SWISS FINTECH INNOVATIONS

DISCUSSION PAPER

Future of Financial Institutions View 2030

FOREWORD

Swiss Fintech Innovations strongly believes in innovation and is committed to shape the future ecosystem of financial services. Early engagement in the future and anticipating possible future outcomes are within our DNA.

Future Finance – for sure, the financial industry will have a future, but where will the journey of future finance take us?

Swiss Fintech Innovations addressed the question and produced the enclosed discussion paper. The discussion paper will not provide final answers nor is it conclusive however, it stipulates and fosters communication based on our findings.

During our work, the team focused on the human individual and identified future scenarios of living. Based on those we funneled our attention on the impact for the financial services industry. Our focus on the human individual clearly aimed to detach our findings from the pure technology race.

Our goal is to provide discoveries and analyses that encourage and stipulate discussions on what the future of finance could look like. We understand our publication as the starting point, a ticket to the journey of future finance. We are convinced that our work supports the financial industry in discussions and allows for timely decision making. This will strengthen the Swiss financial ecosystem including Switzerland as a Fintech hub.

We thank all team members for their valuable contribution and hard work, which helped make the paper so inspiring.

Swiss Fintech Innovations is keen to continue the discussion and, along with our partners, readers and feedback providers, shape the Swiss financial ecosystem.

We hope you will enjoy the reading and look forward to further debate and discourse.

Thank you.

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SWISS FINTECH INNOVATIONS (SFTI)

The **SFTI** association was founded in April 2016 with the objective of making Switzerland a leading international center for digitisation and innovation in the financial sector.

WHAT WE DO

We strengthen the Fintech ecosystem in Switzerland by involving relevant partners, supporting Fintech events and initiatives – connecting the dots.

CONNECT

We network with and raise awareness of stakeholders in advisory boards, committees, academia and public institutions. We collect information about relevant developments in Fintech and the innovational landscape to our members.

FOSTER

We foster an open dialogue with Fintech startups. We offer opportunities to present startup projects to the **SFTI** Board. Networking and pitching events take place every three months. This helps to establish viability, verify concepts or ideas, and to demonstrate feasibility with interesting and interested startups.

DO

We develop and implement solutions on projects of common interest in our working groups. Different members work together on topics of shared concern with explicitly defined goal and clear timelines. We shape industry standards on a regulatory level, verify and analyse use cases, test new technologies on different sceanrios, and ensure knowledge transfer as well.

ABOUT THE PROJECT

This discussion paper has been commissioned and produced by SFTI (Swiss Fintech Innovations).

Any views expressed are solely those of SFTI and therefore may not necessarily represent those of SFTI member companies.

This paper should therefore not be reported as representing the views of SFTI member companies or of other contributor companies.

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NOTE TO THE READER

This discussion paper addresses individuals and groups whose professions offer and require contact points with the financial industry, as well as individuals and groups with a general interest in future scenarios, such as developments in technology and social behavior that could influence our lifestyle and its financial impact in the future.

The scenarios we developed are based on input from various sources. Our discussion paper aims to be accessible to a broad public, and therefore aims to avoid theoretical or abstract concepts. Instead, our content is light on formulas to facilitate the understanding and processing of the concepts and findings presented herein.

This paper is a first rendition of a broader and more balanced perspective on the discussion of finance institutions. In addition to our original research, our analysis takes into account a comprehensive context of literature on the topic. We have also considered STEEP-Factors and evolving customer needs in selected aspects of life, aiming to develop a possible main future scenario with five alternative scenarios.

The results indicated possible strategic implications for financial service providers. We do not claim to predict the future. However, based on studies and various other sources, we have designed a first version of what we believe could come to pass. We offer what we believe to be the most likely future scenario with some derivative alternatives, and what we believe with less probability, with some derivative, in alternative scenarios.

We understand this discussion paper as a first step for a conversation about the future of finance and its strategic implications for financial institutions. This discussion paper is intended as a basis to facilitate the exchange of ideas and views, on what the future of financial services might look like. This discussion paper will be updated as new information comes along.

By sharing these insights with the financial industry and its stakeholders, we want to invite interested persons/companies/organizations to participate in a discussion and exchange of possible future scenarios and topics.

Please direct questions, comments and suggestions about this discussion paper to **FutureFinanceDP@swissfintechinnovations.ch** or post it on Twitter, LinkedIn, etc. with **#FutureFinanceDP.**

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I. ABSTRACT

The world we live in is undergoing **considerable changes fast**, due to powerful technological realizations of information processing technologies. As we know, throughout history, technological changes have inevitably led to social and cultural changes and/or vice versa. These often-fundamental transformations lead to the modification of existing business models and to a new allocation of resources at the economic level. New developments, with emerging solutions and new ways of working, have to be taken seriously and companies and organizations have to adapt in time to remain successful in business and to guarantee future profitability.

We at SFTI (Swiss Fintech Innovations) are very eager to foster the spirit of curiosity and foresight, hoping to start a discussion about the future manifestation of financial services. **With this discussion paper we wish to both inspire and provoke**. We want to explore the future of financial institutions and to anticipate the future conceptually.

An interdisciplinary team conducted extensive research and analysis on future social, technological, economic, environmental and political trends to get a clearer picture of the driving forces and elements of change. Our time horizon was the year 2030. We developed and evaluated six different scenarios, representing possible manifestations of the time to come. We have devoted particular care to the “most probable scenario” in order to understand it comprehensively and to anticipate its consequences.

In our research, we have purposefully put the customer at the core of our probe to understand the future customer needs that will arise and affect customer behavior. This paper discusses how new developments could lead to future products and services that meet those changing needs.

Our first central finding was that in 2030, **trustworthiness** and **control** will be of vital importance. People will be seriously concerned about topics like security, privacy, transparency regarding data usage, and will want to have full control of access and usage of their personal data. This focus on trustworthiness will impact all thus far most trusted players in the market. We believe that there will be a **shift from traditionally reliable institutions towards individual actors**, particularly to partners that not only guarantee control of one’s personal data, but also enable and empower the customer of the future.

These trusted partners create an environment, where **people have control over their personal data** as it is collected, processed, shared and stored. They guarantee full transparency of the collection and processing of data as well as of the fees and costs involved. They make sure that the various applications and systems can communicate with each other

across a range of services and providers. **They unbundle these services to ensure that users can tailor services to their individual needs.** These trusted partners create a service-oriented environment, where customers feel understood and therefore comfortable, where they are not bound by long-term contracts, and where they experience self-empowerment by access to relevant information and personalized advice. Customers experience a service that is tailored to their needs and desires, easy to understand and convenient to use.

Our most likely scenario indicates that in 2030 the technology based ecosystem mentioned above will be characterized from the **user's perspective by aggregator UI (User Interface)** (connectivity gateways). They will be of central importance and will replace once successful platforms. This is caused by the afore-mentioned change in behavior. People do not want to accept that one single player has access to all their data, locking them into a single ecosphere of services, applications, and UIs. This customer demand will be reflected by changes in legislation, requiring not only **data mobility** but also **interoperability** between the different digital applications.

As a result, in 2030, the customer journey will no longer be under the control of one single player. Many players may orchestrate the customer journey for different segments and aspects of life, and **these ecosystems will be dynamic and in constant flux**.

People will live in a hybrid (digital and analog) reality in the truest sense of the word. Ever more aspects of our existence take place in the digital world, at least in part or even completely. This new form of reality needs the **ubiquity of digital UI (User Interfaces)** (e.g., smart chatbots, Augmented Reality-, or Virtual Reality-solutions).

By the year 2030, we will further experience an **explosion of digital assets**. **All real-world assets, tangible and intangible, will be digitized and the rights to these assets will be tradeable and exchangeable within interconnected and interoperable systems.**

Taking this in consideration, it is obvious that even until 2030, the amount of digital data will continue to grow exponentially. The value of this data continues to increase not only for advertisers, investors and AI (Artificial Intelligence) solutions manufacturers that have to provide the infrastructure and tools to handle our hybrid reality. The value of the data regarding all digital assets will also fundamentally transform the business sector of financial institutions. Most of the **exponentially-growing digital data will be private**: People will demand their data to be confidential,

intact and retrievable based on need and usage. Due to privacy concerns consumers will be determined to maintain control over their data. If need be, users will hide any activity that could be tracked on the digital provider side. Digital service providers themselves may therefore no longer have access to the activity data of their users.

If customers will indeed live in a hybrid reality and have full control over their personal data, providers of financial services have to rethink their business models.

Financial service providers need to **expand their efforts to understand customers more comprehensively** and to segment them based on their needs and self-selected solution modules from a product portfolio available to them. Financial service providers have to understand changing customer demands for tailored advisory recommendations and act as digital concierge services – available exactly in the moment needed, be it in the physical, virtual or hybrid reality. Taking this to the extreme, we are convinced that in 2030, the role of a financial institution will have to transform from that of a **financial advisor** to that of a **trusted life coach**, who is discreetly available whenever needed.

The principal need of future customers lies in the **value protection of all their assets** – tangible or intangible. Customers demand protection of their values in a yet to be developed new kind of "wallet". The wallet will be the universal solution to access and control assets. Financial institutions will have to expand their bank and securities accounts to offer **protection for these new types of values**. Customers will reward financial services with trust and loyalty.

Customers want services to be **simple, instant, available anytime, anywhere, and anyhow**, focused on real needs and fully customizable.

Living in hybrid reality and in using aggregator UIs, financial institutions have to develop the **capability to seamlessly embed their services into the customer's journey** and build up a consistent and clear ecosystem strategy with reliable partnerships.

The future challenges us to deal with it continuously and intensively, to make our own deductions and to start **shaping it with intelligence, a sense of responsibility, and creative vision.**

II. INTRO-DUCTION

What do you see, looking in the crystal ball? Are you hoping to see the unknown? Not all scrying is done with crystal balls. What you hold in your hands is an abstract. It is trying to foreshadow the future, and even if it may not be exactly right, it will provide insight and guidance.

