this study.

Status of the Swiss R&D location

Indicators of innovation competitiveness

Since 2012, Switzerland as a business location has performed remarkably well in the leading global rankings of the World Economic Forum (WEF) and the Institute for Management Development (IMD) that measure national competitiveness in several general dimensions – for example, economic performance, business efficiency, government policies, infrastructure, human capital as well as innovation ecosystems.

Leading the overall rankings in the WEF Global Competitiveness Report from 2012 to 2017, Switzerland's general competitiveness declined only in 2018 and 2019 to rank 4th and 5th respectively – more recent data is not available because the WEF paused its comparative country rankings since the COVID-19 pandemic.³ In the other major ranking, the IMD Global Competitiveness Index, Switzerland followed a similar trajectory – also dipping in 2018, but regaining its leading position shortly thereafter (see Chart 1).



“Switzerland has many excellent framework conditions that make it attractive for R&D. The excellent education system is a key factor. There is also a variety of talent and the country remains safe, reliable and predictable.”

Gerhard Salge, CTO at Hitachi Energy



Chart 1: General indicators of competitiveness⁴

Placement of Switzerland in the IMD World Competitiveness Index

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Hong Kong	USA	USA	USA	Hong Kong	Hong Kong	USA	Singapore	Singapore	
2	USA			Hong Kong			Hong Kong	Hong Kong	Denmark	Sweden
3		Hong Kong	Singapore	Singapore	USA	Singapore	Singapore	USA		Denmark
4	Singapore	Sweden	Hong Kong		Singapore	USA	Netherlands		Netherlands	Netherlands
5	Sweden	Singapore	Sweden	Canada	Sweden	Netherlands		UAE	Hong Kong	Singapore

Source: IMD.

Overall, Switzerland has consistently kept its spot in the top 5 of the IMD Global Competitiveness Index of more than 60 countries in the last decade. While other leading economies – for example Hong Kong and USA – lost in competitiveness and dropped out of the top 5 in recent years, new competitors – such as Denmark, Sweden or the Netherlands – gained ground over the same period and challenged the position of some of the established, leading countries.

The increased competitive pressure in the innovation space is also illustrated by the historic trend in the EU Industrial R&D Investment Scoreboard, where the above mentioned countries are catching up with Switzerland in their R&D intensity efforts across all sectors. Switzerland's leading R&D focus remains heavily reliant on the high R&D expenditure of its pharmaceutical and biotechnology sector (see Chart 2).



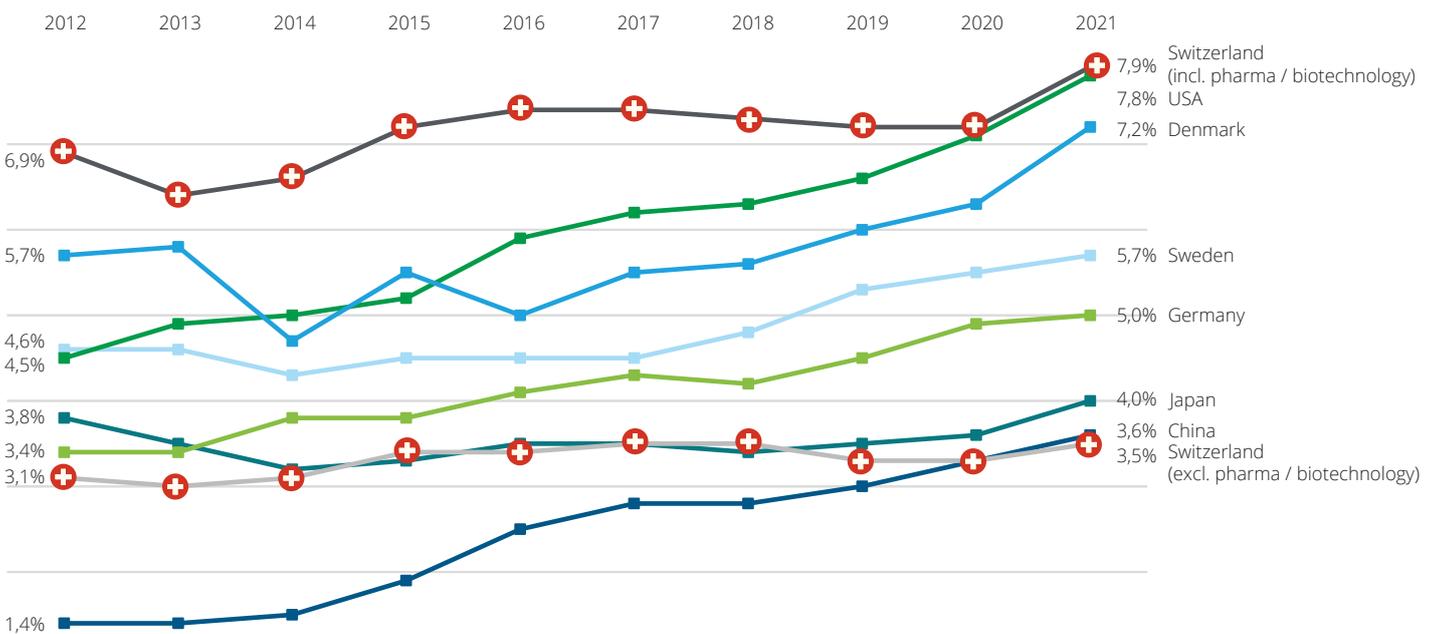
“Other R&D locations in Europe have also become more competitive, for example the Netherlands, Belgium and Denmark.”

Gian-Luca Bona, CEO at Empa



Chart 2: R&D intensity trends by region⁵

[Average R&D expenditure in percentage of revenue, 2012–2021]



Note: The averages for the selected countries are calculated from the R&D expenditure figures of the 2500 global companies from all sectors (e.g., industrials, materials, technology, health care, financials, consumer discretionary, consumer staples, energy and utilities) listed in the EU Industrial R&D Investment Scoreboard. Source: European Commission.

All the experts point out that Switzerland’s attractiveness and competitiveness as an R&D location is based on its dual-track education system which combines on-the-job training with academic input, as well as outstanding education institutions such as the ETH Zurich (Swiss Federal Institute of Technology Zurich) and EPFL (Swiss Federal Institute of Technology Lausanne). Switzerland also boasts a high-performing and competitive manufacturing industry – one of the key requirements for innovation – and has an innovation-friendly and secure investment environment. More general factors, such as the country’s political stability, good infrastructure and robust business environment, also boost Switzerland’s attractiveness as a centre for innovation. However, the general rankings of the WEF and the IMD represent just a snapshot of the past – with much of the data being ‘soft data’, focusing on a few dimensions, which do not take into account the implementation and market launch of innovations.

A more comprehensive picture – specifically for R&D and innovation competitiveness – arises for Switzerland when looking at the global innovation rankings of the World Intellectual Property Organization (WIPO) and Bloomberg (see Chart 3).

Chart 3: Placement of Switzerland in leading global innovation rankings⁶
[2012 vs 2021]

WIPO Global Innovation Index			
	Rank 2012	Rank 2021	Trend
Institutions	13	13	→
Human capital and research	10	6	↗
Infrastructure	8	2	↗
Market sophistication	5	6	↘
Business sophistication	6	4	↗
Knowledge and technology outputs	1	1	→
Creative outputs	1	2	↘
Total	1	1	→

“The current framework conditions for R&D in Switzerland are very good – for example – the liberal environment, networks and institutions, general availability of talent, sufficient public/private funding and spin-off opportunities.”

