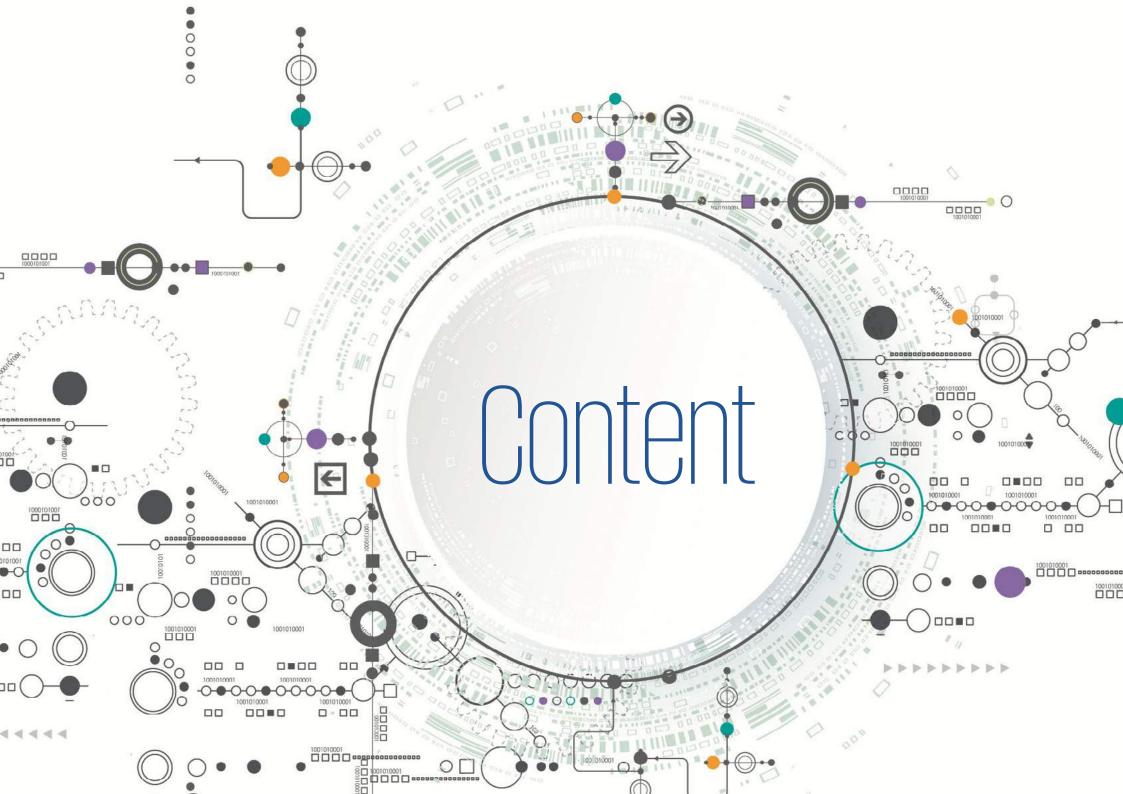
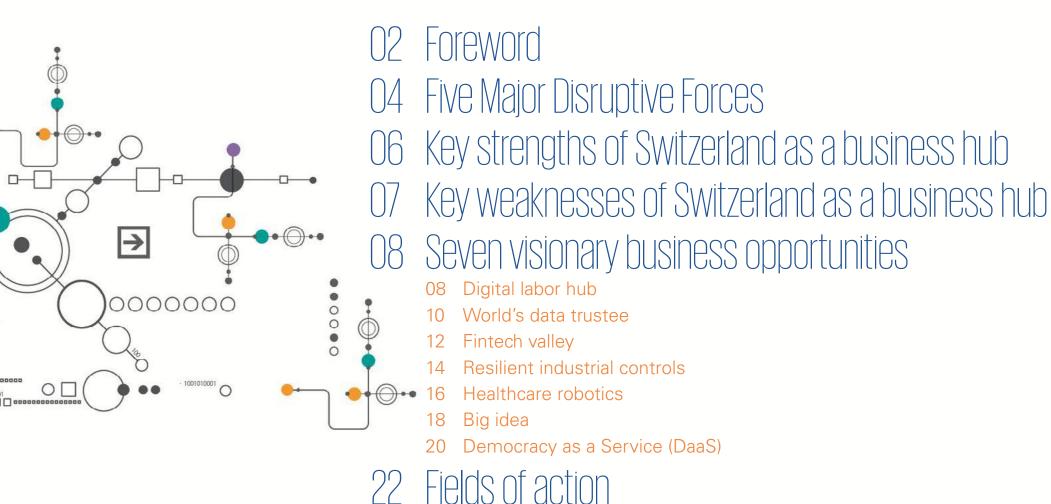


Shaping Switzerland's digital future

Seven visionary business opportunities for leading in a digital world







24 KPMG's Digital Visionaries

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### ForeWord

Switzerland has a long history of striving to be the maker of its own destiny, economy and prosperity. Despite being surrounded by major political and economic powers, hemmed in by its alpine geography with limited natural resources, Switzerland has developed a unique business environment making it both flexible and stable in an increasingly connected and complex world.