When thinking about the future of "something", it is dangerous to think in terms of today's structures, concepts, and vocabulary because we risk inadvertently biasing our thinking to "what is". Instead, **we should start by defining this something at an abstract level.** More specifically, we believe that we should try to describe this something **in terms of the value it creates (or the "job it is hired to do") at an abstract level.**[1]

We also believe that financial institutions have essentially created value for people and society in four distinct value-creating dimensions:[2]

- By protecting value
- By facilitating the exchange of value
- By providing advisory and intelligence
- By accessing exclusive value

This paper identifies six scenarios for the year 2030 that we view as relevant for financial institutions. A most probable scenario and five alternative ones. The most probable scenario is described in a lot of detail and discusses multiple developments. Alternative scenarios are kept much shorter. All scenarios have the same structure: They each **start with a contextual section,** which describes the context in which financial institutions will act, and **finish with a strategic-implications section,** which describes what this context implies for financial institutions. Different passages and different scenarios will not have exactly the same tone and language. We chose not to present a perfectly uniform paper to emphasize the diversity of the individuals that have written and contributed to this document.

The assessment and discussion of the (strategic) implications on financial institutions will follow these four dimensions. The strategic implications are a deliberate teaser of the meaning and consequences of this contextual information to the financial sector. A lot more digging, thinking, and analyzing of the strategic implications is necessary in all four of these value-creating dimensions.

1 This follows the approach adopted by SIX Group White Papers. See e.g., SIX, 2019, Future of money (November 2019).

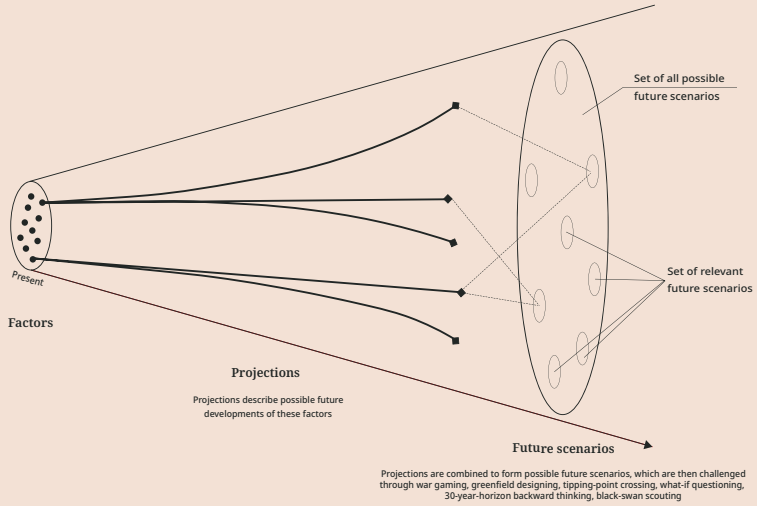
2 See pages 16 and 17 for a description of each of these categories.

We view this paper as a "conversation starter" to engage a broader audience outside the walls of SFTI into thinking about and discussing possible upcoming developments and their strategic implications.

METHOD

The goal of our scenarios is to **help strategic decision-makers in making strategic decisions**.

We believe that scenarios are an **optimal vehicle to communicate** our empirical findings, insights, thoughts, and ideas. The set of scenarios aims at providing a **map of the foreseeable future variability** in a synthesized form. We hope this map will help decision-makers in identifying new market opportunities, understanding the implications of new technologies and innovations, creating awareness for implicitly held assumptions, and/or providing a mental frame to make sense of the never-ending stream of news.



Source: SIX, 2019, Future of money (November 2019)

The scenarios were developed in five steps.[3]

1. We start by **abstracting the system under analysis**.
2. We consider a vast array of factors across all STEEP dimensions (social, technological, economic, environmental, political) and identify **possible future developments** (or "projections") on life areas for each of these factors.
3. We then assess how both individual and combinations of developments **could impact** the above-mentioned four categories. This is both a rational as well as a creative exercise.
4. It is difficult to work with unstructured information about the future. We therefore synthesize all the information about future variables in the form of **scenarios**. Our aim is to identify the most-probable futures and to capture those developments that would result in substantial deviations from those most-probable futures.
5. We finally **challenge** this set of future scenarios from different angles to reduce the likelihood of missing foreseeable key developments.

We strived for **heterogenous sources of data/information** with each step. A large number of people from diverse backgrounds were involved throughout this process in workshops, brainstorming sessions, interviews, or reviews. We attended conferences, read many books, papers and blogs, and watched many videos about possible future developments.

A note of caution. These impact assessments and probability-of-occurrence evaluations are **based on empirical (quantitative and qualitative) data**. This data does not give indisputable knowledge of or insights into future events. Instead, the data must be interpreted. The following assessments and evaluations are our own and **capture our beliefs about the future**. To help each of you make up your own mind, we strive to explicitly highlight our assumptions, arguments, reasoning, and supporting evidence.

3 This follows the approach adopted by SIX Group in its White Papers. See e.g., SIX, 2019, Future of money (November 2019).

How Financial Institutions Have Abstractly Created Value for Clients and Society; or: Why Financial Institutions Have Been Hired by Clients and Society

PROTECTING VALUE

Financial institutions have helped you keep what matters most safe, from your house, your commercial venture's intellectual property, your art collection, your family's health and security, to your privacy.

They have acted as ***custodians*** for safekeeping your assets and rights by providing physical vaults and electronic accounts/ledgers (e.g., accounts, ledgers of securities).

They have ***provided risk-management solutions*** by issuing structured products and insurances, setting up funds to diversify risk (e.g., ETFs – Exchanged Traded Fund), and providing short-term loans to reduce liquidity risk.

FACILITATING THE EXCHANGE OF VALUE

Financial institutions have facilitated your economic exchanges, from buying/selling a house, a cup of coffee on the way to work, a share in your favorite company, to a financial product perfectly tailored to your current life situation (e.g., loans, structured products, insurances).

They have ***provided cash and digital payment pipes*** by ensuring wide distribution, availability and acceptance.

They have acted as ***matchmakers/brokers*** (e.g., digital platforms, gateways) by connecting parties in primary markets (e.g., issuing venues for financial products, bookbuilding) and secondary markets (e.g., trading venues for financial products, data brokers) for assets.

ADVISORY AND INTELLIGENCE

Financial institutions have advised you on how to achieve your goals and dreams, from buying real estate, growing your business, exploring the world after retiring, providing for your grand-children, to making a lasting social impact.

They have acted as ***advisors*** by advising on investment (e.g., wealth managers, family offices), designing trading/investment strategies (e.g., asset managers, funds), directly intervening in the operations of invested assets (e.g., Venture Capital Funds, Private Equity Funds, Hedge Funds), ...

They have acted as ***information brokers*** by collecting, aggregating and cleaning data to improve your decision-making (e.g., enhancing financial literacy).

ACCESSING EXCLUSIVE VALUE

Financial institutions have offered (some of) you status and access to exclusive value, from networking opportunities to priority access to limited investment opportunities.

They have acted as ***private clubs*** (gatekeepers) by associating you with their exclusive, selective, premium brand (status symbol) and providing networking opportunities.

They have acted as ***exclusive brokers and counterparties*** by providing you access to exclusive value such as difficult to access investment classes and non-scalable investment opportunities (e.g., preferential treatment in Initial Public Offering book-building or in capital raising of funds – most alpha-generating investment strategies do not scale).

STEEP FACTORS (SELECTION)

SOCIAL

service demands for transparency and comparability, location-independence; on-line, off-line, real-time; instantaneity and convenience; sustainability and social impact; population development; immigration rate; life expectancy; age pyramid; awareness of privacy and (online) security; social stability; quality of life

TECHNOLOGICAL

robotic; speed and bandwidth; augmented reality; virtual reality; API economy; distributed ledgers; cloud infrastructure; biometry; digitalization of tangible and intangible assets, automation; AI (Artificial Intelligence); quantum computing; big/smart data

ECONOMIC

crisis; investment activity; labor-market; economic openness and integration; brands; workforce and employment rate

ENVIRONMENTAL

sustainability programs; core cities and surrounding municipalities; degree of motorization; urbanization, energy consumption

POLITICAL

regulations development; consumer protection; innovation; competition in a digital world; foreign governments and international organizations; trust in governments; ethical standards

III. SCENARIOS

A BRIGHT HYBRID WORLD

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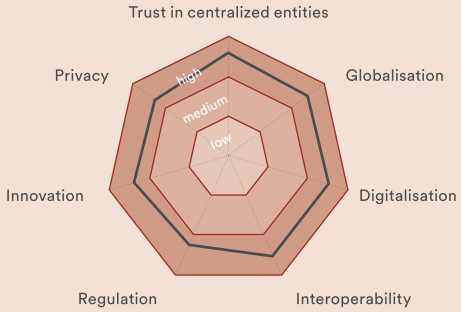

Likelihood of occurrence: most probable scenario

Early-detection signals: explosion in digital assets; explosion in digital data; high privacy concerns; high sustainability considerations; advances in privacy-preserving data processing algorithms; digital platformification; government action to enforce competition in the digital sphere; intact trust in governments

VERY HIGH PROTECTIONISM

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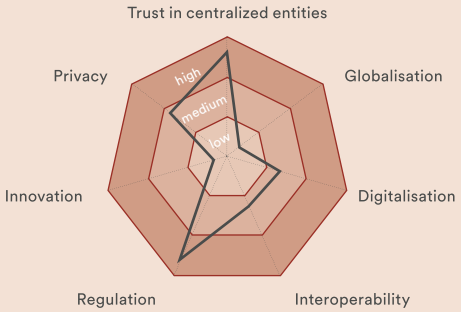

Likelihood of occurrence: medium-probability scenario

Early-detection signals: citizens' movements; right wing parties voter win; increase in protectionist measures; aggravated trade and trade barriers

