Switzerland's digital future

Facts, challenges and recommendations

EPFL –
Collège du Management
de la Technologie

Dear reader

Digitalization is revolutionizing our society and economy. Opinion is divided as to what that will entail. Will my car be able to drive itself in future? Is my doctor soon going to know that I am ill before I do? Am I not going to need cash at all? Will certain occupations become redundant? There are no clear-cut, definitive answers. But the digital revolution is a reality. As people, machines and objects become more interconnected, more data is generated, forming the basis for new services. The services cover all sectors, break down existing value chains and challenge established business models. Nowadays, practically every business idea, product and process optimization is dependent on reliable data transmission.

For Swisscom, the growing hunger for data has made it all the more important to have a powerful, reliable and secure infrastructure. After all, networks are essential to the successful operation of modern society and the Swiss economy. At the same time, new customer requirements are opening up exciting new horizons, including information technologies for banks, the energy sector and healthcare.

Digitalization also presents challenges for SIX as the operator of the financial market infrastructure. Small start-ups and international technology companies from other sectors are entering the market, and new business models are appearing. For example, bank customers now use more automated processes and mobile banking, which has created new demands within the financial market infrastructure.

Digitalization contains huge potential for Switzerland and Swiss citizens. It is worth noting, however, that the EPFL researchers found that the current conditions in our country are not yet good enough to move Switzerland into a successful digital future on the world stage. The population and political decision-makers therefore need to continue to engage with digitalization alongside companies like Swisscom and SIX. Let's continue the discussion about Switzerland's digital future together.

Dr Urs Rüegsegger
CEO SIX

Urs Schaeppi
CEO Swisscom

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Milestones on the road
to a digital Switzerland

Digitalization raises a whole series of new questions. What will change for companies? What are the essential infrastructure requirements? What rules determine how our data is used? What conditions does the State need to put in place to ensure that everyone in Switzerland benefits from digitalization?

Methods
The EPFL compiled the material for this study over a six-month period. The EPFL drew on internal information about ICT, innovation management, e-government, crowdsourcing and social media, which was combined with articles and research in the public domain on digitalization of the economy, open government, regulations on innovation, fintech and IT infrastructure.
Researchers from the EPFL organized a workshop with private sector experts and business owners involved in digitalization, infrastructure, telecommunications and fintech. The EPFL also gathered information about digital innovation strategies through visits to various technology companies. Lastly, the analysis included twelve one-hour interviews with other experts in these sectors. The EPFL transcribed the content of the workshop discussions and interviews, which was then evaluated using content analysis.
Based on the material analyzed and their own expert knowledge, the EPFL team determined where Switzerland currently stands in relation to other countries and then recommended targeted measures for shaping Switzerland's digital future.

Digitalization is changing the world. But the pace of change is not consistent around the globe. Even Switzerland could take several different routes. In 2014, Swisscom commissioned the Gottlieb Duttweiler Institute to set out four different scenarios for Switzerland. The study on "The future of networked society" identified the "dynamic freedom" scenario as the most desirable, given the high levels of prosperity and strong self-control. In this follow-on study commissioned by SIX and Swisscom, the EPFL looks at the framework conditions that would allow Switzerland to evolve in that direction.
Digitalization is happening in the context of several interdependent factors. **The network infrastructure** is the foundation for storing and transmitting data. That information is subject to **data governance,** whether strict or more liberal. The **business context for start-ups,** which often drive digitalization, can restrict or encourage economic growth and capacity for innovation. **Public sector** bodies can have a significant impact on the start-up segment through legislation, taxation and other measures. The willingness of **society** as a whole to embrace digitalization is also linked to cultural factors. The peer groups used in the following chapters show where Switzerland stands in relation to leading nations. The conclusions and recommendations indicate where action is required

"What does it take to bring Switzerland into a leadership position in the digital economy?"