With each wave of industrialization, Switzerland adapted its economic, educational and tax system to attract the necessary capital and talents and set up a reliable and agile environment for its entrepreneurs and investors to do business. The legacy of this approach is a prosperity founded on an impressive line-up of global leading Swiss corporations from all sectors. Based on world-class research institutions, investments in R&D and cooperation between academic institutions and the private sector, Switzerland also cultivated an ecosystem of innovation. Building on this high level of business sophistication and political stability, Switzerland is well-placed to nurture, attract and retain the world's best talents—specialists who will shape its future.

#### Facing the challenges of digitalization today and anticipating tomorrow

In order to succeed in the 4th industrial revolution (Industry 4.0), Switzerland must seize the opportunities digitalization

presents and adopt optimized business models to turn these opportunities into products and services.

The first wave of digitalization is already redefining our way of life. Automation, digital labor and the mobile economy are a reality. And there's more on the horizon, particularly in the domain of artificial intelligence and cognitive computing. In the years to come, the following **five major disruptive forces** will impact businesses globally:

- Race for the customer as consumer demographics, behaviors and expectations drive businesses to become more customer-centric
- Mobile economy based on a combination of low-cost devices, high-speed wireless connectivity and increasingly sophisticated mobile apps, often leveraging cloud computing
- **3. Internet of Things** as networks of sensors and actuators in machines and other physical objects act on,

- monitor, collect and exchange data
- 4. Digital labor as knowledge and expertise-intense (white-collar) professions are disrupted by cognitive systems, artificial intelligence and robotic process automation

**5. Platform business models** that facilitate the exchange between interdependent parties, reducing transaction costs and maximizing resource and capacity usage

Switzerland must leverage these forces to secure a leading position as digitalization shifts the economic landscape. To do so, the country can capitalize on its **well-known strengths as a business hub** – strengths such as its political stability, direct democracy, competitive taxation and effective data protection laws. Moreover, the alpine country is an attractive location for multinationals that further contribute to its modern, tech-savvy society and highly qualified workforce. It also ranks among the world's best places to live, offering world-class universities and a high quality of life.



On the other hand, it's not all smooth sailing. To secure its position as a global leading economy, Switzerland will have to **overcome its weaknesses**, namely its risk-aversion mentality and disfavour of entrepreneurial failure, the widespread lack of confidence to think big regarding business ventures and its comparatively high labor costs. Adding to these factors is the impact the public referendum 'against mass immigration' has on the country's ability to attract and retain global top talent. Furthermore, developments in tax law such as BEPS and Corporate Tax Reform III along with the existing tax restrictions facing fast growing start-ups pose further challenges to Switzerland's bid to remain a prime business location.

#### **Future-proofing Switzerland**

Rapid advances in digitalization are changing the rules and the risks of business which means both market and policy makers need to think and operate differently. In this white paper, we introduce seven visionary business opportunities with the potential to ensure that Switzerland harnesses digitalization's phenomenal growth potential, thrives in a modern world, and hosts the next generation of leading global companies.

Each of the seven visionary business opportunities considers the business drivers, Switzerland's strengths and weaknesses, early adopters and thought leaders, as well as actions to drive the respective business opportunity forward.

#### Success in the digital era

From creating fierce competition across multiple sectors to transforming customer expectations and challenging business models, digitalization continues to disrupt at an accelerated pace. To play a central role, fostering cuttingedge research and education is essential. Moreover, the country will need to align its attitudes and policies to convince the world's brightest minds to pursue their big ideas in Switzerland.

The digital age is a highly creative one – offering companies and people an unprecedented opportunity to actively shape their future. By introducing seven visionary business opportunities, our wish is to stimulate this potential for Switzerland as well as to inspire further brainstorming and discussion about shaping Switzerland's success in the digital era.

#### Race for the customer

Changing consumer demographics, behaviors and expectations drives businesses to become more customer centric and enhance customer experience.

#### **Impact**

Increasing need for businesses to elevate and differentiate their customer service and experience from competitors leveraging 'Design Thinking' and evolving omni-channel approaches. Adapting to the voice of the customer and enhancing customer experience requires more spending on IT, R&D, personalized marketing and skilled professionals. Establishing and maintaining customer trust in how companies manage customer profiles and their privacy will be key in order to benefit from this disruptive force.



<sup>2</sup> Survey of technology executive 2014, BI Intelligence

<sup>3</sup> Gardner

Other sources: Amazon; Facebook; Forbes; Government insights – smart cities strategies, IDC



#### Internet of Things

Networks of sensors and actuators in machines and other physical objects that act on, monitor, collect and exchange data.

#### Impac

The Internet of Things is a key enabler of Industry 4.0. 62% of executives say they have already adopted IoT-based systems or have plans to do so.<sup>2</sup>The ability to securely manage, operate and monitor 'smart' devices is crucial to ensure public health and safety.

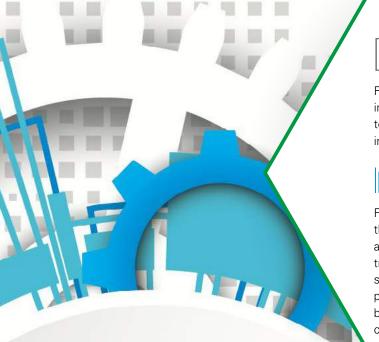


Combination of low-cost mobile computing devices, high-speed wireless connectivity and artificial intelligence-enabled apps, often leveraging cloud computing.