THE RISE OF DECENTRALIZED SYSTEMS

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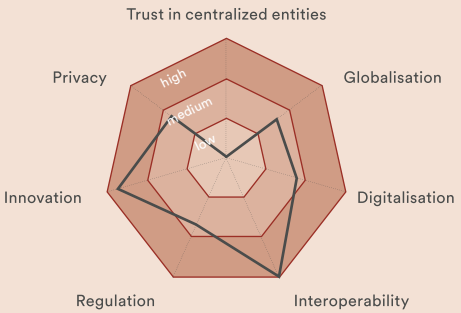

Likelihood of occurrence: medium-probability scenario

Early-detection signals: loss of trust in governments; rising discontent with existing institutions; rising trust in code; substantial advances in permission-less Distributed Ledger Technologies (DLTs)

DIGITAL DENIAL

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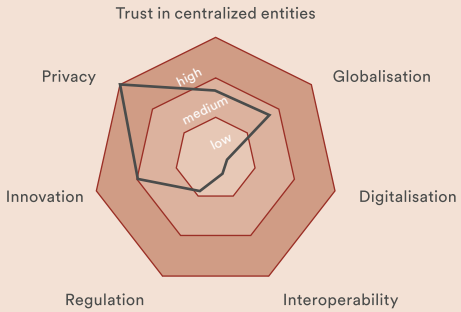
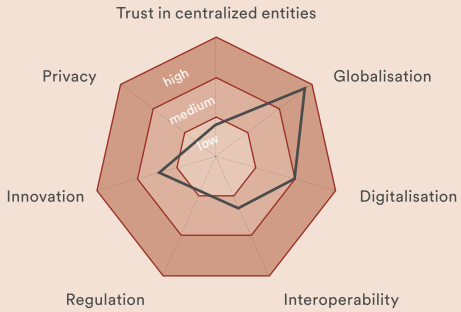


Likelihood of occurrence: low-probability scenario

Early-detection signals: increasing state influence of global internet companies accompanied by a very high number of daily used connected devices

WINNER TAKES ALL

(Page 100)



Likelihood of occurrence: mid-probability scenario

Early-detection signals: increased dominance of a few BigTech companies, companies have never been able to rise and fall in such short periods of time, on a global scale

DIGITAL RESET

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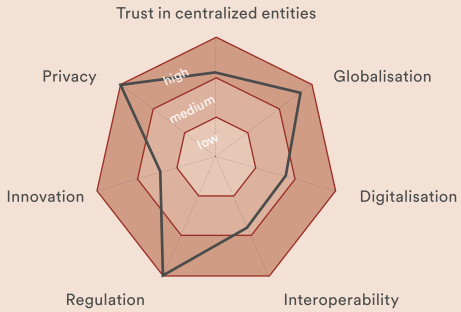


Likelihood of occurrence: low-probability scenario

Early-detection signals: exponential rise of big system failures and cyber-attacks with strong consequences, increasing number of incorrect data and resulting incorrect transactions

A BRIGHT HYBRID WORLD

Likelihood of occurrence: most probable scenario
Early-detection signals: explosion in digital assets; explosion in digital data; high privacy concerns; high sustainability considerations; advances in privacy-preserving data processing algorithms; digital platformification; government action to enforce competition in the digital sphere (e.g., data subjects have sovereignty over their data, data mobility, API and interoperability requirements); intact trust in governments

The most likely scenario is described in lots of details. It follows the same structure as all other scenarios:

It starts with a "contextual section" and then finishes with a "strategic-implications section". To help readers navigate this scenario, we subdivided each of these sections:

GENERAL VIEW

Context I:
Setting the Stage

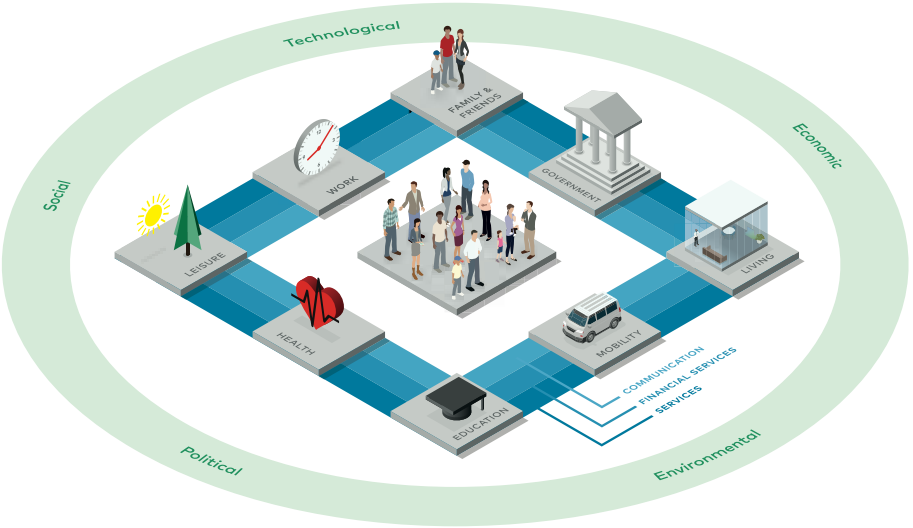
FINANCIAL INSTITUTES VIEW

Context II:
Key Themes for Financial Institutions

Strategic Implications I:
General Implications for Financial Institutions

Strategic Implications II:
Financial Institutions' Four Pillars of Value Creation

Context I:
Setting the Stage



This section provides the broader context for our most-probable scenario. The basis for our description is a model[4] which puts the human individual at the center. This model comprises two layers:

STEEP
Life Areas

The purpose of this section is to help the reader dive into the scenario by offering snippets of information of what our prognosed future looks like. Everything we say is highly speculative – the studies cited should not be mistaken for proven certainty.

4 Based on a model used by the 'Trend & Innovation Management' team at the Zürcher Kantonalbank.

More information and real-world examples, supporting the statements, can be found in the Appendix.

We have used two theoretical models to help structure the contextual information and evaluate the different impacts: The **STEEP dimensions** in combination with the **life areas** view.

STEEP

SOCIAL

The demand for **transparency and comparability** of services and products has increased. We believe that origin, manufacturing, costs, fees intermediaries must be transparent. Consumers want to know where their snacks are coming from, who was involved in their production, what ingredients have been used to produce them, and – finally – if the snacks have been produced under fair-trade conditions and with sustainability in mind.

The demand for and expectation of **instantaneous** and **convenient service** has continued to increase in the recent past. Same day package delivery with immediate tracking and service responses, as well a quick turnaround are the norm. **Location-independent services are in high demand**. Packages are no longer just delivered to fixed addresses, but to temporary receiver locations anywhere.[5]

Millennials and digital natives face uncertain economic security/prospects. The **millennial generation is worse off than their parents.**[a] Millennials face global competition, possible displacement due to technology, and uncertain relevance of acquired skills. In such an environment, it is no surprise that people **refrain from long-term commitments** and rather choose access over ownership. Preference for short-term contractual engagements, often driven by opportunity costs, are the new norm.

Contrary to popular belief, consumption preferences of millennials and digital natives seem to be closer to older generations (including their parents).[b] It seems again that a lesser sense of economic well-being

5 Global Positioning System (GPS) based location allows delivering packages where you are, even if only a present and temporary location. If additional information about your location is provided, algorithms compute how you can be optimally intercepted on your path there.

and prospects drive (part of) the younger generation's diverging consumer behaviors, such a decrease of car and real-estate ownership, or an increase in spending on healthy food and fitness.[c]

Sustainability and positive social impact are in high demand with customers.[6]

People are very **aware that seemingly free services/products are not free at all**. Customers know they are paying for services or products somehow – if not with their money, typically with their privacy (e.g., data).

Awareness of privacy risks has increased dramatically – especially relating to the digital sphere. Privacy considerations stand in tension with the need to share data for convenience and tailoring of services. People expect services and infrastructure to provide top-in-class (cyber-)security.

Switzerland's institutional framework provides good preconditions for maintaining world-class education that supply in-demand skills to the economy. This contributes to social stability, social mobility, and a good quality of life.

The **population has continued to grow,** predominantly due to high net migration,[d] although the immigration rate has slightly decreased.

Further aspects:

- Increased life expectancy[e]
- Changed age pyramid: wider peak[f]
- Progressive increase in the number of online security cases

TECHNOLOGICAL

> "Software is eating the world"
> Marc Andreessen, 2011[g]

The march of digitalization continues unabated. Digitalization continues to spread across and deepen its presence in all aspects of life, ecosystems, and business activities.

6 Social impact can be found everywhere, from the vegan sausage at Greggs, to Nike running a marketing campaign with Colin Kaepernick; see e.g., Forbes, 2018, Taking Risks Can Benefit Your Brand – Nike's Kaepernick Campaign Is A Perfect Example (30 September 2018).

Automation and AI (Artificial Intelligence)

Repeated tasks are fully automated – Robots can compete with a low-skill workforce in the service industry and deliver high quality real-time translation. Robotics is well-established in most industries, but there's still great potential in the service sector. For example, with the help of sensor-arrays, household robots can analyze their environment and make intelligent decisions.

Machines are still far away from emulating the often unexplained and intuitive abilities of humans. The capacity of computers to process data according to predefined structures has continued to increase at rapid speed.

AR (Augmented Reality) and VR (Virtual Reality)

AR is ubiquitous – It is mature and widely deployed in leisure and business contexts. AR is used to superimpose **holographic images** and instructions **atop** an individual's real-world perspective, for instance used to instruct workers on how to operate large machinery or specialized devices. Many more potential areas of use are: gaming, traveling, eating, entertainment, market research, medicine for surgery, psychotherapy, sports, and military. Retailers offer customers everything from virtual fitting rooms to the ability to design and customize products. Consumers shop virtually, entering stores using headsets from the privacy of their homes rather than physically traveling to a store.