Stephan Mumenthaler, Director at scienceindustries

Bloomberg Innovation Index			
	Rank 2012	Rank 2021	Trend
R&D intensity	5	3	↗
Researcher concentration	12	4	↗
High-tech density	14	11	↗
Manufacturing value-added	15	5	↗
Productivity	20	7	↗
Tertiary efficiency	28	15	↗
Patent activity	31	18	↗
Total	8	3	↗

Source: WIPO, Bloomberg.

Switzerland has also been leading the WIPO Global Innovation Index in the last decade, performing especially well in the dimensions of infrastructure, knowledge and technology outputs, as well as creative outputs. In the Bloomberg Innovation Index, Switzerland established itself in the top 5 in recent years, performing strongly in the dimensions of R&D intensity and researcher concentration and having improved in all other dimensions over the past decade – for example, productivity, tertiary efficiency or patent activity.

R&D expenditure trends of industrial sector

Swiss industrial companies remain committed flagships for innovation and continue to spend significant amounts on R&D in sectors including mechanical engineering, electronics/electrical engineering, precision instruments, automotive suppliers, industrial applications, and chemicals. On average, top innovating companies in the Swiss industrial sector spent 5% of revenue on R&D in 2021 – the same percentage figure as in 2012, however, off a higher revenue base (see Chart 4).

Chart 4: Top innovating companies in the Swiss industrial sector⁷

[R&D expenditure in CHF million, as a percentage of revenue, 2012 vs 2021]

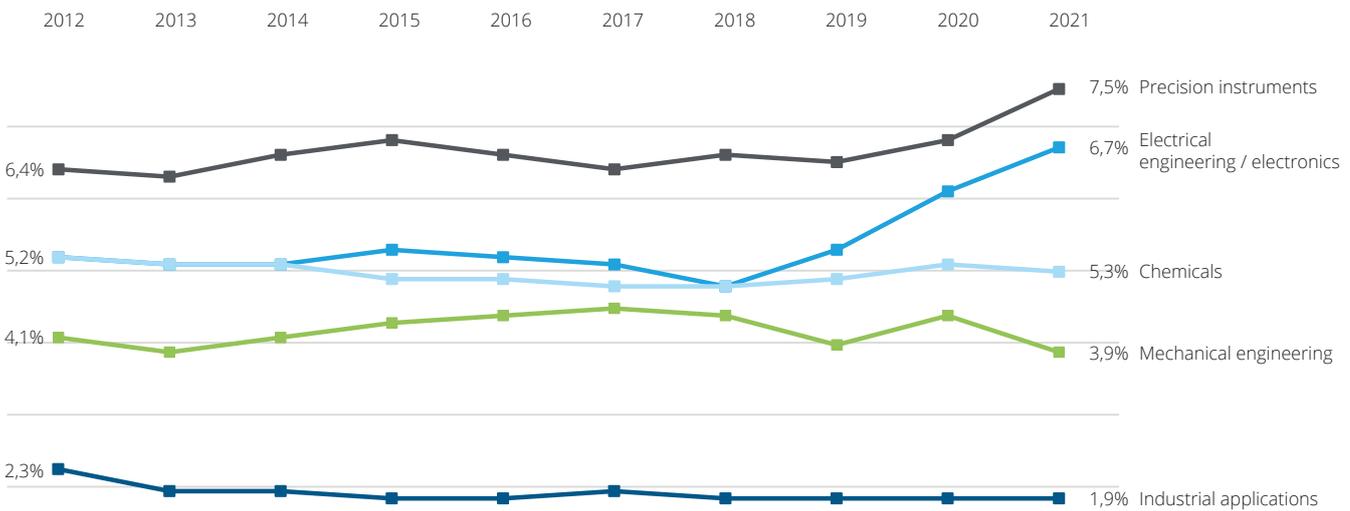
Company	Sector	R&D expenditure (CHF millions)		R&D expenditure in % of revenue		Trend
		2012	2021	2012	2021	
ABB Ltd.	Mechanical engineering	1 373	1 114	3,7%	4,2%	↗
Syngenta AG	Chemicals/Pharma	1 175	1 017	8,8%	6,6%	↘
Liebherr International	Mechanical engineering	586	604	5,3%	4,8%	↘
Givaudan AG	Chemicals	404	562	9,5%	8,4%	↘
Firmenich International	Chemicals	264	388	10,0%	10,0%	→
Clariant AG	Chemicals	175	190	2,9%	3,7%	↗
Sika AG	Chemicals	173	214	3,6%	2,3%	↘
Endress+Hauser AG Int.	Precision instruments	137	213	6,7%	7,4%	↗
RUAG Holding AG	Mechanical engineering	134	28	7,7%	2,6%	↘
Lonza Group AG	Chemicals	116	181	3,0%	3,3%	↗
Schindler Holding AG	Mechanical engineering	115	223	1,4%	2,0%	↗
Sonova Holding	Electrical engineering/Electronics	114	178	6,3%	6,8%	↗
Mettler-Toledo	Precision instruments	106	155	4,8%	4,6%	↘
OC Oerlikon Corporation AG	Conglomerate	106	105	3,6%	4,0%	↗
Bühler Holding AG	Mechanical engineering	104	142	4,3%	5,2%	↗
Georg Fischer AG	Mechanical engineering	93	113	2,6%	3,0%	↗
Meyer-Burger	Electrical engineering/Electronics	92	4	14,3%	9,1%	↘
Sulzer AG	Mechanical engineering	89	43	2,2%	2,0%	↘
Bucher Industries AG	Mechanical engineering	81	118	3,1%	3,7%	↗
Bobst	Mechanical engineering	70	88	5,5%	5,6%	↗
Autoneum	Automotive supplier	66	45	3,5%	2,7%	↘
Geberit AG	Industrial applications	50	78	2,3%	2,4%	↗
Rieter Holding	Mechanical engineering	43	58	4,8%	6,0%	↗
Ems-Chemie Holding AG	Chemicals	36	46	2,2%	2,5%	↗
Starrag Group	Precision instruments	29	21	7,6%	10,4%	↗
Huber+Suhner	Electrical engineering/Electronics	28	56	4,0%	6,5%	↗
Forbo	Industrial applications	16	16	1,4%	1,3%	↘
		5 775	6 000	Ø 5,0%	Ø 5,0%	→

Note: The ranking includes top companies from the mechanical engineering, electrical engineering/electronics, precision instruments, automotive suppliers, industrial applications and chemical sectors listed in the Handelszeitung Top 500 index. The ranking is determined by R&D expenditure in 2012. Source: Annual reports, analysts' presentations and company websites.

Very large companies generally invest heavily in R&D. Small and medium-sized companies (SMEs) do not have the budget to do so and cannot afford to invest on the same scale in R&D, innovation management, intellectual property management or marketing – although they may be investing the same proportion of their revenue in innovation. This means that SMEs are more dependent on stronger support and cooperation in the R&D and innovation space than large companies. Alongside company size, there are also marked differences in R&D expenditure in different sectors (see Chart 5).

Chart 5: R&D expenditure trends by sector*

[Average R&D expenditure in percentage of revenue, 2012–2021]



Note: The ranking includes top companies from the mechanical engineering, electrical engineering/electronics, precision instruments, automotive suppliers, industrial applications and chemical sectors listed in the Handelszeitung Top 500 index. The ranking is determined by R&D expenditure in 2012. Source: Annual reports, analysts' presentations and company websites.