#### Impact

Forrester forecasts that by the end of 2016, 4.8 billion individuals globally will use a mobile phone and >25% of companies will use mobile not as a channel, but as a fully integrated part of their overall strategy. In the medium-term digital assistants embedded in mobile devices will be ubiquitous and constantly interact with their owners and the environment.





#### Digital labor

Replacement of knowledge and expertise intense (white collar) labor through disruptive technologies such as cognitive systems, artificial intelligence and robotic process automation.

#### **Impact**

Far reaching changes to the workforce – one of three jobs will be converted to software, robots and smart machines by 2025, saving \$5 – 6 trillion in global employment costs while at the same time creating a demand for new job profiles.³ Current global outsourcing hubs that benefit from labor arbitrage may be disrupted as companies insource digital labor.





# Five major disruptive forces

## Platform business models

The adoption of a digitized business model facilitating exchanges between two or more interdependent parties while reducing transaction costs and/or enabling innovations of services (e.g. through digital marketplaces, online brokerage or auctions).

#### **Impact**

Rapid shifts in business models, operations and the redistribution, sharing and reuse of excess capacity in goods and services.

## Key strengths

### of Switzerland as a business hub

#### Democracy and peace

- Switzerland's direct democracy and its system of government are generally regarded as being among the most stable in the world.
- Switzerland has not had an internal civil conflict since the Sonderbund war of 1847.
- Swiss society has a comparatively small income imbalance.

## Neutrality, stability and privacy

- The neutrality principle has guided Swiss foreign policy for centuries and provided stability.
- Switzerland has consistently remained outside international conflicts and wars for generations.
- Switzerland has a long tradition of protecting personal data. The right of personal privacy is established as part of article 13 of the Swiss Federal Constitution.

#### Modern and convenient

- Switzerland provides all the benefits of a modern society including a well maintained physical and technological infrastructure in the heart of Western Europe.
- The international airports provide high frequency direct flights to most relevant places globally.
- Zurich and Geneva are rated among the top ten cities in the world in terms of quality of life.

## Academia and innovation

- Swiss universities and business schools are among the best in European and global rankings – particularly ETH, EPFL and IMD – and supply highly educated academic talent and knowledge transfer to the private sector.
- Switzerland ranks among the world's leading countries in terms of filed patents per capita, suggesting a high level of innovative thinking.

In corporation with









## Cosmopolitan and business friendly

- Home to the European and global headquarters of hundreds of multinational companies, Switzerland provides a largely English-speaking environment and expatriate communities in the bigger cities.
- Switzerland is renowned for its robust economy, stable legal and regulatory environment and widely respected judicial system along with its competitive taxation.
- Employers find a qualified workforce and a productive work ethic, supported by flexible labor laws.

## Environmentally protected

 Comparatively low environmental risks of natural disasters – low probability of major flooding and hurricanes, and below average risk of strong earthquakes.



## Key weaknesses

of Switzerland as a business hub

## Growing labor costs and stagnant productivity

- Labor costs as one of the main challenges of doing business in Switzerland.
- Cost of mid-level positions has grown at a faster rate than labor productivity in recent years.
- Uncertainty surrounding the Swiss franc's exchange rate exacerbates this concern.

## Zero failure culture and risk aversion

- Swiss society disapproves of entrepreneurs whose businesses fail, which fosters risk-averse behavior and limits the attractiveness of starting new ventures.
- Very few Swiss start-up ventures of the past decades have grown into global leaders in their industries. Most business plans lack an ambition to scale up to become a global player.

#### Competitive taxation

- The OECD tax regulation on base erosion and profit shifting (BEPS) will significantly impact Switzerland's attractiveness as a business location for a considerable number of multinational corporations.
- Further challenges are arising from uncertainty on the implementation of Corporate Tax Reform III.

#### Labor laws

- Increasing labor regulations will pose a challenge to attracting foreign individuals and multinational corporations to doing business in Switzerland in the future.
- Restrictions and work-permit bureaucracy on employees from outside the EU are a particular issue for attracting top and senior talents who have the option to move to other appealing countries.



done by computers. Artificial Intelligence and cognitive computing systems will be the digital workforce. For this type of labor, low-cost countries are no longer the first choice. Digital labor can cost a third of what outsourcing labor to existing low-cost countries does while improving quality and speed. Many companies will have to choose a preferred location to run their cognitive systems. Although Switzerland is currently not seen as a preferred outsourcing

seen as a highly secure country with respect to data privacy. In addition, Switzerland must stimulate the research and implementation of cognitive computing within the country. Possibilities for doing so include funding scientific research in this field and promoting cognitive computing in the country for governmental bodies.

economy.