VR (Virtual Reality) has not been deployed to the same extent. Nonetheless, it has found application in market research (reducing costs, creating environments for experiments), psychotherapy, training (e.g., military), flight and driving simulators, or computer gaming. **It has not (yet) been widely deployed in the business context**, but finds some application to reduce distraction, focus, and to retrieve some privacy in jammed open-space offices (return of the office cubicle – "the virtual office cubicle").

Further Technological Developments

Decentralized architectures and solutions are common. There is an established **Application Programming Interface-Economy**. It exhibits aggregating one-stop shop connectors because there are still many different API standards. **Distributed ledgers** find application in cases where no trusted party could be identified.

The reliance on **cloud infrastructure** has increased dramatically. The usage of cloud infrastructure is driven by continued cost pressures, exploding cyber-security costs, and technological advances (**interoperability**, 5G). **High speed and bandwidth** allow thin/**mobile clients** for all kinds of applications: the software is completely separated from the hardware.

The first **quantum-computing-based solutions** have become available.

Further aspects:

- Increased development around more secure and combined methods of "biometrical" solutions
- Continued developments around "big data / smart data" topics
- Data quality (accuracy, actuality, veracity, etc.) remains one of the central challenges
- Increased digitalization of tangible and intangible assets

ECONOMIC

There have been further downturns since the "financial crisis of 2007–2008", but none had an extreme long-term negative impact.

Despite an aging Swiss population, investment activity is high, production potential is increasing, and labor-market integration is improving.[h] The social and political integration of foreign workers is well.[i]

Economies are globally integrated – Rising nationalism and populism during the 2010s have not led to protectionism, economies have remained open and the market global.

Further aspects:

- Switzerland ranks among the top five brands worldwide
- Unchanged employment rate of those 15-65 years old[j]
- Greater highly-qualified workforce
- Increasing need for reskilling and further training

ENVIRONMENTAL

Sustainability is still an important and much discussed topic. Various measures such as "2030 Agenda for Sustainable Development"[k] and targets (e.g., for greenhouse gas emissions)[l] are implemented and supported by incentive systems.[m]

Core cities are the primary economic and workplace centers in urban areas, while housing continues to dominate in most surrounding communities. In comparison with the core cities, the surrounding municipalities have experienced an increase in importance both as places to work and as places to live.[n]

Further aspects:

- Decrease of individual motorization in large cities
- Continued urbanization
- 2000-watt society

POLITICAL

Governments have realized that 20th-century laws and regulations are no longer appropriate to guarantee growth, consumer protection, innovation, and competition in a digital world. They **passed many new laws and regulations**, primarily focusing on increasing transparency, reducing changing costs and lock-in effects, increasing the data subject's rights and control over digital data.[o]

The faster pace of change (including technological developments) have prevented governments from passing regulations until they truly understand the developments surrounding them. This has at times led to excessive, insufficient, and inappropriate regulations.

Foreign governments and international organizations increasingly influence domestic laws and regulations. Economic bargaining power (e.g., restriction of market access) is used to force democratic governments into taking certain actions. The international sphere is increasingly transactional in nature.

Trust in governments remains high, especially in institutions such as the "rule of law" and "central banks".

Further aspects such as:

- AI (Artificial Intelligence): ethical standards and laws have been passed requiring visibility, traceability and human-intervention possibilities
- Topics such as "autonomous driving" are highly debated topics, due to moral and ethical decision-making processes

LIFE AREAS

FAMILY AND FRIENDS

The classical family model is no longer the norm. There is an increased number of patchwork families and of single households with one child.[p] Families are founded at an ever later age.[q] The economic dependence between family members is no longer as strong as it was ten years ago.

An **increasing number of older people re-enters** the **workforce**.

The change in the age pyramid means that the care of older people is becoming an ever-greater challenge.

GOVERNMENT

Ever more interactions with and services from governments take place in the digital sphere (e-government). Increasingly, services are provided as self-services and DIY (Do It Yourself) and embedded in customer journeys. For example, during the relocation process you can obtain a debt collection statement as you apply for an apartment or you can automatically unregister and register in the respective municipality.

Services have increasingly been provided by the private sector.

LIVING

The **diversity of living accommodations has continued to increase**. Accommodations vary from area-optimized micro-housing (in cities), mobile living, home sharing concepts to classic apartments in the city and traditional houses in the country side. Especially students, young professionals, and singles are living in micro homes or shared housing. For workers who need to be highly mobile, special offerings of co-living spaces are provided. The shared-rooms concept is popular: kitchens, entertainment rooms, sometimes even bathrooms are shared by several residents. **Specialized platforms help manage these forms of shared living**. Next ownership, co-ownership, and rental access with pay-per-use arrangements are becoming increasingly important. This has led to a power shift between tenants and landlords. Houses are highly connected (**smart homes**).

Major drivers of this development are a lack of financial resources, solitude, convenience, environmental considerations, and safety.

MOBILITY

Urban centers have experienced drastic changes. **Ownership of vehicles has been replaced** to a large degree by new forms of mobility services. Most people use the sharing offerings of public and private service providers. **Miniature vehicles**, mostly electric, are widely used in metropolitan areas. This new vehicle segment includes e.g., two-seaters, tricycles, pedelecs, e-bikes, scooters, folding bikes, e-boards. Micro-mobiles are driven by efficiency and environmental considerations.

Autonomous driving in the private sector has **not yet** taken off. Only in **public transport** has this transformation **partly** taken place.

Small autonomous delivery robots are everywhere. Drones are used in specific B2B contexts such as delivering blood samples between hospitals. **Autonomous vehicles exist in specific contexts**, such as highway traffic, where the surrounding infrastructure has been adjusted.

EDUCATION

Education is highly tailored and specialized. Intelligent machines provide personalized content based on a person's preferences and learning speed.

Lifelong learning is the norm. Fact based skills have become largely obsolete. Emotional intelligence, logical reasoning, problem solving, and creativity are the most in-demand skills. Almost all jobs require digital literacy.

Interactions with human teachers and coaches increasingly takes place remotely via digital means. With the help of **VR (Virtual Reality)**, people immerse themselves and interact in virtual spaces.

HEALTH

The number of people suffering from **mental illnesses has grown significantly** within the last decade. Particularly striking is the increase in affective disorders (mood disorders such as depression) leading to high absenteeism amongst working adults. The socio-cultural reasons for this development are diverse: the decline of permanent social relationships caused by smaller families and increased geographical mobility, more demanding jobs, altered role expectations for men and women, lack of physical activity, and an unhealthy way of life. **Non-mental illnesses have decreased** thanks to significant advances in biotechnology.

Self-optimization and real-time self-diagnostics of one's own health has become popular. Biosensors help monitor health hazards and diseases, and textiles release drugs directly into the skin when needed. Extensive technology in the body (cyborgs) are not widespread but have gained some momentum and are more widely accepted.

There is an increase in **tailor-made medicine, therapies and solutions**. New and improved technologies have made highly individualized medicine possible. **Artificial organs**, sometimes 3D (three dimensional) printed, are widely used. People do not only live longer, they also feel much younger than their biological age. Demographic change, such as the shift to an older population, has **increased the overall demand for healthcare**.

All health records are fully digitized and controlled by the patient, who can share those data instantly with any health-authority as desired.

Plant-based meat and artificial meat taste like "the real thing" and have widely gained in popularity. Some people are starting to grow these things in their own houses. CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) changes how food tastes, increasing the yield of plants.

LEISURE

Sports continue to be among the **most important leisure** activities. Out of equality considerations, sports franchises have established more women's teams.[r] Esport is enjoying increasing popularity and is increasingly established as a professional career path.

Other leisure activities such as travel or concerts are still very popular. Their experience in virtual form has continuously increased with advances in **VR (Virtual Reality)** (total immersion).

Spare time continues to be a very precious resource (**time poverty**), and people outsource/automate as many chores as possible.

WORK

Most repetitive tasks are automated. Repeated tasks, physical activities in highly predictable and structured environments are automated or supported by technology.[7]

The Gig Economy (temporary and freelance work) has gained some momentum. **People have several careers in the course of their lives**, and within each career change jobs much more frequently. The number of people having a **passion-job on the side** has increased significantly.

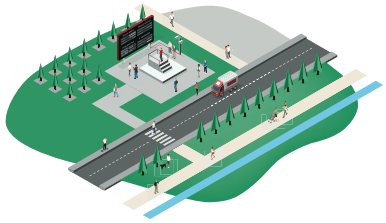
AR (Augmented Reality) reduces entry barriers for many jobs since it reduces information/knowledge necessary upfront.

7 For instance, exoskeleton for heavy weights or precise operations, AR support for simple work as well as complex processes/activities.

Context II:

Key Themes for Financial Institutions

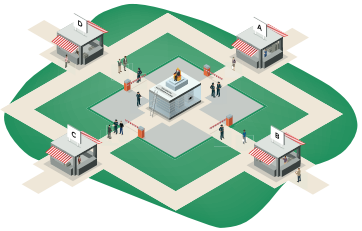
PEOPLE



Increased Importance of Trustworthiness

Changing Behavior

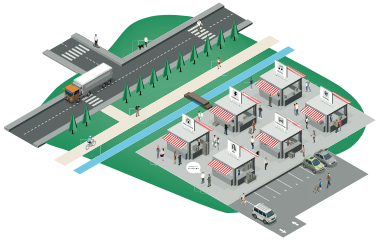
IMMEDIATE ENVIRONMENT



The Empowered Digital Customer

Ubiquity of Digital UI (User Interfaces)

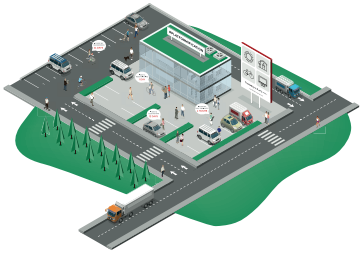
BROADER ENVIRONMENT



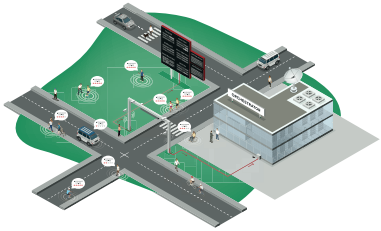
Explosion in Digital Assets

Explosion in Private Digital Data

BUSINESS LANDSCAPE



Changing Business Models



Changing Business Ecosystems

This section extracts the common denominators of the previous statements into a manageable/workable number of aspects, and studies them in more detail. **We believe that these eight key themes capture the fundamentals for understanding future profitability and differentiation (competitive advantage) in the most likely future scenario.** These aspects are key for assessing one's current business strategy and for spotting future market opportunities.