Patrick Aebischer
President of EPFL

The digital revolution is changing and connecting the world in ways that were unimaginable even as recently as 50 years ago: Publishing, entertainment, medicine, even higher education have succumbed or are succumbing to major transformations, and the list of sectors gets longer every day. In this report, a team from EPFL has undertaken a study of what it would take to bring Switzerland into a leadership position in the digital economy. Switzerland, which is well known for innovation and economic power, has not yet been able to translate its strengths into global leadership in the information technology sector. This report outlines a few key steps we could take to move in that direction: emphasizing data privacy and security and how Switzerland is a trusted home for the world's data; more mobile broadband infrastructure; better tax treatment of start-ups; and letting fintech share the stage with traditional financial services.

High standards with room for improvement

The network infrastructure forms the basis for all digital solutions and services. It is the backbone and driver of all technological advances. Standard protocols also guarantee connections to the global network. The term network infrastructure usually refers to information and communication technologies (ICT) – the hardware and software required to make connections, communicate and exchange data. Consequently progress in all cutting-edge sectors such as e-health and fintech is only possible if there is an excellent and reliable infrastructure.

Leader for fixed broadband connections
The EPFL team classified the ICT infrastructure in Switzerland as highly competitive. Nevertheless, city-states like Singapore and Hong Kong are leading. Like Switzerland, these countries have high coverage in terms of fixed, mobile and Internet connectivity. In fact, Switzerland is the clear winner for fixed broadband connections. However, Internet users in Singapore benefit from 75%

more bandwidth on average than in Switzerland, while mobile broadband Internet use is twice as high as in Switzerland. One conclusion is that mobile broadband usage in Switzerland is constrained by strict regulatory requirements and the associated costs. Switzerland has one advantage, which is that investments by infrastructure operators are promoting the Internet of things, smart cities and making use of energy efficiencies.

Fintech innovations made in Switzerland
The study concluded that Switzerland could emerge as an innovation driver in the fintech segment, given the presence of global banks and the quality of the infrastructure in the segment. Fintech hubs such as Singapore, Hong Kong, New York and London are still ahead of both Switzerland and Luxembourg. However, the EPFL identified opportunities to develop a Swiss approach – as an alternative to imitating the Silicon Valley mechanisms – such as in the field of blockchain technologies.

Swiss ICT infrastructure performance compared with other countries

Switzerland   Singapore   Hong Kong   US   Luxembourg   UK
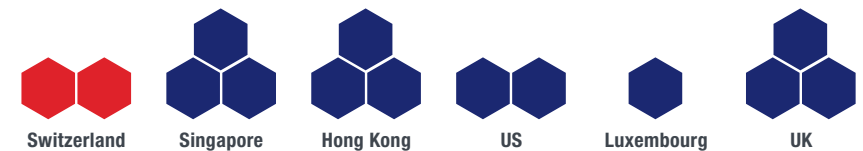
Swiss fintech infrastructure performance compared with other countries
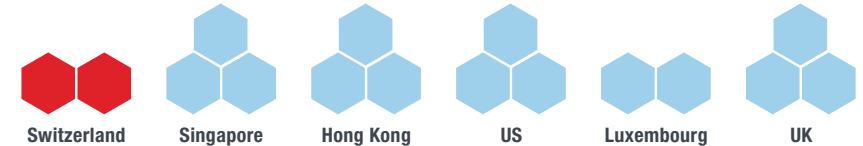
Switzerland   Singapore   Hong Kong   US   Luxembourg   UK

● Improving   ●● Competitive   Leading

The data used to create and classify the peer groups can be found in the full report, which is available at six-group.com/digitalch and swisscom.ch/digitalch.
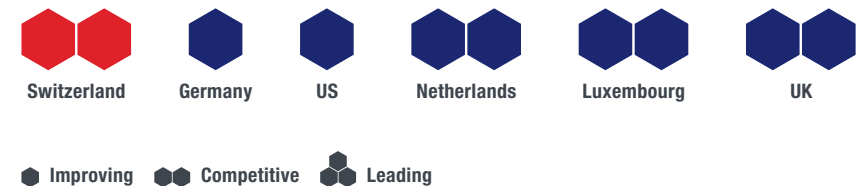
Applying Swiss standards to secure data storage

In the narrowest sense of the term, data governance means protecting privacy. The EPFL also explored the broadest sense of the term with reference to digitalization: transparency and confidence in the data management systems used by the public sector and private companies. Digitalization introduces new data protection challenges. For example, over the next two years, the EU plans to adopt legislation that will increase companies' obligations. For its part, Switzerland can turn the spotlight onto the country's widespread reputation for confidentiality. According to the EPFL, Switzerland could become a role model for other countries by developing progressive ways to handle data.