The precision instrument and electrical engineering/ electronics sectors head the league table for R&D expenditure, with both sectors having spent more than the average 5% of their revenue on R&D annually over the last decade. Precision instrument manufacturers and companies in the electrical engineering/electronics sector even increased their R&D expenditure in 2021 to 7.5% and 6.7% respectively – most likely due to higher technology investments as a result of the COVID-19 pandemic.

Excluding the chemicals and pharmaceuticals manufacturer Syngenta, R&D expenditure by chemicals companies is sitting at an average of 5% annually for the past decade.

The mechanical engineering sector, by contrast, invested just over 4% of revenue in R&D per year. The lowest proportions are to be found in the industrial applications sector, which spent only around 2% of their revenue on R&D.



“The main challenge for many MEM companies in Switzerland remains that there is not enough pressure to change due to high prosperity levels. Even the Swiss Franc shock and the COVID-19 crisis have not had as huge an impact as expected. As a result, competitive pressure to change and be willing to take more risks is rather low.”

**Robert Rudolph, Member of the Executive Board/
Digitalisation & Innovation at Swissmem**



Twenty measures to boost R&D and innovation leadership

The 2012 Deloitte study Innovation Reinvented identified three main deficits – and the most significant areas for improvements – for Switzerland as a centre for R&D and innovation: human capital, collaboration and the implementation of innovation.⁹

With regard to human capital, interviewees in 2012 reported major challenges in finding or training the right R&D staff. They were also critical of the fact that many universities produced excessive numbers of ‘pure’ scholars when industry actually needed graduates with solid practical experience. Most interviewees also stressed that the collaboration between universities and industry could be organised more professionally and that there was a lack of collaboration between businesses. In the area of implementing innovation and bringing it to market, the interviewees agreed that the most significant barrier remained the Swiss mentality, specifically its risk-averse nature.

In some of these areas Switzerland seems to have made some progress, as reflected in the 2021 global innovation rankings of the WIPO and Bloomberg (see Chart 3). However, current discussions with our experts show that in many areas there is still room for improvement to secure the long-term attractiveness and competitiveness of the Swiss R&D location.

Based on these discussions, we have identified twenty measures to boost R&D and innovation leadership in Switzerland in the areas of framework conditions, support and funding, mindset, collaboration and skills and training.



“There are several elements involved in creating excellence in R&D and differentiating yourself. Most deal with increasing the existing innovation collaboration within new networks and ecosystems. For example, more co-creation with customers, creating dedicated spaces for innovation within the organization, such as idea boosters, team challenges and so forth, or organizing R&D challenges and competitions with universities”

André Muff, Head of R&D at Siemens Smart Infrastructure, Building Products unit (SI BP)



Framework conditions

Maintain Switzerland's general location attractiveness

– Switzerland has many advantageous social, political and economic framework conditions that are conducive to R&D and innovation leadership. The high quality of life, good infrastructure, excellent education system, highly skilled workforce, stable political environment, flexible labour market, solid financial system and attractive tax system are the main factors. However, Switzerland's leading position in the global landscape has been threatened in recent years by other business locations that have become much more successful in attracting international companies and talent. To maintain Switzerland's future location attractiveness for R&D and innovation, the government, education sector and industry/businesses need to work together more closely to strengthen the main location advantages.

Improve ability to attract and retain top talent from abroad

– The availability of talent is an essential factor for a leading R&D and innovation location. However, Switzerland – and its world class universities – does not produce enough top talent on its own, resulting in additional R&D talent needing to be attracted and retained from abroad. A much more competitive framework to support international talent mobility is needed to satisfy current and future talent needs. Companies with R&D footprints in Switzerland should benefit from simplified and harmonised immigration processes which will encourage intra-company mobility at international companies. There should be also a stronger emphasis on attracting and retaining highly talented graduates. Government, the education sector and industry/businesses – working in close collaboration – will be best positioned to drive the improvement of framework conditions to attract and retain top talent.¹⁰

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“Many of the framework conditions are in place, however it will be important that they are nurtured and strengthened on an ongoing basis.”

**Robert Rudolph, Member of the Executive Board/
Digitalisation & Innovation at Swissmem**

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“While the high-cost location of Switzerland can still attract excellent R&D talent with good salaries, the cost of living in the country can be prohibitive.”

**Robert Rudolph, Member of the Executive Board/
Digitalisation & Innovation at Swissmem**

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Encourage competitive R&D tax system and reduce regulations

The aim of the recent Swiss corporate tax reform was to create more incentives that keep Switzerland in the top tier of attractive business locations from a tax perspective. Two attractive tax incentives were created at the level of cantonal taxes (not the federal tax level): A super-deduction for certain R&D expenses and a tax relief for income from patents (patent box). There are, however, cantonal differences in tax rates – for example, the R&D super-deduction is not available in all cantons. At the same time, other international business locations are also creating more scope for R&D and innovation to be tax-deductible – for example, having more favourable tax rates than Switzerland and applying patent boxes more broadly (including software copyrights as IP assets). In this increasingly competitive landscape, apart from tax incentives, lowering the burden of regulation for businesses in general is a key lever to boost R&D and innovation leadership – for example, allowing the easier sharing of data and IP across different locations.



“Regulations should also change to more easily allow foreign students who graduated in Switzerland, to stay and work here.”

Stephan Mumenthaler, Director at scienceindustries



Drive broad framework for business research, but no formal industrial policy

The general framework for business research provided by government should be broad and equal i.e., applicable to all industries/businesses and not focused on specific industries or trending topics. Government should also facilitate and support more innovation platforms and help build a broader innovation ecosystem. Such systems should, however, allow for spontaneity and creativity. rather than being rigidly planned and administered.



	Measures	Main driver			Priority
		Government	Education sector	Industry/ Businesses	
Framework conditions	Maintain Switzerland's general location attractiveness	✓	✓	✓	
	Improve ability to attract and retain top talent from abroad	✓	✓	✓	Top priority
	Encourage competitive R&D tax system and reduce regulations	✓			
	Drive broad framework for business research, but no formal industrial policy	✓			

Support and funding

Follow a collective support/common ownership

approach – A much more collective approach is required to boost R&D and innovation leadership more effectively in the future. Government, the education sector and industry/businesses need to join forces, take up common ownership and actively leverage public-private partnerships to foster innovation. This close collaboration will be key not only in the areas of digitalisation and digital transformation – where the provision of digital infrastructure is an essential requirement for new digital services and innovations – but also especially for tackling the big generational innovation challenges such as clean energy transition and addressing climate change and biodiversity.

Increase support of basic and applied research to give industry an edge over its competitors

– Increased support and funding through the existing government instruments – for example, Swiss National Science Foundation (SNSF) and Innosuisse (Swiss Innovation Agency) – will help Swiss industry/businesses to boost R&D and innovation. Funding should include both ‘early stage’ support of basic research and ‘later stage’ support of applied research or research-based innovation. However, there should be a special focus on funding instruments that close the gap between research and applications. Government funding should be broad and equal, only allowing for a more specific focus when it comes to topics of societal relevance – for example, CO2 reduction, sustainability, etc.