This section continues with our approach of focusing the discussion on the people and expanding from there. We first analyze changes affecting people, then changes affecting their immediate environment, then changes in their broader environment, and finally changes affecting the business landscape.

Some aspects are broader than others and require explanation.

INCREASED IMPORTANCE OF TRUSTWORTHINESS

People are far less trusting than in the past. They employ far more care when considering whether or not to trust someone with their data. **Trustworthiness has become an increasingly important criterion in people's decision-making**.[8] As digitalization further spreads into ever more aspects of our lives, trustworthiness (appearing trustworthy) has become ever-more important for ever-more service providers.

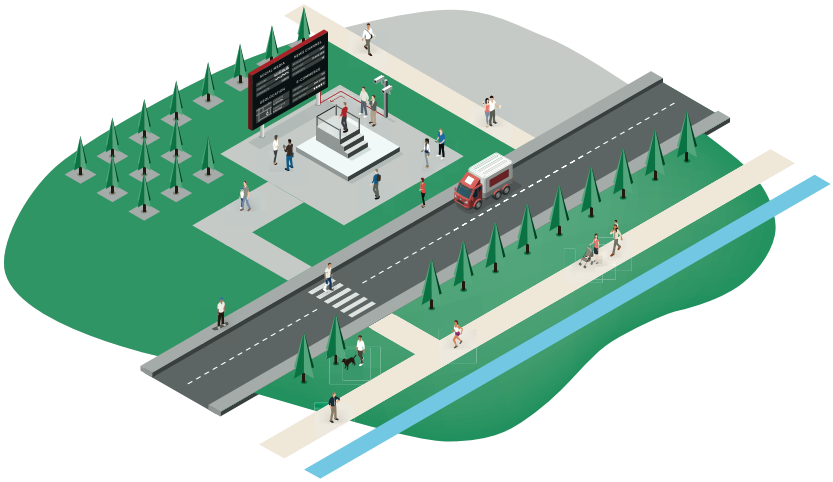
This development was driven by people who have experienced first-hand the costs associated with (consciously or unconsciously) trusting service providers with their data too easily:

- Their data was treated with little care, lying around unprotected.[9]
- Their data was accessible to human employees.
- Their data was sold without their knowledge, at times in non-anonymized form.[10]

8 Someone's perceived trustworthiness is not absolute, but context-dependent and thus varies from situation to situation.

9 Uber employees could easily spy on the movements of politicians, celebrities, friends, and ex-boyfriends/girlfriends (The Guardian, 2016, Uber employees 'spied on ex-partners, politicians and Beyoncé, 13 December 2016). Google accidentally stored passwords from some corporate G-suite users in plain text since 2005; see e.g., Wired, 2019, Google Has Stored Some Passwords in Plaintext Since 2005 (21 May 2019).

10 Mobile carriers and location-based apps (e.g., weather apps) have sold their data to third-parties – even after they swore they would stop (Wired, 2019, Carriers Swore They'd Stop Stelling Location Data. Will They Ever?, 9 January 2019).



Convenience and immediate rewards continue to be highly valued, but convenience and other short-term benefits no longer always win in the digital sphere.

- Their data was used to manipulate their choices and actions.[11]
- Their data was stolen,[12] lost,[13] made public, and used for blackmailing.[14]

People have come to greatly value **security, privacy, transparency, and control of their personal data**. Convenience and immediate rewards continue to be highly valued, but **convenience and other short-term benefits no longer always win** in the digital sphere.[15] Convenience may be of secondary importance with a less-convenient but more trustworthy service provider.

The most-trusted players of the past may not be the most-trusted ones in the future. Such changes are not new. Trust shifted away from traditionally-trusted institutions (government, the media, business and NGOs)[s] to individual actors (e.g., preferring individual journalists over a newspaper)[t] and to relationships within one's control.[u] In other words, trust has moved from an "institutional" to a "distributional" model. Nonetheless, **governmental institutions such as the "rule of law" or "central banks" remain highly trusted in western countries.**

CHANGING BEHAVIORS

Beliefs, values, and social norms are key factors in human decision-making. They do not arise randomly. They are bestowed upon us by our parents and society (including technologies,[16] markets, population), and they are influenced by our experiences.[17] Hence, **as the world surrounding us changes, so do our beliefs, values, and social norms**.

11 Their digital data allowed creating detailed behavioral/psychological profiles. This then allowed tailoring messages to leverage people's deepest fears, prejudices and beliefs. Besides influencing shopping decisions, this data was arguably also used to influence people's votes in political elections.

12 To name just a few: Facebook suffered a data breach of almost 50 million user accounts in 2018 (Wired, 2018, Everything We Know About Facebook's Massive Security Breach, 28 September 2018); Marriott had 500 million guest records stolen, including the guest's name, postal address, phone number, date of birth, gender, email address, passport number (Financial Times, 2018, Marriott breach potentially exposed data of 500m guests, 30 November 2018).

13 Facebook lost the data from over 50 million of its users. Guardian, 2018, Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach (17 March 2018).

14 Even the world's wealthiest person, Jeff Bezos, had digital private communication and intimate photos stolen, made public, and used to blackmail him (Wired, 2019, Jeff Bezos Goes Hard Against The National Enquirer, 7 February 2019).

15 It has been argued that 'convenience' was the main driver of human decision-making in the digital sphere in the early twenty-first century: "Convenience is the most underestimated and least understood force in the world today … convenience" (Tim Wu, 2018, The Tyranny of Convenience, New York times, 16 February 2018).

16 Although people shape technologies at first, technologies tend to shape people down the road.

17 They are mainly formed during childhood and adjust only slowly/slightly in the course of a life.

As the world changes, so do our beliefs, values, and social norms.

The scope of **what people are willing to share** has increased over the past years. In 2012 people were unwilling to share their homes, cars, or to lend someone money.[v] The growth of Airbnb and of P2P (Peer-to-Peer) lending suggests that people's propensity to share has indeed increased.

Some people have **lost/unlearnt the capacity to make decisions on their own**[w] because of a pervasive reliance upon digital assistance for any decision-making. From navigating the world by relying on a GPS (Global Positioning System) based mobile app to searching information by relying on Google's ranking algorithm to choosing a restaurant relying on peer reviews and ratings.

People **feel more comfortable in digital settings** than in offline environments. Younger generations find it challenging to talk to strangers on the street and they feel uncomfortable being asked for a date in a public library.

People **don't want to be contractually bound for long periods**. Arguably, this development is driven by economic circumstances rather than fundamental changes in preferences.[18]

The majority of **people seek information online before making an offline purchase**, and over 20% of customers seek offline information before making an online purchase.[x]

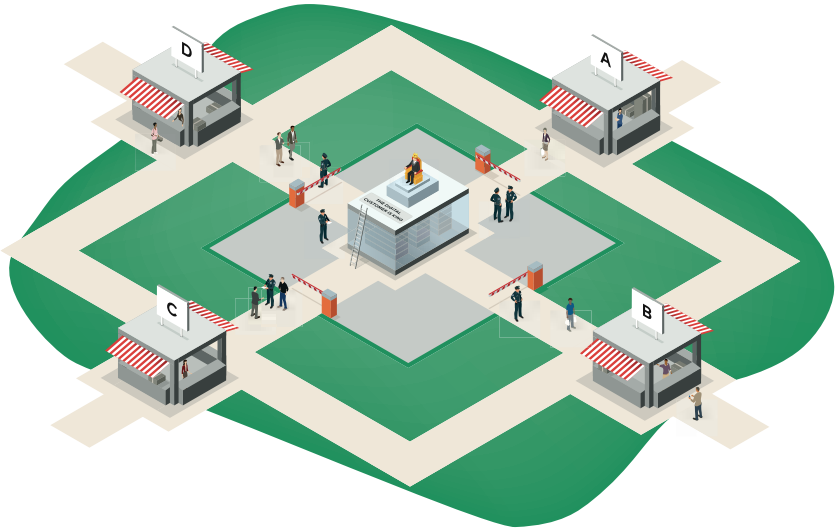
THE EMPOWERED DIGITAL CUSTOMERS

From the perspective of the customer, **the digital sphere appears completely open, flexible plug-and-play.**[19] The customer feels empowered: They can tailor the digital sphere to their needs and preferences. Specifically, the digital sphere is characterized by the following pillars.

- **Control –** The data is only collected, processed, shared, and stored insofar as consented to by the data subject; data can be seamlessly shared with third-party systems; the rights of the data subject are respected and enforced; data subjects can order processing, storage, sharing of their data.
- **Transparency –** Data collection and processing are clearly indicated, fees and costs are visible, and different services and actors are easily comparable. Data usage is fully transparent, comprehensible, and logged (data-usage traceability).

18 See footnote a.

19 To be sure, a digital ecosystem need not be connected to the internet. Indeed, although a digital ecosystem exhibits digital interconnectivity of applications and systems within and across ecosystems, it need not exhibit internet connectivity. As seen in Subsection 'Explosion in private digital data', people may refuse internet connectivity out of privacy and cyber-risk concerns. The digital data is then held and processed at the edge ('edge data' and 'edge computing'). For example, all digital applications and system in your (smart) home may be connected to each other and talk to each other, yet you may not want them to be connected to the internet.