Google Al Lab, Zurich

**NVIDIA Deep Learning Institute, Zurich** 

IBM Research Center, Rüschlikon

Academic research at ETH,

EPFL at spin-offs and others



- ⊙ Improve digital education and readiness on all levels of the Swiss education system.
- Promote digital labor's opportunities to the public.
- while cushioning impact on individuals.
- Provide pragmatic yet trustworthy regulatory environment, in particular with regards to data protection, cyber resilience and labor law.
- Foster academic research in cognitive computing, artificial intelligence and their societal and
- Embed digital labor in the implementation of the know-how of Swiss companies.
- Make a reliable and cyber resilient critical infrastructure a key objective of the Swiss government and implement derived measures in public and private sector with vigor.

## What are the drivers of this business opportunity?

- The advent of a digital labor 'workforce' based on advances in robotic process automation, data analytics (Big Data) and cognitive systems
- Interconnectivity and interaction with the physical world enabled by the Internet
- The ability to leverage platform business models and related economies of scale

### Which strengths should Switzerland build upon?

- Highly specialized AI workforce already resident in the country working for world-World-class innovation capability leading 'early movers' and research bodies
- Reliable, high-performing technology infrastructure (in particular connectivity  $\Theta$ and power)
- Trusted public and private institutions.
- Political stability  $\Theta$
- High level of data protection

## What weaknesses should Switzerland

- Risk aversion and lack of 'thinking big'
- Preparedness for major cyber attacks on Swiss critical infrastructure



## World's data trustee

Data is the currency of the digital age. Individuals are becoming more and more aware of the importance of adequately protecting their personal data and privacy. It is not practical for individuals to understand, govern and manage the processing of their personal data created as a consequence of their interactions with the digital and physical (IoT) environment. Consumers will need to rely on legal frameworks, industry self-regulation, 'codes of best

practices' and specialized third parties to govern the use of consumers' personal data and to enforce their interest on their behalf. Beyond personal data, the confidentiality and integrity of intellectual property, business secrets, and digital assets (e.g. bitcoins) need strong, often long-term protection against often sophisticated and/or powerful adversaries, including nation states.

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Crypto research at ETH Zurich, >>> IBM Research Rüschlikon

- Adapt existing laws and regulation that balances open sharing of data and cross-border data transfers with expectations of data subjects.
- Develop a vision beyond a pure data storage bunker towards a data trustee model, which enables exploitation of data via sophisticated control over its use by third parties.
- Be proactive and transparent on effectiveness of data privacy and security measures and on how data privacy is enforced and defended towards local and foreign governments.

### What are the drivers of this business opportunity?

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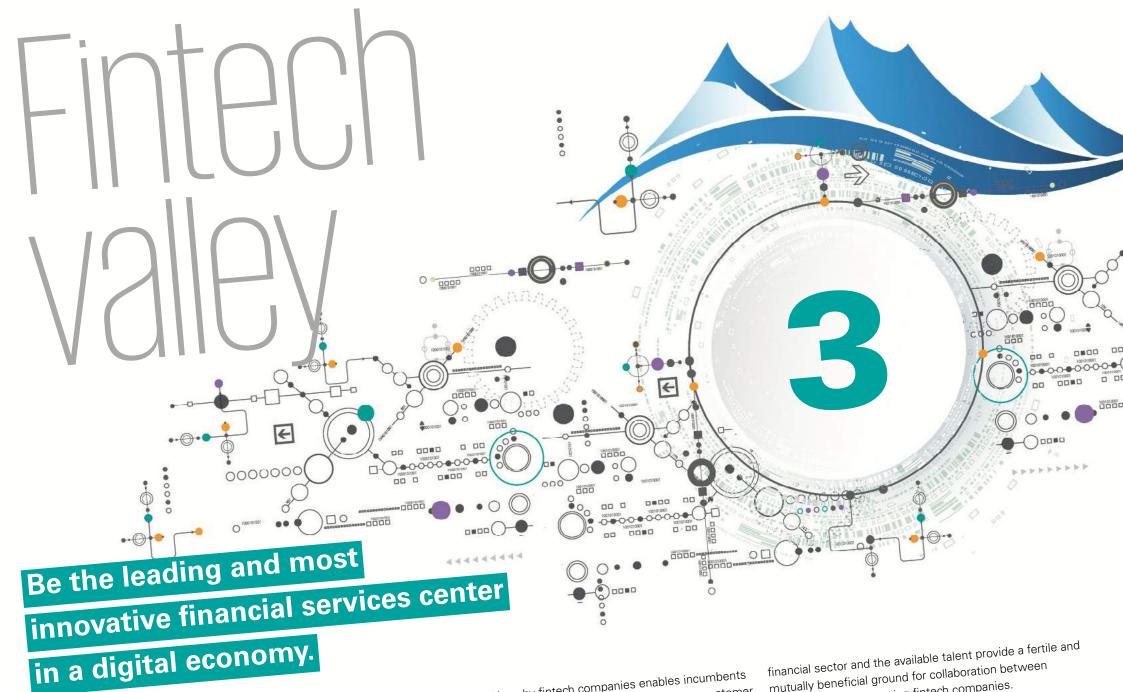
- Data is the currency of the digital economy as a company's most valuable assets will be increasingly digital (customer profiles, intellectual property, etc.).
- The race for the customer, the Internet of Things and the mobile economy will result in ever increasing data and profiles of individuals being constantly collected
- The network effect of platform business models that aim to aggregate and monetize personal data profiles.