Facilitate better knowledge and technology transfer

– A good transfer of knowledge and technology between public research institutes, education sector and industry as well as between businesses themselves is essential for successful innovation and should be actively encouraged. Exchanging information and skills and transforming research findings into marketable products and services will strengthen Switzerland’s R&D and innovation leadership. The technology transfer offices at the ETH Zurich and EPFL as well as other universities/technical colleges, the Federal research institutes (e.g., Empa, Paul Scherrer Institute), different Swiss Innovation Park branches and other technoparks play all a key role in facilitating such knowledge and technology transfer. In addition, privately and publicly co-financed research institutes (e.g., Disney Lab Zurich, Nestlé Institute of Health Sciences) and privately funded university chairs are also important.



“R&D in Switzerland would benefit greatly from a more collective approach, targeted incentivization and increasing public-private partnerships based on solidarity, rather than a dedicated industry policy and more regulation.”

Gian-Luca Bona, CEO at Empa



“Funding the landscape of innovation could improve in Switzerland. While subsidies are not needed, instruments like Innosuisse (Swiss Innovation Agency) as well as universities and networks that foster better cooperation could all benefit from more funding.”

**Robert Rudolph, Member of the Executive Board/
Digitalisation & Innovation at Swissmem**



Develop risk capital ecosystem for start-up and innovation financing

The venture capital sector is well established in Switzerland, with plenty of risk capital available. Besides banks, innovation parks, incubators and other bodies also offer support in financing start-ups. Startup INVEST is one of the most important financing platforms that connects start-ups with potential investors – such as business angel groups, institutional investors, corporate venture departments etc. However, financing of early and later stage start-ups in Switzerland is lagging by international comparison.¹¹ In addition, risk capital funds are often organised as foreign legal entities and are therefore less attractive for Swiss institutional investors. The risk capital ecosystem needs further development. Currently, government only provides support and advice for start-ups in Switzerland and does not directly invest in them. For example – the Swiss State Secretariat for Economic Affairs (SECO) provides loans to start-ups in developing countries and Venturelab of Innosuisse offers coaching and training. In other countries that are innovation leaders (for example – Denmark, Sweden) the state is much more directly involved and helps to organise the financing – for example, through state investment funds in collaboration with institutional investors and banks. These state ‘umbrella funds’ then invest in private funds that provide loans, guarantees and risk capital for start-ups and SMEs that have been identified as having potential to grow



“The global energy transition trend and the focus on renewables has great potential for Switzerland which is already strong in key technology areas that could support this move. Europe is a front-runner in the energy transition, and it will be important for Switzerland to be an active part of the European R&D landscape through a good research exchange.”

Gerhard Salge, CTO at Hitachi Energy



	Measures	Main driver			Priority
		Government	Education sector	Industry/ Businesses	
Support and funding	Follow a collective support/common ownership approach	✓	✓	✓	Top priority
	Increase support of basic and applied research to give industry an edge over its competitors	✓	✓	✓	
	Facilitate better knowledge and technology transfer		✓	✓	
	Develop risk capital ecosystem for start-up and innovation financing	✓		✓	

Mindset

Create holistic culture/common mindset for

innovation – Successful innovations depend strongly on the creation of a dedicated innovation culture within companies that is embraced by everybody. The buy-in and support of senior management will be essential to achieve this. Some characteristics of such a holistic culture/common mindset are, for example, a clearly defined innovation strategy, company culture aligned with innovation, strong cross-functional collaboration and networking across borders. Switzerland can benefit from further improving its innovation mindset. To strengthen R&D and innovation efforts a mindset that is entrepreneurial and takes more risks, a willingness to engage in open innovation and focusing not only on incremental but also on game-changing innovations, will be required. This will need to happen alongside cultivating a greater awareness of customer needs in the innovation process.

Use agile development processes to boost speed of

innovation – The innovation success of businesses also depends on their internal R&D setup and processes. The development of new products, services or business models can be accelerated by substituting linear processes with more agile, iterative ones. Techniques such as Scrum, Design Thinking and Lean Start-up help to deal with fast-changing environments, where circumstances, customer needs or competitor landscapes are continually changing and evolving. Adapting an evidence-based, lean and iterative process can accelerate R&D and reduce time-to-market for innovations in the midst of uncertainty. Speed of innovation is not necessarily a strength of Swiss companies, with many global competitors launching their innovations more rapidly. While the relative slowness of Swiss companies to innovate may mean higher quality, products may be out of date once they arrive on the market. Boosting the speed of innovation and accelerating market launch and commercialisation will require embracing agility across the whole business and making innovation a company-wide strategic priority

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“There is room for improvement in the cultural dimension of innovation in Switzerland. This could include greater customer integration in R&D/innovation, a better view of innovation pipelines and more agility topics for MEM companies to consider.”

**Robert Rudolph, Member of the Executive Board/
Digitalisation & Innovation at Swissmem**

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“Room for ‘failing forward’ should also be part of such an innovation culture. If an R&D team makes an error, there is benefit in still discussing it broadly within the organization, so that other teams can learn from it and evolve.”

**André Muff, Head of R&D at Siemens Smart Infrastructure,
Building Products unit (SI BP)**

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Encourage start-up mentality and willingness to take more risks

– To remain innovative in the long term, a more entrepreneurial mindset and start-up culture is required. When identifying potential innovations, clear business cases should be articulated and P&L considerations should always be taken into account. In addition, promoting innovation should go hand in hand with creating a positive culture of tolerating mistakes. Switzerland is not necessarily known for taking risks or ‘failing forward’ when it comes to innovation. The Swiss innovation focus tends more towards reliability, precision and high quality. However, management and R&D staff should be encouraged to take more risks and learn from mistakes. Many key innovations arose out of initial failure. To further boost R&D and innovation in Switzerland, companies need to create a learning culture around mistakes, offering the space to get things wrong and try out new solutions through experimentation. This is a key feature of successful innovation.

Increase diversity of R&D teams – To achieve innovation excellence it is also important to have the right composition of R&D teams. Greater diversity in R&D teams and/or having a mix of local and global team members is key. Game-changing innovation often requires a wider knowledge base. Successful businesses increasingly rely on international and multidisciplinary R&D teams to identify new ideas, bridge development gaps and reduce time-to-market. This can mean the involvement of other business functions as well as external experts. Businesses in Switzerland should consider an appropriate mix of capabilities and skills in their R&D teams – this will enable them to benefit from the creativity of more diverse teams and boost their innovation efforts.



“Diversity of thoughts and approaches are the main elements of a successful innovation culture. Instilling a common mindset of collaboration across functions (for example from engineering to finance) and across a global network is key.”

Gerhard Salge, CTO at Hitachi Energy



	Measures	Main driver			Priority
		Government	Education sector	Industry/ Businesses	
Mindset	Create holistic culture/common mindset for innovation		✓	✓	
	Use agile development processes to boost speed of innovation		✓	✓	
	Encourage start-up mentality and willingness to take more risks		✓	✓	Top priority
	Increase diversity of R&D teams		✓	✓	

Collaboration

Restore Switzerland's participation in Horizon Europe and expand international R&D exchanges

– Cross-border cooperation and access to international research networks have always been important to boost R&D and innovation leadership. Increased participation in international research initiatives and collaboration with international peers will be essential for the Swiss education sector and businesses to successfully innovate and secure Switzerland's position as a leading R&D location. Full association with the EU framework programmes for research and innovation (Horizon Europe) needs to be restored to address the negative impact of 'non-participation' that Switzerland is currently experiencing. More so than businesses, universities/technical colleges are directly impacted by the disrupted participation i.e. they are less able to attract top R&D talent because of Switzerland's non-associated third country status in Horizon Europe. The education sector is already warning that unless full association with Horizon Europe is restored there is a high risk that top researchers and innovative companies could choose to leave the country.