Customers can freely combine platforms, applications, services, and unbundled sub-services ... Service providers risk losing their customer interface to gateway/aggregator UI (User Interfaces) ... Customers can readily switch between services providers as they can give any service provider access to the entirety of their data held in another system.

- **Interoperability** – The various digital applications and systems all communicate with each other and allow users to have a seamless, all-in-one experience across services from different providers.
- **Unbundling –** Services are unbundled into their constituents (sub-services) and offered as separate services. Users can tailor the digital sphere to their exact preferences.

Interoperability between applications/systems within as well as across digital ecosystems enables customers to freely combine applications and services.[20] Communication/matchmaking platforms float in a **distributed net/web of interoperable platforms**, where platforms are connected to platforms, to digital services and digital UIs (User Interface) – which may themselves amount to platforms.[y]

Interoperability and control allow data subjects to easily provide access or sell the – ownership or usage – rights to their data. This enables the **monetization of one's digital data** – data-as-digital-asset.[21] It also **eliminates (technical) switching costs between different service providers.** Technical lock-ins are a thing of the past. Data subjects can give any service provider access to the entirety of their data held in another system.[22]

Where the UIs are digital,[23] interoperability enables digital aggregators to seamlessly integrate digital services from different providers in one place. **Service providers risk losing their customer interface** to these connectivity gateway/aggregator UIs. **Different types of (aggregator) UIs (User Interface) are likely to dominate different contexts**. An aggregator UI may take the form of one-stop shops covering the entire customer journey and offering a seamless UX (User Experience) throughout the journey. An aggregator UI may cover a single element in the entire customer journey and seamlessly integrate all service providers serving that element. An aggregator UI may be a local or a global player. An aggregator UI may integrate only local service providers. In any event, advertising revenues are captured by the one owning/operating the UI.[24]

20 For the definition of an ecosystem, see footnote 139 and the text surrounding it.
We are aware of the many different definitions of ecosystem that exist in the literature.

21 See also subsection 'Explosion in private digital data'.

22 This includes data about settings, User Experience (UX) preferences, etc.
This situation is a more extreme version of what digital ride-hailing platform operators were already facing in the 2010s: even without interoperability or aggregator User Interface (UI), both drivers and passengers have Lyft and Uber apps and easily toggle between the two (it only involves opening both apps, and for some, entering their destination twice). In the future, they may only need to open a single aggregator UI.

23 We expect digital User Interfaces (UI) to be ubiquitous, see subsection 'Ubiquity of digital user interfaces'.

24 For illustrative purposes, look at the privacy-focused web browser 'Brave' (footnote 107): 'Brave' owns the UI and thus captures the advertising revenues.

Interoperability combined with a modern micro-services-based infrastructure **allows services to be completely unbundled into their constituents (sub-services) while still offering a seamless/frictionless UX for any combination of sub-services**. Let us consider the case of Spotify to exemplify unbundling.[25] Today, we use Spotify for finding music, for paying (buying the usage right),[26] for listening to a digital "copy" of the music, and for providing us with curated playlists. In the future, we may still connect with a musician via the Spotify matchmaking platform,

Find a song on Spotify, freely agree with musicians on the usage rights to their songs, freely choose the app to stream the music, freely choose from where to stream, freely choose a playlist curator, freely interact with all these parties to agree on fees ... Or freely choose an all-in-one bundle instead.

but we will be able to freely choose whether to pay the musician directly or rely on some third-party to provide a monthly subscription.[27] We will also be able to freely choose where to store the "usage right" (custody provider),[28] to freely choose the application(s) wherein to listen to the

25 Unbundling Amazon might look as follows: We go onto Amazon's e-commerce platform to search for a product and a seller. Once we have both, we freely choose the communication platform to contact the seller and discuss the terms. After agreeing on the terms, we can then freely choose a service to digitally sign the contract, freely choose a service to transfer the money to the seller, and the seller can freely choose the logistics provider to deliver the product.
Consider also that the button on Samsung phones dedicated to call Samsung's own voice assistant ('Bixby') can now be reprogrammed to automatically call another provider's voice assistant (e.g., Google's voice assistant). See e.g., The Verge, 2019, How to re-program the Bixby button on a Samsung Galaxy S8, S9, S10, Note 8, or Note 9 (5 March 2019).

26 It is a temporary usage right since Spotify is subscription-based.

27 The subscription may include access ('usage/listening rights') to multiple songs of some musician, or may include access to the songs of multiple musicians (who may have gotten together to offer a joint-subscription).

28 This contrasts with the status quo in the 2010s: The distributor of the songs (e.g., Amazon, Apple's iTunes, Spotify) also operated the 'rights ledger' (i.e., operated the DRM server) for its products. See footnote 87 for a description of the status quo and its drawbacks.

music,[29] to freely choose from where to stream a digital copy of the music (digital-storage provider), and to freely choose a playlist curator. We will pay each of these third-parties directly.

Unbundling increases the agility, innovation, and personalization of the overall service, because it exposes every element in the value chain to full competition, and because it lowers entry barriers for service providers. **Unbundling allows every customer to *perfectly* tailor the digital sphere to their individual needs and preferences** (individualization). Customers have therefore gravitated towards services that exhibit unbundling, interoperability, and openness.

(Aggregated) user data no longer amount to a unique asset ... Network effects no longer yield a lock-in.

Service providers (inclusive platform operators) might no longer have access to the activity data of their users.[30] But even where they do, **service providers' (aggregated) user data are no longer a unique asset**. Control and interoperability allow users to provide third-parties with access to their data.[31] Users may share data in exchange for access to a service, for more tailored services, and/or for monetary compensation.[32] This reduces the profits service providers can capture from user data alone.

Although network effects are still prevalent, interoperability and user control over data usage **substantially reduce the power, lock-in, and expected profitability of platforms**. Alternative matchmaking platforms

29 Insofar as the 'usage right' allows for it, we would be able to listen to the music in any third-party application. This again contrasts with the status quo in the 2010s: The usage/access rights were limited to the distributor's own digital sphere (e.g., Amazon's Kindle, Apple Music, Spotify). See footnote 87 for a description of the status quo and its drawbacks.

30 See subsection 'Explosion in private digital data'.

31 For example, you can send/connect the data on your apartment held by Airbnb to any competing player. Or you can send/connect the data on your desired destination from Uber into Lyft and vice versa to receive a quote in the other apps as soon as you open it.
Privacy considerations are unlikely to stop them from sharing their data: advances in privacy-preserving data sharing and privacy-preserving machine-learning algorithms have been significant.

32 Monetary compensation may take the form of a 'right to a percentage of the revenues or profits', where the percentage may itself be a function of the number of users sharing their data.

can easily be set up, users can easily connect to multiple platforms simultaneously via gateways/aggregators,[33] and users can authorize multiple platforms to access their data[34] from one another. The sharing of user data allows alternative platforms to train matchmaking/recommendation algorithms.[35] This reduces the profits services providers can capture from operating a platform alone. Even when there is a single winning platform, there is no profit in only operating a platform, because alternative platforms could be set up at any time (contested markets).

Several drivers underlie the rise of this plug-and-play digital sphere. Here are just a few:

- Customers demand **convenience** – all-in-one experience, one-stop digital UI (User Interface), digital identities, **personalization** (complete unbundling of value chains and services, flexibility),[36] **best conditions** (competition, comparability, transparency), **low lock-in** (zero switching costs), and **monetization of their data** (full control over data usage).[37] Data subjects/owners have therefore preferred systems and applications that promise high unbundling, interoperability, openness, and control.
- Interoperability **empowers people to monetize their data** (data-as-digital-asset).
- **Technological advances** in cyber-security[38] and privacy-preserving systems have significantly reduced the costs and increased the privacy/security of interoperable systems.[39]

33 Several digital paths (going through different platforms) therefore connect people with each other. Keep in mind that the digital sphere is a net/web of platforms connected to platforms connected to services providers, see footnote y.

34 For social-network platforms, this would include chat histories, settings/preferences, as well as social graphs (digital-identity providers have made these graphs perfectly portable). For e-commerce platforms, this would include the sellers' shops and product data (inclusive description, pictures, layout, prices), customers' comments and reviews (ratings) of sellers/products.

35 Alternative platforms can provide monetary compensation for the usage right to the data (see e.g., footnote 56). Alternative platforms can also offer lower transaction fees and restrict access to those sharing their data (restriction is needed to avoid free riding, since the quality of matchmaking/recommendation algorithms is a public good).

36 When it comes to groceries, customers seem to highly value being able to shop on 'their terms' indeed: "Shoppers want to choose when and how they get their groceries, whether it's same-day delivery; in-store, curbside, or drive-through pickup; or delivery to a convenient location, like a school or an office building." (Amit Sharma, 2019, What the Grocery Stores Holding Their Own Against Amazon Are Doing Right, HBR, 18 April 2019)

37 Control combined with interoperability empowers data subjects: they are in the driver seat, in full control over access, storage, and usage of their data.

38 This was far from trivial. In 2018, a bug in one of Google's Application Programming Interfaces (API) exposed user data from over 50 million accounts; see Wired, 2018, A New Google+ Blunder Exposed Data From 52.5 Million Users (12 December 2018).

39 A key force was the 'MIT Trust: Data Consortium', which developed open-source tools for trusted interconnectivity and interoperability.