Switzerland as a safe place for data

Responsible conduct needs to be combined with a secure infrastructure in order to protect data effectively. The move to cloud-based services has made this even more relevant. Switzerland is currently ranked in the top three countries for server security, well ahead of the US and Germany. Switzerland's security expertise is also demonstrated by the fact that several Swiss companies are market leaders in the field of data encryption. According to the EPFL, that makes Switzerland an ideal location for large data centers – a segment that is currently dominated by the US and UK.

Data governance in Switzerland and other countries

| Switzerland | Germany | US | Netherlands | Luxembourg | UK |

● Improving ●● Competitive ⬢⬢⬢ Leading

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"The digitalized world opens up opportunities for courageous people who have a pioneering spirit and are willing to take risks."

**Hanspeter Rhyner
CEO of Glarner Kantonalbank**

A media owner with no content. A retailer with no stock. A taxi company that doesn't own any taxis. All of these are possible with digitalization. Unprecedented opportunities are available to young turks, start-ups, fintech companies and digital giants. At the same time, there is a danger that established, traditional companies could be swept aside. The digitalized world opens up opportunities for courageous people who have a pioneering spirit and are willing to take risks. The courage to cannibalize their own business model in order to tap into new sources of revenue. A pioneering spirit that seeks to create and innovate. And accepting that the venture might fail. The financial sector is in the throes of digital transformation. Demand for platforms and networks is currently high, with a view to creating the best ecosystem for a strong digital Switzerland.

Shifting from SMEs to start-ups

Start-ups experiment, use new methods and cutting-edge technologies. So they are different to the company model that we have long been familiar with. Switzerland seems to offer ideal conditions for start-ups: innovative people, political stability and consistent economic growth. Yet to date, Switzerland has not been known as a country for start-ups. Why is that?

Innovative country, fearless founders
The Swiss economy is one of the most competitive in the world and has a reputation for being exceptionally innovative. But entrepreneurial spirit is in short supply. The EPFL found that there was no start-up culture comparable with that found in the US, for example. There is no shortage of career opportunities, which eliminates one possible source of motivation. As a result, Swiss people tend to set up companies relatively late in life. Thus existing experience and a healthy awareness of risk mean that entrepreneurs have less fear of failure than in the US and start-up survival rates are higher

than average. On the plus side, the study noted that Swiss start-ups tend to have an international focus, which is essential given the small size of the Swiss market. Unfortunately, it often takes a long time to transform the initial idea into a marketable product.

Focus on financing and taxation
There are no Swiss cities in the international ranking for start-up ecosystems, while only eight Swiss companies made it into the list of the top 5000 fastest-growing European companies. The EPFL identified scope for improving the environment for start-ups through financing and taxation. Singapore, the US and UK offer attractive conditions and protection for investors. Switzerland is still strongly rooted in the traditional SME sector, but the conditions for a start-up-friendly environment are clearly in place. This is apparent from the large number of incubators, accelerators and innovation hubs. Not being in the vanguard may well prove to be an advantage, provided that companies know how to adapt "finished" innovations rapidly.

Innovativeness in Switzerland and other countries

Switzerland   Singapore   US   UK

Market sophistication of Switzerland and other countries

Switzerland   Singapore   US   UK

● Improving   ●● Competitive   ⬡⬡⬡ Leading

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Robust institutions make the leap into the digital age

The public sector is often identified as synonymous with bureaucracy. The accusations are usually unfounded in the case of Switzerland: Switzerland ranks among the top five European countries for institutional quality. However, the EPFL concluded that the federal structure could potentially create digital division: problems could emerge if each canton were to apply different rules and create different incentive schemes.
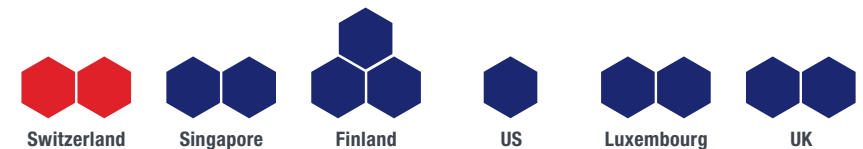
A safe haven
Switzerland is generally seen as a safe haven for digital society. The institutions are trustworthy and transparent. Intellectual and other property rights are enforced. But when the EFPL examined the data sources, the team identified a number of criticisms linked to the relatively high level of regulation.