Foster R&D clusters and provide more 'pre-competitive spaces' for researchers/companies

– Research benefits immensely from clusters and collaboration with peers. Government and the education sector in Switzerland have a key role to play in setting up innovation ecosystems. Universities/technical colleges could create more start-up and business research clusters in the regions around them where they can incubate and encourage research and foster cooperation and commercialisation. This would help to improve collaboration between research institutes and R&D departments of large companies, innovative SMEs and start-ups. The creation of 'pre-competitive spaces' is also key to drive innovation and boost R&D efforts. Encouraging pre-competitive collaboration will allow competing companies to come together to develop a solution for a common problem or topic of societal relevance, without anyone gaining a competitive advantage.

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“Ongoing international collaboration and working closely together is currently very important and will continue to be in future. Europe is a front-runner in the energy transition, and it will be important for Switzerland to be an active part of the European R&D landscape through a good research exchange. In this regard, the disrupted participation in Horizon Europe is concerning.”

Gerhard Salge, CTO at Hitachi Energy

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“Global competition for R&D talent is tough and without participating in collaborative programmes such as Horizon Europe, Switzerland will find it even more difficult to attract top R&D talent.”

Stephan Mumenthaler, Director at scienceindustries

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Strengthen professional research partnerships between industry and universities/technical colleges

– Professional research partnerships and collaboration between businesses and the education sector can take different forms. For example – collaborative R&D in shared laboratories, private funding/sponsoring of professorships or masters’ programmes or businesses helping to set strategic direction and develop innovation curricula at higher education institutions. Strengthening such business-university relations will further boost R&D and innovation leadership in Switzerland

Leverage non-traditional collaboration to accelerate R&D

– Businesses should also collaborate more with non-traditional external partners to become even more competitive. This could mean collaborating with other sectors in the form of joint ventures to accelerate the development of expensive technologies that are crucial for all parties – for example, digital infrastructure for smart devices, batteries for electric vehicles. Businesses in Switzerland can also benefit from greater engagement and co-creation with customers – for example, increasing the use of customer feedback in R&D, and leveraging open innovation and crowd innovation for their development processes.



“Swiss companies tend to be more conservative when it comes to open source in the industry. More training and education at universities and institutions would also help to build more willingness and capacity in this area.”

André Muff, Head of R&D at Siemens Smart Infrastructure, Building Products unit (SI BP)



	Measures	Main driver			Priority
		Government	Education sector	Industry/ Businesses	
Collaboration	Restore Switzerland’s participation in Horizon Europe and expand international R&D exchanges	✓	✓		Top priority
	Foster R&D clusters and provide more ‘pre-competitive spaces’ for researchers/companies	✓	✓	✓	Top priority
	Strengthen professional research partnerships between industry and universities/technical colleges		✓	✓	
	Leverage non-traditional collaboration to accelerate R&D			✓	

Skills and training

Leverage the flexibility of the dual-track education system further – The dual-track education system – i.e., apprenticeship and vocational training versus the traditional baccalaureate and university route – is one of the success stories of Switzerland and offers a competitive advantage in the R&D space. There is considerable flexibility within and between the vocational and academic career paths, ensuring a sufficiently skilled workforce. To ensure ongoing innovation success however, the practice-oriented training and education of the vocational career path needs to be continuously tailored to the latest requirements of the changing workplace. In addition, research exchanges and knowledge and technology transfer with industry/business should be expanded in undergraduate and post-graduate programmes offered by higher education institutions

Direct more subject funding to STEM (science, technology, engineering and mathematics) and invest in digital skills at schools – Educating and developing STEM graduates remains a challenge in Switzerland. Greater focus on developing STEM skills is required in schools and during vocational training. As digitalisation increases in the workplace, the school curriculum also needs to include more digital and entrepreneurial skills.

Train teachers in STEM topics and provide more practice-based training for students – There is also a lack of STEM and industry knowledge and experience amongst teachers in Switzerland. Teachers who also have an understanding of industry/businesses are better able to motivate and engage their students on STEM and digital topics. The recruitment of career changers with industry experience into the teaching profession could help to address the gap and should be supported. Practice-based training opportunities should also increase through a strengthened exchange between schools and industry/businesses offering – for example, regular factory visits, workshops, focus weeks etc.



“Switzerland still has a problem educating and developing enough of its own STEM (science, technology, engineering and mathematics) graduates – we need to strengthen STEM education even more in our dual education system.”

Gian-Luca Bona, CEO at Empa



“It is essential to train teachers in STEM topics, already at the primary school level. Investment in education needs to factor in that digital skills will be key in the future.”

André Muff, Head of R&D at Siemens Smart Infrastructure, Building Products unit (SI BP)



Attract and develop more future talent for R&D –

Attracting and developing talent to drive research is crucial. With digitalisation increasing in the workplace companies are often competing for scarce digitally skilled talent, including in the R&D space. Businesses in Switzerland need to continue attracting talent and investing in the development of their own R&D workforce. Offering a stimulating and diverse work environment and unique research opportunities in a digitally-savvy company can help to attract and retain top R&D talent rather than losing them to technology companies. To further develop the R&D workforce, continuous training/lifelong learning and upskilling needs to be encouraged. In addition, traditionally overlooked talent segments and more flexible employment models should be considered to supplement future R&D talent needs in Switzerland. This could include older employees and women in part-time, freelancing and/or contracting work models.



“R&D specialists are in short supply – especially those with expertise in IT/digitalisation. The demand for these specialists is growing faster than the supply. It will be important for Switzerland to keep its borders open for R&D talent and in this regard.”

Stephan Mumenthaler, Director at scienceindustries



	Measures	Main driver			Priority
		Government	Education sector	Industry/ Businesses	
Skills and training	Leverage the flexibility of the dual-track education system further	✓	✓		
	Direct more subject funding to STEM (science, technology, engineering and mathematics) and invest in digital skills at schools	✓	✓		Top priority
	Train teachers in STEM topics and provide more practice-based training for students		✓		
	Attract and develop more future talent for R&D		✓	✓	Top priority

Expert interviews

Gerhard Salge, CTO at Hitachi Energy

Deloitte: R&D has been identified in the Deloitte's Power Up Switzerland report as a crucial element to ensure ongoing Swiss competitiveness and prosperity. What do you think are the optimal support conditions and framework to boost R&D in Switzerland?

Gerhard Salge: Switzerland has many excellent framework conditions that make it attractive for R&D. The excellent education system – schools and universities – is a key factor. The dual-track school system offers flexibility and allows for different paths – for example, apprenticeship and vocational training, as well as the traditional baccalaureate and university route. This flexible system is a competitive advantage in the R&D space.

There is also a variety of talent. The fact that Switzerland is well-positioned in the technology space – with many global companies located here and having world-class R&D expertise in technology areas such as machine learning, AI etc. – serves as great talent magnet for both students and R&D professionals from abroad. The good salaries, safe and attractive social environment and fantastic working infrastructure are further incentives to attract the right talent.

The country remains safe, reliable and predictable – even through the hottest phases of the Covid-19 pandemic, key services such as public transportation and internet connections remained stable. On the other hand, the high living standards, the quality of life and the wonderful environment in Switzerland, seduces especially young people to put a focus on their leisure time. This fact could impact productivity and the global competitiveness of the location in the long term.



Deloitte: An attractive R&D framework includes participation in international research initiatives. What are the consequences of disrupted participation in Horizon Europe (the largest international research initiative in the world), for Switzerland as R&D location?