- Next generation IT systems are built around **micro-services.**[40] Since all these micro-services must be interoperable, interoperability at the system level can easily be set up.[41] More generally, if an AI-based UI ("chatbot")[42] is enabled across all services/applications of a closed ecosystem, then these services/applications are readily interoperable at the system level, since these chatbots can simply talk to each other.[43] Micro-services-based IT also facilitates the unbundling of services.
- **Governments have at times required unbundling of services**. This has included vertical as well as horizontal unbundling of services.[44]
- **Governments have required data mobility and interoperability.** Laws and regulations give data subjects extensive rights and control over the data they produce. Governments have provided users with **sovereignty over their data** [45] by imposing "data-usage restrictions" and requiring "data mobility".[46] Governments have

40 New elements can easily be added (including from third-parties), removed, upgraded, replaced, and outsourced; individual parts can be reused (efficiency) and freely recombined. This facilitates experimentation and thus increases internal agility/innovation.

41 Especially if we consider that most IT systems will operate on some public cloud. Indeed, applications and systems on a given cloud will be interoperable (micro-services-based, 'serverless') by design, so that full interoperability would only require additional interoperability between cloud providers.

42 See subsection 'Ubiquity of digital user interfaces'.

43 Interoperability at the system level would even exist in the absence of Application Programming Interfaces (API) since different Artificial Intelligence (AI) based User Interface UI could talk to each other in plain language.

44 Vertical unbundling has most notably included the unbundling of the data-storage infrastructure through data-mobility requirements (footnote 73). The 'Markets in Financial Instruments Directive II' (EU-MiFID II), which entered into force in 2018, has required trading facilities to offer free choice of clearing venue to the trading parties, thus breaking up vertical silos in the securities value chain.
Horizontal unbundling has, for example, been required in trading: EU-MiFID II has required the unbundling of 'trade execution' from 'investment research' which used to be offered as one product.

45 An early-mover was the European Union in 2018 when the EU General Data Protection Regulation (GDPR) took effect. It requires service providers to request consent from data subjects for any type of processing of their data ('opt-in').
The California Consumer Privacy Act of 2018 (AB 375) even goes a step further (the law goes into effect on January 1, 2020). It prevents businesses from unfairly penalizing consumers who refuse to opt in, though they will be able to charge a fee that makes up for the lost data usage. The purpose is to prevent businesses from imposing the 'opt-in' by offering a sole alternative to 'opt-out of the service entirely'.
Europe's actions have global reach: "Thig big five tech giants, Alphabet, Amazon, Apple, Facebook and Microsoft, make on average a quarter of their sales there. And as the world's biggest economic bloc, the EU's standards are often copied in the emerging world." (Economist, 2019, Europe takes on the tech giants, 23 March 2019).

46 An early-mover was the European Union in 2018 when the EU General Data Protection Regulation (GDPR) took effect. It requires service providers to allow data subjects to export their data in standardized ('data portability').
Some regulations in the 2010s already went further than simple 'data portability' by providing data subjects with the right to give third-parties access to their data held ('data mobility'). Here, too, the European Union was an early-mover in 2018, when the EU Payments Service Directive 2 (PSD2) took effect. It requires banks to provide communication interfaces for third-parties to access bank-account information. A third-party has only access if the account owner (data subject) consents. The UK Open Banking Regulations (in effect since 2018) goes a step further by additionally requiring access to product data (e.g., fees, charges, lending rates to the customer). And the Australia Open Banking Regulation (in effect since 2019) goes even further by requiring access to any customer data they hold. Both regulations again require that the data subject consents to a third-party accessing the data.

furthermore required APIs (**Application Programming Interfaces**)[47] in ever-more areas. Governments were generally driven by concerns over market-power abuses and lack of competition,[48] and a willingness to enforce people's property rights in the digital sphere (including over personal data).

- API standards have emerged from the market in several areas (**market-led API standards**).[49] Where markets have not been able to come up with standards,[50] **governments have set up agencies to define mandatory API standards** to prevent a heterogeneity of APIs from making the laws de facto ineffective.[51]

47 Once again the European Union was an early-mover in 2018, when the EU Payments Service Directive 2 (PSD2) took effect. It not only requires banks to provide communication interfaces for third-parties to access bank-account information, but also to provide interfaces to initiate payment orders. Several other countries have adopted similar regulations, see footnote 45. Also note that "as the world's biggest economic bloc, the EU's standards are often copied in the emerging world." (Economist, 2019, The Future of Big Tech: Why Big Tech Should Fear Europe, 23 March 2019)
Even though this regulation only targets the financial sector, we can expect such regulations to extend to other areas, since the underlying rationale applies. The coverage of other data types and into other areas is likely to be exponential as transferrable learnings and API specifications accumulate.

48 Considering both the short-term effects on prices as well as long-term effects on overall innovation capacity.

49 Several areas had already seen market participants voluntarily join forces to develop API standards. In banking, consider 'NextGenPSD2' (driven by The Berlin Group, which represents over 40 banks, association and payment providers in the Europe) or 'Swiss Common API' (driven by SFTI). Several organizations are also developing standards beyond banking: the Internet Engineering Task Force (IETF), the World Wide Web Consortium (W3C), or the Internet Society. Although the 'Data Transfer Project' only develops standards for 'data mobility' and not for 'APIs', it is nonetheless noteworthy because of its members: it was launched in 2017 by Google, Facebook, Microsoft, and Twitter with the goal of building a common framework with open-source code to enable seamless and direct data mobility between platforms.
In other areas, such standards may appear more indirectly via intermediaries which provide a one-stop single-API aggregator/gateway connecting a heterogeneous set of APIs to their single API. Over time, the 'single API' of an intermediary, or the 'single APIs' of several intermediaries, may be adopted voluntarily by other market participants (perhaps to avoid having to connect to partners and customers via these intermediaries).

50 See the discussion on market-driven standards below.

51 In banking, the UK created an independent agency ('Open Banking Implementation Entity', OBIE) to develop a mandatory Application Programming Interface (API) standard to implement its Open Banking Regulation.
Supporting government agencies to develop mandatory standards becomes relevant in case the market fails to do so: Digital Competition Expert Panel, 2019, Independent Report: Unlocking digital competition (19 March 2019; appointed by the British government), page 73.

- **Governments have at times required public availability of aggregated data**. Service providers were required to make the troves of aggregated/bulk user data available in anonymized/privacy-preserving form.[52] Governments were driven by consumer-protection and anti-competition considerations (levelling the playing field). Requirements are likely to depend on the size, maturity, service-operation duration, or market position of the service provider to not destroy innovation and competition by taking away the incentive to invest in the first place.[53]

UBIQUITY OF DIGITAL UI (USER INTERFACES)

Ever more aspects of our lives take place in part or completely in the digital sphere. Digital UIs (User Interface) integrate (permeate) all aspects of our daily lives. Offline customer journeys are riddled with digital UIs.[54] A customer may try on a dress in a shop and, while still in the dressing room, go onto the internet to consult peer reviews, compare prices from different shops, and make the purchase online. Walking into a store may involve seamless authentication (e.g., facial recognition) and seamless payment.[55] Going to a restaurant may start on a comparison website with peer reviews, photos of the food, and tailored recommendations. In other words, **almost all customer journeys exhibit connectors to the digital sphere**.

The shift towards digital UI (User Interface) for services started in the 1990s on internet-connected desktop computers. It experienced its first iteration in the early 2010s with the shift towards internet-connected mobile device (ubiquitous/mobile internet). Digital UIs allow services to be embedded wherever the customer is (**embedded services**). When people are about to buy a new car, they get a credit offer from their financial institute inside the car dealership – they no longer need to visit their bank branch.

Digital UIs yield an **unbundling of the customer journey**. As customers

52 Such a requirement would not be new: In Germany, large insurers must provide smaller competitors access to their data to help these smaller companies assess risks, see e.g., Viktor Mayer-Schönberger, Thomas Ramge, 2018, A Big Choice for Big Tech: Share Data or Suffer the Consequences, Foreign Affairs (September-October Issue).
Concerns over privacy risks (anonymizing large data sets is far from straightforward) have decreased due to substantial advances in privacy-preserving systems and privacy-preserving machine-learning algorithms.

53 The rationale is the same as for intellectual property rights: players are given an exclusive commercial usage right for some time to provide enough incentives to invest in the first place.

54 Digital User Interfaces (UI) (or 'human-machine interfaces') are not limited to screens. They also include, for example, AI-based UIs such as voice, movements, or gestures.

55 Therefore there is a digital User Interface (UI) with one's digital-identity provider, respectively with one's bank. Most of us have actually had a digital UI with our banks for quite some time: whenever we paid with a credit card (on a website or at a physical point of sale).

Digital UIs (User Interface) integrate (permeate) all aspects of our daily lives. People repeatedly make use of digital UIs in offline experiences ... Service providers risk losing their customers at any point in the customer journey.

can easily switch to other service providers through their digital UIs, service providers **risk losing customers at any point during the customer journey.**

Digital UIs **increase competition for service providers** by digitally connecting many participants: increasing comparability/transparency of different service providers' offerings;[56] facilitating bypassing traditional intermediaries (disintermediation risk);[57] and empowering new service providers (new competitors).[58] The digital systems where such interactions take place are referred to as digital matchmaking platforms (or 'aggregation platforms'). The world has experienced the appearance of such digital platforms in ever more aspects of life and in ever more industries (this shift is referred to as '**Platformification**' or 'Uberization').

The next iteration of digital UIs (User Interface) is likely to involve a combination of 'chatbots' and AR (Augmentet Reality).[59] Further iterations may involve VR (Virtual Reality).

The next iteration of digital UIs (User Interface) is likely to involve a combination of "chatbots" and AR (Augmented Reality). AI (Artificial Intelligence) based digital UIs ("smart chatbots") are widespread. These one-stop digital UIs will mark the downfall of many apps.

56 Think of comparison websites such as www.comparis.ch.

57 Think of crowdfunding platforms (e.g., Peer-to-Peer lending) which allow bypassing traditional financial service providers by allowing capital seekers to directly interact with those willing to deploy capital (investors).

58 Uber, for example, enabled peers to become ride providers. Crowdfunding platforms enabled peers to become direct external-financing providers. And both of these examples also put pressure on traditional intermediaries.