Open data is an opportunity
E-government is not yet firmly established in Switzerland, the EFPL team concluded. This is largely due to delays in the planned rollout of the Federal online services. The EPFL does not consider the limited scope for e-participation to be a problem for citizens in Switzerland, as the traditional direct democracy instruments work well. However, the current open data debate represents a missed opportunity. The governments in other countries such as the UK and US are more advanced. By providing data, the governments are facilitating a multiplicity of innovative business models.

Swiss institutions compared with other countries

Switzerland   Singapore   Finland   US   Luxembourg   UK

E-government in Switzerland and other countries

Switzerland   Singapore   Finland   US   Luxembourg   UK

⬡ Improving   ⬡⬡ Competitive   ⬡⬡⬡ Leading

The data used to create and classify the peer groups can be found in the full report, which is available at six-group.com/digitalch and swisscom.ch/digitalch.

"Switzerland is not investing enough in start-ups."

Fathi Derder (FDP)
Member of the Swiss National Council

It is time for Switzerland to wake up. The world has gone digital and the digital world is dominated by the United States. All developments in innovative companies involve North America, with some activity in Asia. But Europe is not on the map.
That said, Switzerland has the resources to develop a start-up ecosystem. We have an excellent education system, outstanding universities, an incredibly productive network of SMEs and multi-nationals who are very active in scientific spheres. However one essential ingredient is missing: venture capital. Switzerland is not investing enough in start-ups – and is therefore failing to invest in the country's future. We need to establish the framework conditions that will encourage venture capital and investments in science-oriented SMEs.

Learning to be a digital citizen

When assessing the progress made with digitalization in terms of the network infrastructure, data governance, start-up business context and public sector, it is important to take the particularities of Swiss culture into account. For example, British culture is more focused on the individual than in Switzerland and is better at coping with uncertainty. This can often have an impact on start-ups.

Life is for living
Switzerland is consistently in the top rankings for quality of life. Unemployment is low, salaries are high and the infrastructure is excellent. Switzerland is one of the leading OECD countries for life satisfaction.

Familiarity breeds openness
Switzerland has a good ICT infrastructure and it is easy for citizens to access the Internet. But the population's digital literacy skills could certainly be improved. This is particularly important given the huge number of services that are being transferred to digital media, both in the public and private sector. Bank customers are being encouraged to use fintech applications, for example. Switzerland is not alone in facing this challenge: building digital literacy is a challenge for almost all countries. The more familiar users become with using digital media, the more likely they are to disclose personal information, according to the research. Provided that effective data protection is in place, that is.

Quality of life in Switzerland and other countries

Switzerland   Germany   US   UK   Denmark

Digital readiness in Switzerland and other countries

Switzerland   Germany   US   UK   Denmark

● Improving   ●● Competitive   ⬡⬡ Leading

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"People are at the heart of digitalization and machines come second."

Sunnie J. Groeneveld
Managing Director, Digital Zurich 2025

Digitalization is bringing change to every workplace. IT permeates everything: it is impossible to imagine our economy and society without digital media, which now shape the way we communicate. The digital world also affects the way we think, act and organize activities.

In future, digitalization will increasingly drive growth. Yet in the midst of this sweeping transformation, it is important to remember that people are at the heart of digitalization and machines come second. After all, it is people who understand and know how to use the technologies – not the other way round.

Potential solutions for Switzerland's digital future

Although Switzerland has a reputation as one of the most competitive economies and a world leader in many sectors, it has a very low profile for information and communication technologies and the digital economy. Switzerland's digital future depends on the complex interplay of several factors – society, legislation and national and local entrepreneurs all have key parts to play. The following recommendations indicate the measures that Switzerland needs to take in the different areas.

Keeping the infrastructure agile and flexible.