Gerhard Salge: Ongoing international collaboration and working closely together is currently very important and will continue to be in future. As an example – the global energy transition trend and the focus on renewables has great potential for Switzerland which is already strong in key technology areas that could support this move. Europe is a front-runner in the energy transition, and it will be important for Switzerland to be an active part of the European R&D landscape through a good research exchange. In this regard, the disrupted participation in Horizon Europe is concerning.

Apart from Horizon Europe, the R&D landscape also includes cross-collaboration with European customers, suppliers etc. and since Switzerland is located centrally in Europe – participation and collaboration should happen naturally and be encouraged.

Deloitte: Establishing an innovation culture is one of the most important success factors to achieve excellence in R&D. How are you fostering an enabling environment for innovation and R&D?

Gerhard Salge: Diversity of thoughts and approaches are the main elements of a successful innovation culture. Instilling a common mindset of collaboration across functions (for example from engineering to finance) and across a global network is key. Apart from internal collaboration, it is also important for us in Hitachi Energy to partner and share externally with customers, suppliers, universities and also in associations or initiatives.

Digitalisation is a key facilitator to enable an innovative R&D environment. The right equipment and a good digital infrastructure are required. The COVID-19 pandemic has increased the digitalisation of our external collaboration. Online meetings and workshops – in both R&D and other areas – with our customer and suppliers, have increased a lot and helped us to collaborate intensively and successful.

Deloitte: Some observers say that Switzerland is losing its competitive edge globally, because the country is not known for taking risks or failing forward when it comes to innovation. What is your view on this topic?

Gerhard Salge: While Switzerland might not necessarily be famous for risk-taking it has other qualities that are important for successful innovation – such as being reliable, very clear and structured as well as focused on quality.

One such example is Swiss public transportation. Experiencing daily the reliability of trains, trams and buses, I am not surprised that many people call it one of the most reliable public transportation system in the world. And Apps that allow flexible check-in and check-out as well as optimized billing are standard. The realization of the new Gotthard railway tunnel is another example of Swiss reliability, precision and innovation.

While the Swiss decision-making process is described by many people as slow, once a decision is made by public opinion, government or other involved parties – execution is pretty fast and highly reliable. The same approach could now be applied to Switzerland's energy transition towards higher level of electrification based on renewables. This would significantly reduce dependency on oil and gas, especially in heating and transportation sectors.

Gian-Luca Bona, CEO at Empa

Deloitte: R&D has been identified in the Deloitte's Power Up Switzerland report as a crucial element to ensure ongoing Swiss competitiveness and prosperity. What do you think are the optimal support conditions and framework to boost R&D in Switzerland?

Gian-Luca Bona: There are many factors that contribute to Switzerland's reputation as an R&D hub in the center of Europe. We have an excellent education system and are able to produce and attract highly educated people such as excellent engineers, amongst others. A stable political and a (still) solid financial system, with capital to invest, also contribute to an attractive and highly competitive R&D ecosystem here in Switzerland

However, the current political gridlock in the relationship with the EU, our biggest trading partner, has put a lot of pressure on Switzerland's R&D framework conditions. If we want to compete with – for example – Silicon Valley and dynamic cities in Asia such as Shanghai, we need to remain open and liberal and cooperate proactively.

To further develop our R&D credentials, we should draw from our past and the Swiss concept of common ownership ("Allmendgedanke"). For example, when – in the 19th century – politicians, bankers and engineers came together in the spirit of solidarity to end the frequent flooding of the Linth river and improve living conditions, today's Credit Suisse (at that time SKA) and the ETH Zurich were founded. We realized then that the best brains have to join forces. R&D in Switzerland would benefit greatly from a similar, more collective approach, targeted incentivization and increasing public-private partnerships based on solidarity, rather than a dedicated industry policy and more regulation.



Deloitte: An attractive R&D framework includes participation in international research initiatives. What are the consequences of disrupted participation in Horizon Europe (the largest international research initiative in the world), for Switzerland as a R&D location?

Gian-Luca Bona: Empa currently has 75 EU projects running, with most of them focusing on developing novel materials and technologies. Even though the majority of these projects are not on fundamental science funded by the ERC (European Research Council), we nevertheless work with numerous partner institutions across Europe. Disruptions have meant we lost some European funding – but more importantly our role as a prime driving partner has been compromised. Successful R&D requires open borders and fruitful relations with our neighbors.

This is especially true as digital technologies – such as digital twins, digital image processing/ recognition, machine learning, predictive maintenance, etc. – are accelerating and adding a new dimension in the way we develop new technologies and systems. R&D is becoming more complex and multi-faceted and will be increasingly distributed across different locations. As a result, demand for international R&D cooperation will be even greater. Closing off opportunities for cooperation now puts us at risk of becoming a "Ballenberg for R&D", i.e. – just a showcase museum of past innovation successes.

Deloitte: Attracting and developing the right talent to drive research is crucial. What are your views on the current R&D talent pool in Switzerland?

Gian-Luca Bona: While the high-cost location of Switzerland can still attract excellent R&D talent with good salaries, the cost of living in the country can be prohibitive. Nevertheless, Empa receives at least one application per day from Asia, especially from PhD candidates in South Korea, Taiwan, China or India – who are generally highly educated and motivated. Other R&D locations in Europe have also become more competitive, for example the Netherlands, Belgium and Denmark.

Switzerland, however, still has a problem educating and developing enough of its own STEM (science, technology, engineering and mathematics) graduates – we need to strengthen STEM education even more in our dual education system.

Talent pool supply is further complicated by the fact that many Swiss companies now follow a clear dual strategy and move more R&D abroad / outside of Switzerland. The reason for building up an R&D presence abroad (for example, in Asia) is – among others – to be closer to the customer in growth markets, but also to be closer to a larger talent pool.

Deloitte: Establishing an innovation culture is one the most important success factors to achieve excellence in R&D. How are you fostering an enabling environment for innovation and R&D?

Gian-Luca Bona: We can no longer afford to remain complacent if we wish to keep and improve our innovation competitiveness in Switzerland. The mindset needs to change from relying on past successes to focusing on the future. There are encouraging early signs with a new generation of scientists coming through – they take more risks, network more effectively across borders and focus more on customer needs in their research.

While there is still room for improvement, the new approach does seem to be more entrepreneurial – with a start-up mentality and a focus on a clear business case, i.e. taking into account P&L considerations. It will be important to sustain this, as there are many future opportunities where Swiss R&D could differentiate itself and could indeed become a global technology leader – for example, in the areas of clean energy transition and addressing climate change and biodiversity.

Deloitte: R&D benefits immensely from the creation of clusters, collaborating with external partners and operating as part of an ecosystem. How are you engaging with your external partners to boost your R&D efforts?

Gian-Luca Bona: Ecosystems and the provision of “pre-competitive spaces” for researchers are key to drive innovation and boost R&D efforts. An example of this would be the Swiss m4m Center – an additive manufacturing center for medical applications that promotes the development and usage of 3D printing. The center is part of the AM-TTC Alliance (Advanced Manufacturing Technology Transfer Centers), which is supported by the Swiss Government. The alliance comprises 32 member organizations in addition to Empa – including ETH Zurich, EPFL and other research institutions, as well as companies such as Trumpf and Sandvik, and industrial associations.