## Which strengths should Switzerland build upon?

- An excellent technology infrastructure. 1400 company or public data centers are already based in Switzerland. Switzerland is ranked as Europe's #2 in terms of gross data center surface area per capita. Reputation and history of providing a
- Stable public institutions and a government that respects privacy more than is the case in many competing locations.

## What weaknesses should Switzerland overcome?

- Limited transparency and robustness of data disclosure processes under political
- Limited transparency with regards to protection strategies and their effectiveness (data breach notification)
- No national digital identity



Innovation driven by fintech companies enables incumbents and new entrants in the financial sector to improve customer experience, customization of services and products, and to streamline back-office operations. Switzerland's major

mutually beneficial ground for collaboration between incumbents and emerging fintech companies.

Incumbent fintech companies such as Avaloq, Finnova, Temenos, swissQuant

**Swiss Finance Startups,** www.swissfinte.ch

Various incubators and accelerators

Crypto Valley Zug



- Think big; Fintech is much less restricted by national borders than banking.
- Join forces and support one voice to promote Swiss fintech in Switzerland and internationally.

## What are the drivers of this business opportunity?

- There is an opportunity in disaggregating the components of traditional financial services and offering targeted solutions with better servicing to both individual
- Digital labor provides a major opportunity to optimizing processes with regards to service level and efficiency, both in the front and back office of the financial
- The banking industry has been a pioneer in adopting platform approaches to electronic markets with exchanges, clearinghouses and with multilateral trading facilities; block chain technology and financial industry utilities will further transform the business and operating models of the industry.

## Which strengths should Switzerland

- As a major financial center, Switzerland's workforce has excellent banking and
- Switzerland's financial center benefits from a reputation of trust compared to many
- Long track record of companies that provide technology for the financial services industry; availability of the latest technologies and open minded workforce to adapt
- Recent changes in regulations provide a favorable environment for fintech companies.

## What weaknesses should Switzerland

- Limited visibility of Switzerland's fintech ecosystem on a global scale.
- High labor costs drive high product costs and therefore limit competitiveness of Swiss fintech products. 13
- Fintechs often target their solutions to the small Swiss market.

## Resilient industrial controls Switzerland's strong industrial 4 PO O O 4 competency and its ability to innovate provide the basis to build and operate

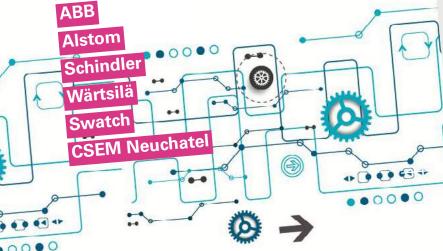
the Industrial Control Systems

of Industry 4.0.

Industrial Control Systems (ICS) are distributed systems to steer and monitor industrial production processes, power production and distribution, water purification, oil and gas production, transportation systems and so on. ICS are typically cyber-physical systems, which means that they connect cyber space with the real world. Malfunctioning or cyber attacks on such systems often have fatal or even catastrophic consequences. Highly specialized and

inherently scarce know-how is required to operate ICS in a way that is secure and resilient against cyber attacks.
Industry 4.0 will accentuate the challenge even further as ICS will be ubiquitous and increasingly interconnected. There is an opportunity for Switzerland to become a center of excellence in building and operating such complex and mission critical systems for companies globally.

**CERN with UNICOS** 



- Foster security by design in the early phases of engineering and science education in Switzerland specifically for Industry 4.0.
- Establish a Hub for international highly specialized talents and enable knowledge exchange.
- Make a reliable and cyber resilient critical infrastructure a key objective of the Swiss Government and implement derived measures in public and private sector with vigor.