Network infrastructure
The EPFL found that Switzerland has a solid ICT infrastructure. However, in order to become a global leader, the researchers recommend setting the following priorities for the next few years:
- Services tailored to the rapid growth of mobile connectivity through smart devices.
- Promoting the development of mobile broadband but also Wi-Fi hotspots – for example on public transport and in public places.
- Switzerland already offers a cutting-edge ICT infrastructure in terms

of stability and reliability. Constant pressure to innovate has also produced a competitive financial market infrastructure. The overall infrastructure now needs to be oriented towards the rapid changes prompted by digitalization, with a particular emphasis on agility and flexibility (anytime, anyplace, any device).
- Participatory design and design thinking – a customer-oriented approach to developing new products and services – will allow digital services of the future to tap into the full potential of ICT, while also satisfying genuine user requirements.
- Measures should also actively promote the particular advantages of the Swiss infrastructure for finance-related services.

Switzerland should advertise its international reputation as a secure custodian for data.

Data governance
Confidential data handling and data protection are essential strategic factors in digitalization. The EPFL concluded that Switzerland has the potential to become a

global market leader for data governance. The researchers recommend setting the following priorities for the coming years:
- Creating a national data infrastructure by tapping into synergies between the public sector and private companies. This will involve:
  - Improving awareness about the importance of data management in all sectors – public sector, research institutions and private companies.
  - Establishing a common understanding of sustainable data usage with reference to data protection and security.
  - Combined action by politicians and industry.
- Switzerland should advertise its international reputation as a reliable and secure custodian for data.

Start-up business context
The EPFL criticized the lack of entrepreneurial spirit and the absence of any real start-up culture in Switzerland. The researchers recommend setting the following priorities for the coming years:
- Improving cantonal tax policies. Under current tax legislation, start-ups are taxed in accordance with their market value. This means hefty tax bills for start-ups with high levels of investment. As a consequence, rapidly growing companies tend to relocate to other countries.

- New financing mechanisms are needed to close the gap between seed financing and large-scale investment. Because of the extended idea-to-market processes in Switzerland, many start-ups leave the country before entering the market due to the lack of capital.
  - Swiss companies need to become more active as providers of venture capital with a view to plugging the gap through peer-to-peer financing.
  - Banks and other institutions could create investment funds, taking on the task of identifying start-ups in need of support and thereby freeing up investors.
- Developing a dynamic start-up ecosystem, with a particular emphasis on incubators, accelerator schemes and activity hubs.
- Thematic areas where Switzerland should build on its strengths to develop strong start-up ecosystems: fintech, biotech, edtech, medtech, clean technology and data security.

Start-ups need better financing and tax legislation that reflects their requirements.

Automated services based on open data should reduce the workload for state authorities and private companies alike.

Public sector

Although Switzerland's public institutions have a good reputation internationally, e-government and e-participation are relatively underdeveloped. That said, institutions are using the current momentum to forge ahead with programs to encourage new business models for supplying, collating and processing open data. The researchers recommend setting the following priorities for the coming years:

- Increasing the pace of digitalization within public services. This will make state services more efficient, cut red tape and reduce workloads for companies.
- Identifying and promoting open data models, with a view to making Switzerland a more attractive location for developing new digital business models. The outcome will be shared value for companies and the public sector.
- Digitalization can change the way we live from one day to the next. Amending laws, on the other hand, can take

years. Thus overly rigid regulations can hold back the development of businesses involved in digitalization.

Society

The EPFL identified further scope for developing digital literacy in Switzerland. Digital literacy is, after all, the foundation for establishing and developing digitalization in any society. The researchers recommend setting the following priorities for the coming years:

- Programs to promote digital literacy. Training in digital skills, but also raising awareness about the digital future, which will involve more online services, a more dynamic digital economy and a strong online culture.
- In order to identify and explore potential new solutions, we need a clear snapshot of digital society, together with information about current and target usage of digital applications.
- As a small country, Switzerland is dependent on highly qualified labor. Workers therefore need simplified or new immigration rules, such as special visas for highly qualified individuals, trainees and start-up companies.

Programs to promote digital literacy should pave the way for more online services.

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