Besides the Swiss m4m Center, the Paul Scherrer Institute (PSI) and other partners have established another AM-TTC – ANAXAM (Analytics with Neutrons and X-Rays for Advanced Manufacturing), and we have plans for additional centers to transfer academic research to industrial applications. The Innovation Park Zurich, in which Empa was involved from the beginning, is another good example that will enable collaboration between Swiss research institutions and the R&D departments of large companies, innovative SMEs, as well as start-ups.

Stephan Mumenthaler, Director at scienceindustries

Deloitte: R&D has been identified in Deloitte's Power Up Switzerland report as a crucial element to ensure ongoing Swiss competitiveness and prosperity. What do you think are the optimal support conditions and framework to boost R&D in Switzerland?

Stephan Mumenthaler: The current framework conditions for R&D in Switzerland are very good – for example – the liberal environment, networks and institutions, general availability of talent, sufficient public/private funding and spin-off opportunities. From a company perspective, liberal corporation tax and global market access also play an important role. It is key for all framework conditions to work together to create optimal conditions for R&D.

However, there are some concerns. Not being fully associated to the largest international research cooperation programme Horizon Europe anymore will impact the attractiveness of Switzerland as a future R&D location. Global competition for R&D talent is tough and without participating in collaborative programmes such as Horizon Europe, Switzerland will find it even more difficult to attract top R&D talent which will be drawn rather towards locations that can offer better growth opportunities. Additionally, Swiss multinationals that have a global and diversified R&D footprint may choose to set-up or expand their R&D capabilities in locations other than Switzerland. Another concern is that Switzerland is also lagging specifically in the digitalisation of the health care sector. The digital infrastructure, data systems and capabilities in this sector are still in their infancy, by global comparison.

Overall, however, there is still reason for optimism when considering Switzerland as an R&D location – especially in the area of new products and new business models. This potential is evidenced, for example, by the fact that Zurich continues to remain an R&D location for Google.



Deloitte: Attracting and developing the right talent to drive research is crucial. What are your views on the current R&D talent pool in Switzerland?

Stephan Mumenthaler: R&D specialists are in short supply – especially those with expertise in IT/digitalisation. The demand for these specialists is growing faster than the supply. It will be important for Switzerland to keep its borders open for R&D talent and in this regard, disrupted participation in Horizon Europe has certainly not helped. While for now R&D specialists still come to Switzerland, this could very well change in the future.

There are also both quantitative and qualitative challenges with STEM (science, technology, engineering, and mathematics) talent. In response to this, ten years ago scienceindustries founded its own foundation called SimplyScience – an initiative aimed at promoting the understanding of science among young people and informing them about possible training and career opportunities. However, much more needs to be done.

While the talent output at ETH/EPFL is excellent, it is not enough – talent often needs to be recruited outside of Switzerland. Regulations should also change to more easily allow foreign students who graduated in Switzerland, to stay and work here. In certain industries, such as the pharmaceutical and chemical industries, the skills sets that are required are also changing – as more data is used and analysed, new data-centered capabilities are increasingly needed and should be nurtured.

Even though pharmaceutical companies remain very attractive as employers – many STEM talents are more drawn towards IT/technology companies such as Google, Amazon etc. The potentially attractive and interesting mix of both health and technology/digital data needs to be emphasised more, in a bid to attract talent to the health sector.

Deloitte: Establishing an innovation culture is one the most important success factors to achieve excellence in R&D. How are you fostering an enabling environment for innovation and R&D?

Stephan Mumenthaler: A successful innovation culture is made up of several factors. These include an international set-up/orientation with cooperation across many locations, a well-coordinated team effort and fostering an open environment where innovation is embedded in the company culture – to name just a few.

Exchanges on a company level are also important. Work permits need to be accessible to enable moving people and fewer borders/regulations make a location more attractive. Less regulation will also support the sharing of data and IP across multiple locations to further encourage successful innovation.

Collaboration is also key – not just internally, but also with external partners like universities, suppliers, customers or other companies. For example – there should be much more collaboration between the pharmaceutical and chemical industries and technology companies, to build the digital talent pool for innovation in Switzerland.

Deloitte: Some observers say that Switzerland is losing its competitive edge globally, because the country is not known for taking risks or failing forward when it comes to innovation. What is your view on this topic?

Stephan Mumenthaler: While there may be some truth in the statement that Switzerland is not really known for taking too many risks and that some innovation processes take a bit longer, Swiss innovation is also well known for being very precise, exact, reliable, and taking its time – symbolized by the successful Swiss watch industry. This careful and considered approach can also be a great asset that supports a solid production hub and feeds back into R&D, prototyping etc.

In many Swiss multinationals and large companies, R&D teams are now anyway increasingly global and part of an ‘international innovation culture’ that displays the desired attributes of risk taking, precision, reliability etc. – all within the same team. Switzerland benefits from being part of this global approach to R&D.

Robert Rudolph, Member of the Executive Board/Digitalisation & Innovation at Swissmem

Deloitte: R&D has been identified in the Deloitte's Power Up Switzerland report as a crucial element to ensure ongoing Swiss competitiveness and prosperity. What do you think are the optimal support conditions and framework to boost R&D in Switzerland?

Robert Rudolph: Good framework conditions for innovation are critically important for the Swiss industry location and the economy as a whole – innovation is actually the 'elixir of life' for the Swiss mechanical and electrical engineering industries (MEM industries). With a small domestic market the MEM industries are massively export oriented so success and growth will only be possible through innovation. Due to limited leverage in old markets with old products, there is a clear need to compete and expand in new markets with new products, services and business models – only through R&D and innovation will we be able to keep our competitive position globally and even strengthen it through digitalisation. Over the last 10 years, the framework conditions for innovation in Switzerland have been going through a transition

The Swiss education system is an essential component of the framework conditions. The reform of technical vocational training is key to stay competitive and remains at a very high standard. This is complemented by our excellent universities and other highly regarded educational institutions which all contribute to an innovation spirit and results in a good spill-over into industries. We also have more FTAs (Free Trade Agreements) in place and good access to and association with the EU.



However, funding the landscape of innovation could improve in Switzerland. While subsidies are not needed, instruments like Innosuisse (Swiss Innovation Agency) as well as universities and networks that foster better cooperation could all benefit from more funding. It will also be important that funding remains broad and equal, only allowing for more specific focus when it comes to topics of societal relevance – for example sustainability, CO2 reduction etc.

Overall, the key advantages of Switzerland as an R&D location are clearly the availability of top talent, open R&D ecosystem, world class universities, low taxes, liberal labour laws, quality of life and the geographic location in the middle of Europe. Many of the framework conditions are in place, however it will be important that they are nurtured and strengthened on an ongoing basis.

Deloitte: Attracting and developing the right talent to drive research is crucial. What are your views on the current R&D talent pool in Switzerland?

Robert Rudolph: Over the last 10 years Switzerland has experienced a shortage of skilled workers. While we have constant numbers of apprentices, baby boomers are retiring and the loss of skills is currently greater than the gain. For example – our intake in electrical engineering candidates in the MEM industries is declining, even though we have high demand as a result of digitalisation. In the long term this will be a significant challenge.

We also still need to increase the number of women in MEM industries. Our activities/information campaigns in schools and technical colleges need to continue and there should be an even stronger push for STEM (science, technology, engineering and mathematics) by industries, as well as schools. The integration of STEM into the harmonized compulsory education across all cantons (“Lehrplan 21”) is still a work in progress. In the context of education, it is important that teachers have not just teaching knowledge but also have an understanding of industry, enabling them to motivate and engage students on digital topics. Exchange opportunities between schools and companies should be strengthened to offer more regular factory visits, workshops, focus weeks etc.