### What are the drivers of this business opportunity?

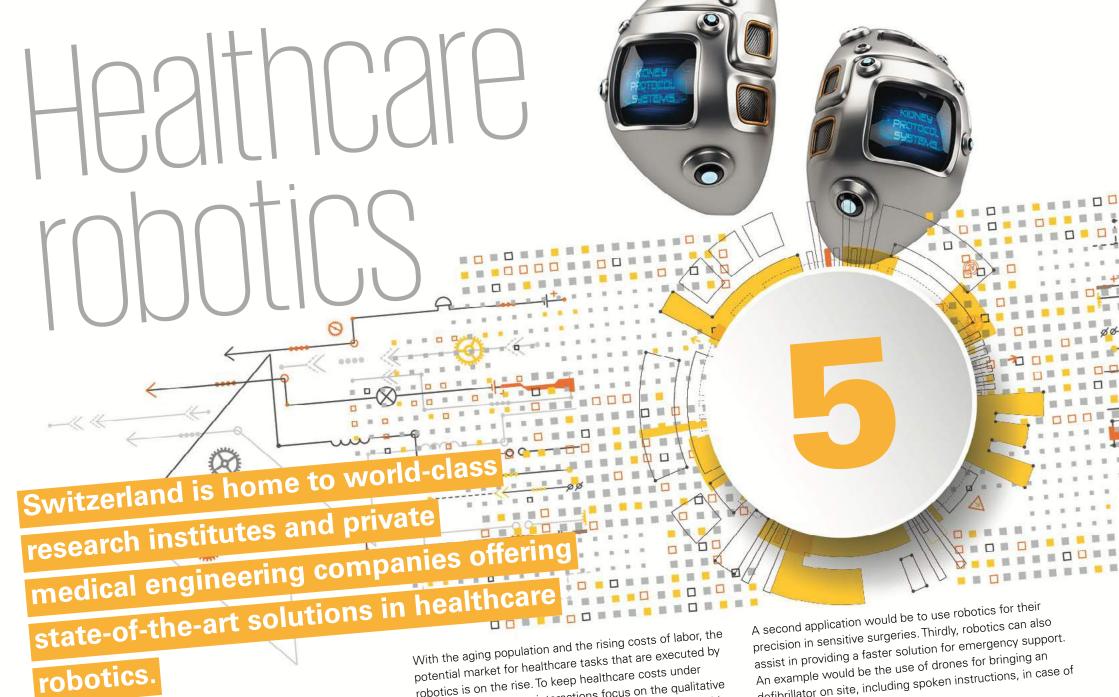
- Industrial control systems are considered as a key driver and enabler for future Industry 4.0 developments.
- Digital labor, robotic-process automation and cognitive systems will take ICS
- Security by design will be a key differentiator for maintaining trust in an ever increasing complexity of connected systems.

## Which strengths should Switzerland build upon?

- Critical infrastructures, which are of strategic importance to the respective countries are controlled by ICS. Switzerland's neutrality and stability enable the level of reliability and trust required to produce and operate mission critical ICS.
- An excellent technology infrastructure, which allows to operate critical systems in
- The ability to innovate and build industrial control systems.

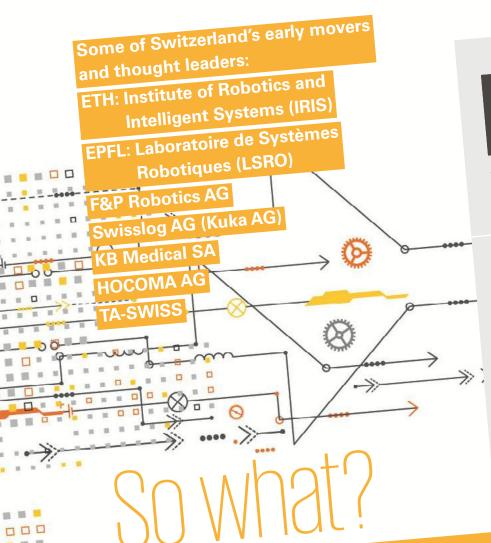
## What weaknesses should Switzerland

Highly specialized engineering talent is required to build and operate industrial control systems. Switzerland's supply of this talent may not meet future demand.



potential market for healthcare tasks that are executed by robotics is on the rise. To keep healthcare costs under control and let human interactions focus on the qualitative tasks, the use of robotics will be required to keep up with the quantitative amount of care and rehabilitation tasks.

assist in providing a faster solution for emergency support. An example would be the use of drones for bringing an defibrillator on site, including spoken instructions, in case of a heart attack.



- Promote engineering and science education in

## What are the drivers of this business opportunity?

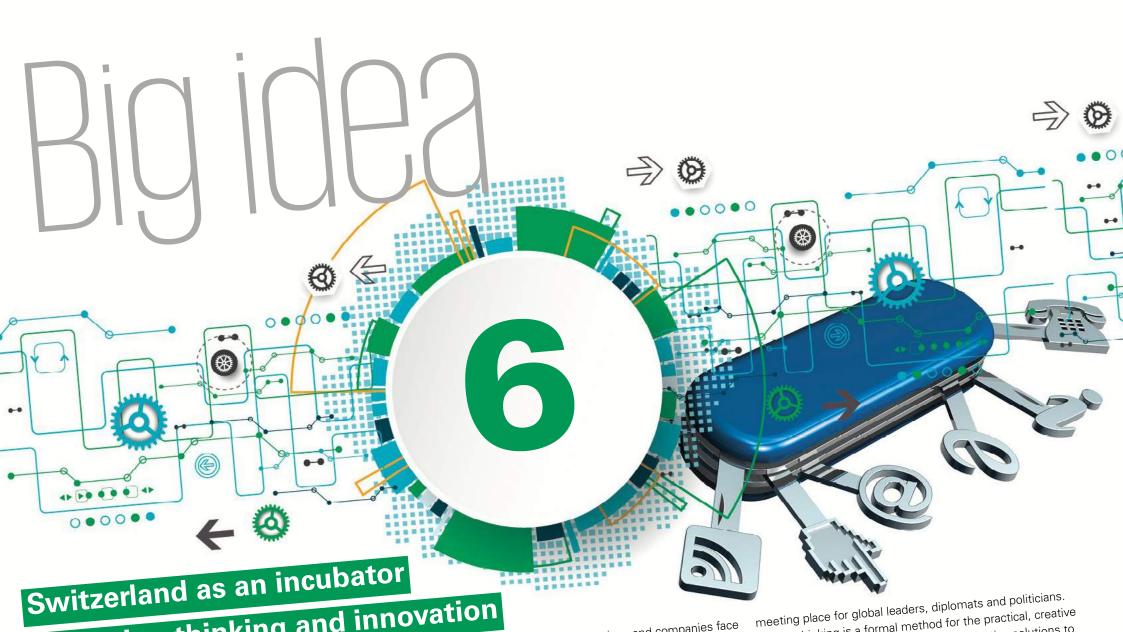
- Digital labor to keep healthcare cost under control
- Enable consistent treatment results  $\Theta$
- Improve surgery methods to increase positive treatment results