While we can easily attract skills and talent from Europe, it is more challenging when candidates are from third states, as a result of quotas. This could improve if people who have been trained and educated in Switzerland have the right to stay in this location. Many of them have highly developed technical skills and knowledge and should receive special permissions, similar to those available for talent in start-ups.

Deloitte: Some observers say that Switzerland is losing its competitive edge globally, because the country is not known for taking risks or failing forward when it comes to innovation. What is your view on this topic?

Robert Rudolph: The willingness to take risks is key for any innovation culture. While many MEM companies in Switzerland can sometimes be slow-moving in this regard, there are also some ‘best-in-class’ companies in global comparison. The strong focus on incremental innovation within Switzerland and its MEM companies has provided a structural innovation advantage. This is strengthened by ongoing quality and reliability, as well as an added focus on disruptive innovations/business models. However, the high cost of Swiss innovations is often a disadvantage.

There is room for improvement in the cultural dimension of innovation in Switzerland. This could include greater customer integration in R&D/innovation, a better view of innovation pipelines and more agility topics for MEM companies to consider. There is also greater need for collaboration, especially in an environment that is increasingly digitalised and will require new competencies and greater awareness.

The main challenge for many MEM companies in Switzerland remains that there is not enough pressure to change due to high prosperity levels. Even the Swiss Franc shock and the COVID-19 crisis have not had as huge an impact as expected. As a result, competitive pressure to change and be willing to take more risks is rather low.

Deloitte: R&D benefits immensely from the creation of clusters, collaborating with external partners and operating as part of an ecosystem. How can MEM companies in Switzerland best engage with external partners to boost their R&D efforts?

Robert Rudolph: Compared to large companies, SME’s can often be challenged in the area of external collaboration. They may struggle with resources or competencies that may be required of them. Intellectual property (IP) can also be a hurdle when cooperating in R&D. The question of who will have the IP rights arises – the SMEs, universities, suppliers, customers or all stakeholders? In the area of open innovation, questions such as who has which responsibility and who is making which investment are also complex to navigate.

For cooperation to be successful there needs to be effective management of the networks within an innovation ecosystem. ‘NTN Innovation Boosters’ would be such an example, where Innosuisse brings together interested players from research, business and society on a range of innovation topics. However, sometimes there can be a degree of over-administration and over-planning that does not allow for the spontaneity associated with successful innovation. Government can help by providing or supporting more innovation platforms to build the ecosystems.

André Muff, Head of R&D at Siemens Smart Infrastructure, Building Products unit (SI BP)

Deloitte: R&D has been identified in the Deloitte's Power Up Switzerland report as a crucial element to ensure ongoing Swiss competitiveness and prosperity. What do you think are the optimal support conditions and framework to boost R&D in Switzerland?

André Muff: R&D framework conditions in Switzerland are well supported by the country's educational institutions, which have a good global reach and network. Swiss universities, such as ETH/EPFL, and technical colleges are well known both locally and globally and work closely with industries and companies. For example – Siemens Smart Infrastructure Building Products, in short SI BP, in Zug is a key research partner of HSLU, the Lucerne University of Applied Sciences and Arts. As Head of R&D of SI BP, I am a member of the Governing Council of the HSLU and actively involved in helping to set strategic direction and guiding the curriculum of the institution.

The country's liberal politics also plays a role in attracting foreign R&D professionals, which is especially important given the limited R&D talent pool in Switzerland. Certain cantons, such as Zug – with its multinational environment, innovation focus, business and customer centricity, and fast and unbureaucratic processes – have a high level of openness toward acquiring foreign talent.

This openness has allowed SI BP to build great local and global R&D competencies by having an ideal mix of international onshore and offshore R&D teams. It also allows us to drive new developments out of Switzerland to be implemented and localized in offshore R&D sites across the globe. Strong connections with local administrations and educational institutions help build excellent R&D networks.



Deloitte: An attractive R&D framework includes participation in international research initiatives. What are the consequences of disrupted participation in Horizon Europe (the largest international research initiative in the world), for Switzerland as an R&D location?

André Muff: Since Siemens AG is headquartered in Germany with a global presence, we have not really been directly affected by the disrupted participation of Switzerland in Horizon Europe. Although the SI BP business unit is headquartered in Zug, only applied research is done in Switzerland, while basic scientific research is driven by our Technology unit in Munich, Germany, and globally. We do however work together with Innosuisse, the Swiss Innovation Agency in Switzerland, on several research projects.

Horizon Europe is especially important for Swiss universities and technical colleges which have been negatively impacted by the disruption to participation – especially as it relates to the acquisition of talent and increased administrative burdens to collaborate. This, in turn, can also impact industries and companies.

Deloitte: Attracting and developing the right talent to drive research is crucial. What are your views on the current R&D talent pool in Switzerland?

André Muff: Generally, the talent shortage in Switzerland has increased in recent years. It is a real challenge to find professionals with the right technical expertise. Subject funding for STEM – science, technology, engineering, and mathematics – continues to be an issue. There needs to be greater investment on the school level and in vocational training. It is essential to train teachers in STEM topics, already at the primary school level. Investment in education needs to factor in that those digital skills will be key in the future, since the entire world is moving increasingly towards digitalization.

Competition for talent with digital and software skills is fierce, and companies like Siemens are noticing that many young talents choose to join big tech companies at the beginning of their careers. However, we are increasingly able to attract R&D professionals, even from big tech companies, by offering interesting and varied R&D opportunities.

Deloitte: Establishing an innovation culture is one the most important success factors to achieve excellence in R&D. How do you foster an enabling environment for innovation and R&D?

André Muff: There are several elements involved in creating excellence in R&D and differentiating yourself. Most deal with increasing the existing innovation collaboration within new networks and ecosystems.

For example, more co-creation with customers, creating dedicated spaces for innovation within the organization, such as idea boosters, team challenges and so forth, or organizing R&D challenges and competitions with universities. The right composition of R&D teams is also important to achieve innovation excellence, for example by having the perfect mix of local and global team members.

Additionally, in R&D processes it is essential to have not only the space, but also the time to develop new ideas. Room for ‘failing forward’ should also be part of such an innovation culture. If an R&D team makes an error, there is benefit in still discussing it broadly within the organization, so that other teams can learn from it and evolve. It should not only be about celebrating the R&D successes – you can learn even more from the failures.

Deloitte: R&D benefits immensely from the creation of clusters, collaborating with external partners, and operating as part of an ecosystem. How do you engage with your external partners to boost your R&D efforts?

André Muff: SI BP collaborates broadly with universities and technical colleges. For example, we are sponsoring professorships, masters’ programs etc., to nurture both talents and ideas. At HSLU, we are not only part of the Governing Council, but also share labs with the university and are in close collaboration with their software department. We have similar collaborations with other universities in Switzerland, like ETH and EPFL.

Customer co-creation is a very important process for our organization. We invite stakeholders, usually customers or suppliers, to participate in a design or problem-solving process to produce a mutually beneficial outcome. These outcomes can include new product ideas, ways to overcome current design limitations, or even technical solutions to complex manufacturing questions.

We also conduct open-source development, as well as collaboration projects within our organization, especially in the software field. Swiss companies, however, tend to be more conservative when it comes to open source in the industry. More training and education at universities and institutions would also help to build more willingness and capacity in this area.

Endnotes

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