## Which strengths should Switzerland build upon?

- A modern healthcare sector with availability of the latest technologies
- Well-established, world-leading medical engineering and micro-technology
- Technology transfer between private companies and research bodies is
- Research funds are available and interdisciplinary research is available

## What weaknesses should Switzerland

- Be more progressive in the Swiss healthcare/nursing industry in terms
- International companies are already striving for Swiss market occupation today. Switzerland does not belong to the early movers in this regard.



for design thinking and innovation

for a better world.

In the age of digitalization, organizations and companies face multifaceted problems that are part of increasingly complex business issues. These entities need the right mix of creative/innovative thinking, methods and environment to move forward. Switzerland has a well-established reputation as a neutral and productive place to resolve major conflicts and globally strategic issues. Many large global-NGO headquarters are situated in Geneva as the city acts as a

Design thinking is a formal method for the practical, creative resolution of problems and creation of effective solutions to many problems. Switzerland's stability and reputation as an innovator create the perfect atmosphere to bring together problem solving and established methods such as design thinking.

World Economic Forum

Various NGOs

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Design Thinking Center, University of St. Gallen

d.swiss - Design Thinking Community Switzerland

Academic research CH IWI HSG, Leimeister HWZ, Vetterli

ITEM HSG, Gassmann & Frankenberger

- Create stronger ties/knowledge transfer between academia and companies/government institutions and enforce Design Thinking as the new global standard.
- Enhance a crowd-trusted open-innovation incubator that enables various contributors to create a dynamic design of ideas.
- big data and advanced analytics contests for young talents to take full advantage of Switzerland's academic reputation.
- Enhance the development of industry clusters and virtual communities and involve masterminds and political leaders to create momentum.

### What are the drivers of this business opportunity?

- Saturated and sophisticated markets have a very high leverage potential in order to create new business, process & product innovation – elevating and differentiating customer service and experience.
- Creativity cannot be carried out by cognitive systems, artificial intelligence and
- Digital business has a strong leverage potential for design thinking creative hubs.

### Which strengths should Switzerland build upon?

Institutions and the stability of the macroeconomic environment facilitate and enhance the establishment and maintenance of any business endeavor. Objective and innovative methods are key in establishing and providing the creative hubs.

### What weaknesses should Switzerland overcome?

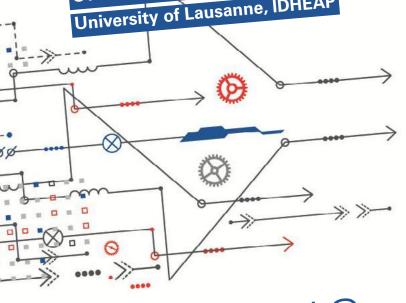
- Providing solutions for macro (economic) issues can be attractive in terms of reputation and international spotlight. The challenge is to monetize on this effort
- Lack of capability to think big and solid investments to scale up innovations.

#### Democracy as a service: Leveraging Swiss expertise in direct democracy for other countries. democracy in their system, through a set of institutions, practices and processes (including civil society involvement) In a political environment where citizens want more as nurtured in the Swiss political system. participation in public affairs, representative governments DaaS can be defined as an enhanced version of democracy often seem out of touch with the problems of society and its which unleashes the power of civil society to tackle issues citizens. The Swiss direct democracy can serve as a role since everybody can directly influence politics by e-voting on model combined with digitalized processes for countries an issue-by-issue basis via collaborative technology platforms. It's achieved by leveraging, secured social heading towards a digital democracy. 'Democracy as a service': The Swiss political 'software' can networking and cryptography technologies. be 'downloaded' by countries with representative democracy who wish to instill a higher share of direct

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OT-Lab, Geneva Lab

University of Lausanne, IDHEAP



- Enhance the public relevance of civic technologies by engaging closely in the areas of government and administration, health and human services, security and justice, economic development, etc. in order to increase confidence in technology for democratic systems.
- Explore how to commercialize the strong democratic reputation in a connected world leveraging digitalization and civic technology
- DaaS as a unique product can be exported and serve as a Swiss vault. DaaS made in Switzerland.

## What are the drivers of this business opportunity?

- Monetizing this opportunity in the short-term will be difficult with many details still needing exploration. However, it is an interesting opportunity to maintain the Swiss reputation as a leading democracy in the digital age.
- Citizens as a consumer of public services and political offerings based on digital
- Mobile is the key to reaching younger generations who are usually the most disenchanted and least likely to participate in political processes when communication is limited to traditional media.

## Which strengths should Switzerland build upon?

- Switzerland's proven institutional stability and effectiveness is the single most
- Cyber security and data privacy are key to making the DaaS concept credible and guaranteeing its legitimate and trustworthy use.
- Market size is huge as it potentially touches every government worldwide. Switzerland is both a tech-savvy country and globally referred to as a role model of how direct democracy can work.

## What weaknesses should Switzerland

Switzerland lags behind in implementing domestic e-government solutions. Examples include its lack of a national digital ID and its heavy reliance on paper-based interaction with citizens.

## Fields of action

#### Education

- Align study and training curricula with emerging needs for skills in the digital world; particularly in applying emerging information technologies.
- Support the improvement of digital education and readiness on all levels of the school system.
- Expand the knowledge base and adoption of design thinking as well as agile and lean approaches.

#### Infrastructure

- Foster strong private public partnerships on emerging technologies and cyber security.
- Support the implementation of e-government initiatives across the public sector and one national digital ID.
- Support the development of smart cities.

#### Entrepreneurial mindset

- Foster a climate of risk taking and thinking big enable business plans to scale up globally.
- Promote a failure-tolerant culture and change the perception of failed start-ups as a sign of incompetency.
- → Engage in the public discussion to promote digitalization opportunities for Switzerland.





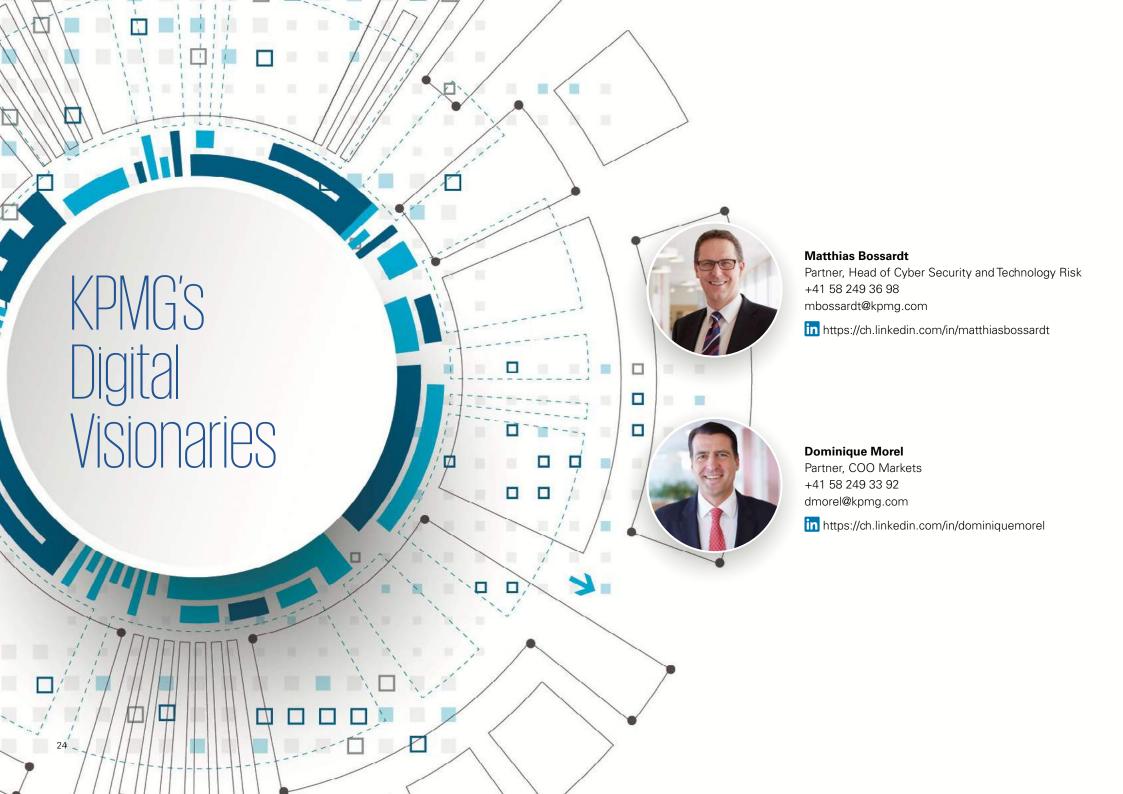
#### Policy & regulatory environment

- Encourage and support the development of a pragmatic, effective and trustworthy regulatory environment, in particular with regards to emerging technologies and business models, free flow of data, data protection and cyber resilience.
- Support a balanced political approach to work permits and restrictions on immigration so that Switzerland continues to attract and retain talent from around the world.
- Support the change of current tax laws that hinder fast growing businesses' success in Switzerland.
- Refrain from protecting disrupted businesses/industries but support a policy environment that supports individuals affected by disruption.
- → Foster a broad discussion of digitalization societal impact and ethics across Swiss society.



#### Research & innovation

- → Support and leverage research on digitalization societal impact and ethics.
- Support funding and expansion of leading Swiss research bodies focused on data science, cognitive computing, artificial intelligence, robotics, engineering and cyber security.
- Further build on strength to transfer research into commercial applications and foster collaboration among established businesses, start-ups and universities.







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