59 Data suggests that people may continue to prefer a visual interface for certain tasks – a picture is worth a thousand words after all. "Echo-branded smart speakers have attracted millions of fans with their ability to play music and respond to queries spoken from across the room. But almost four years after inviting outside developers to write apps for Alexa, Amazon's voice system has yet to offer a transformative new experience. Surveys show most people use their smart speakers to listen to tunes or make relatively simple requests—"Alexa, set a timer for 30 minutes"—while more complicated tasks prompt them to give up and reach for their smartphone." (Bloomberg, 2019, Does Alexa Have Any Hit Apps? Most People Use the Echo for Music, 11 March 2019).

AI-based digital UIs ("smart chatbots") are widespread. Users interact with machines in the same way they would interact with other humans – in written or spoken plain language (writing, respectively speaking chatbots), with gestures, movement and emotions.[60] In combination with interconnectivity/interoperability,[61] these AI (Artificial Intelligence) based UIs (User Interface) have given rise to **one-stop digital UIs providing a single intuitive and seamless gateway** to many different systems and services. Think of all the third-party apps you can already access and control with the voice-chatbot (or "voice-assistants") on your smartphone – this is only the beginning.

These one-stop digital UIs could mark the **downfall of many apps – whether it marks the end of all apps is still unclear**. It will depend on whether people keep certain aspects of their lives completely separated from each other. They may do so via a handful of apps, each acting as one-stop digital UI for a segregated aspect of their lives. Or they may do so via a single one-stop digital UI: instructing this chatbot to seamlessly open secure channels to different chatbots for different aspects of life.[62] In this latter constellation, the entire user experience is without friction or interruption.

Several drivers underlie this ubiquity of digital UIs. Here are just a few:

- Customer demand **convenience** (embedding in customer journeys, instantaneity, ubiquity,[63] AI-based UIs) and **tailoring** (digital data).
- Customers demand **best conditions** (comparability, transparency, competition) and **decision-making support** (peer reviews, expert assessments).[64]
- Customers exhibit a **preference for digital** (digital culture, digital natives) as medium for interacting with peers and service providers.[65]
- **Mobile internet** provides a digital UI (User Interface) anytime and anywhere.

60 This explains why Artificial Intelligence (AI) based digital User Interfaces (UI) ('chatbots') have also been referred to as '*human-centered UIs*'.

61 See subsection 'The empowered digital customer'.

62 Assume you want to go back to something from a chat history. You ask your single one-stop digital User Interface (let us call this chatbot 'Alexa'). Alexa automatically opens a secure channel and you continue speaking with the chatbot associated to that secure channel (let us call this one 'Siri'). Indeed, you already blocked Alexa from accessing the chat's data, you instructed Alexa to automatically open a secure channel to Siri for any request relating to the chat's data, you authorized Siri to recognize you by your voice, and you provided Siri with access rights to the chat's data. Alexa therefore acts as your personal secretary, seamlessly connecting you to your desired counterpart, Siri, and then leaving the conversation.
Microsoft's voice assistant ('Cortana') is a skill on Amazon's voice assistant ('Alexa'): You can ask Alexa to start 'Cortana' (The Verge, 2018, Microsoft and Amazon release preview of Cortana and Alexa integration 15 August 2018). This is not seamless, but we can easily imagine 'Hey Cortana' as a wake-up call for Alexa that prompts Alexa to directly (seamlessly) launch Cortana.

63 There are no 8-to-5 opening hours.

64 See subsection 'Changing behaviors'.

65 See also subsection 'Changing behaviors'.

- **Digital representation** of real-world objects[66] enables linking one's immediate offline environment with the digital sphere.
- Technological advances in **Global Positioning System (GPS) based location, Bluetooth** for precise-indoor location,[67] and **AI (Artificial Intelligence)** for visual search with **AR (Augmented Reality)**.
- Technological advances, computing power, and an explosion in digital data have led to leaps in the performance of **machine-learning-based Artificial Intelligence (AI)**.

EXPLOSION IN DIGITAL ASSETS

The world has experienced an explosion in the number and diversity of digital assets. We distinguish between two types of digital assets: digitized assets and native digital assets. **All real-world assets, tangible and intangible, are digitally represented**: from machines in factories, to cars, to pieces of art, to seats at the theatre.[68] Besides these *digitized assets*, there was a parallel explosion in *native digital assets*, which most notably include crypto-currencies,[69] virtual in-game objects, data produced by sensors, and digital definition/descriptions of (digital and non-digital) assets.

The rights to these (digitized, native digital, and non-digital) assets are also digitally represented –referred to as digitally tradable rights to assets – and led to an explosion in number and variety of rights to assets. This digitalization of tradable rights to assets (i.e., digital rights) facilitates lending, sharing, trading/exchanging, and collateralization of these digital assets and their underlying real-world assets.[70]

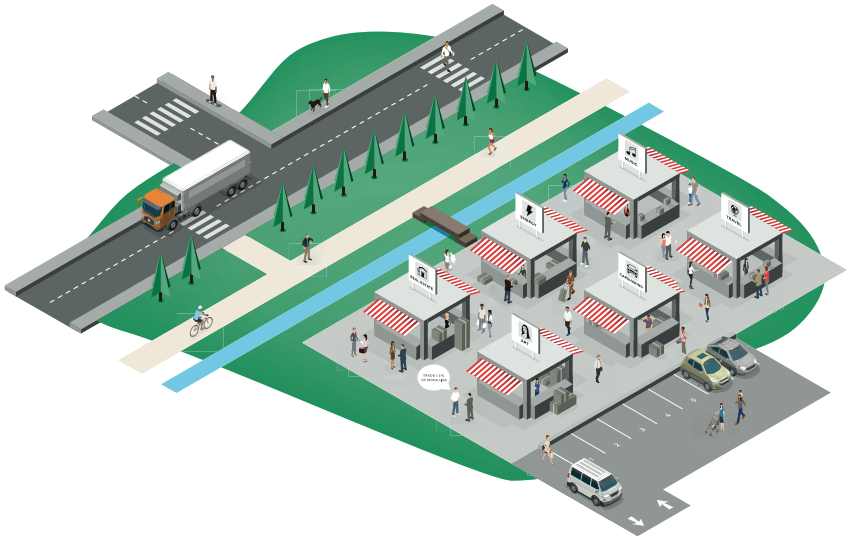
66 "Someday soon, every place and thing in the real world – every street, lamppost, building, and room – will have its full-size digital twin in the mirrorworld … We are now building such a 1:1 map of almost unimaginable scope, and this world will become the next great digital platform … The Street View images in Google Maps are just facades, flat images hinged together. But in the mirrorworld, a virtual building will have volume … will reflect not just what something looks like but its context, meaning, and function. We will interact with it, manipulate it, and experience it like we do the real world … This is happening faster than you may think. The home goods retailer Wayfair displays many millions of products in its online home-furnishing catalog, but not all of the pictures are taken in a photo studio. Instead, Wayfair found it was cheaper to create a three-dimensional photo-realistic computer model of each item." (Kevin Kelly, 2019, Welcome to the Mirrorworld, Wired, March 2019, pages 73-76).
The Cathedral of Notre Dame in Paris, which stood in flames in 2019, was digitally represented in its entirety, which offers hope for its restoration, see e.g., Wired, 2019, The Notre Dame Fire and the Future of History (15 April 2019), "For the last half-decade or so, an architectural historian named Andrew Tallon worked with laser scanners to capture the entirety of the cathedral's interior and exterior in meticulous 3D point clouds."

67 Bluetooth 5.1 will enable connected devices to track each other down to the centimeter (it used to be precise to the meter). See e.g., Chris Smith, 2019, Bluetooth 5.1 will do a much better job of tracking down your lost tech, Trusted Reviews (28 January 2019).

68 See footnote 66.

69 Crypto-currencies are a special type of crypto-assets. Examples of crypto-currencies include Bitcoin (BTC), issued on the Bitcoin blockchain, and Ether (ETH), issued on the Ethereum blockchain.

70 For more details on the mechanisms underlying this development, see the Subsection on 'Explosion in and digitalization of investable assets' in SIX, forthcoming, Future of Financial Information.



The rights to all assets are digitally represented (digitally tradable rights to assets) … This led to an explosion in number and variety of rights to (digitized, native digital, and non-digital) assets.

Examples of rights to (digital and non-digital) assets include:[71]

- Ownership rights to some piece of land,[72] real estate, art, in-game virtual object,[73] virtual luxury goods,[74] crypto-assets,[75] crypto-currencies, etc.
- Usage rights of your home,[76] your car with you as a driver,[77] your car, your spare storage, your seat on a plane, or to your home's electricity production.
- Usage rights to your personal data,[78] or usage right to data[79] (data-as-digital-assets).[80]
- Rights to your attention (attention-as-asset).[81]

71 For a more extensive list, see SIX, 2019, White Paper: Future of the Securities Value Chain (January 2019), pages 30-31.

72 In Switzerland, SIX Terravis is the electronic information portal for land registry data.

73 CB Insights, 2019, Emerging Trends: Luxury Trends (February 2019), page 48, "Free-to-download gaming app Fortnite generated over $300M in revenue from in-app purchases in less than 7 months after launching, according to Sensor Tower. A sign that consumers are willing to spend significant amounts of money on outfits and accessories for virtual characters."

74 For example, virtual luxury goods to be used to change the appearance of one's avatar, or as filter on your real-world photos. Indeed, "If your platform of communication is digital, why can't your clothes be? … But how does one 'wear' the couture? There is a 28-day window for the couture's new owner to provide a photo of the future wearer to the creators in order for them to custom fit the digital garments." (Forbes, 2019, World's First Digital Only Blockchain Clothing Sells For $9,500, 14 May 2019).

75 Crypto-assets are defined as digital assets (without rights against someone or on something) issued on some permission-less distributed ledger. See also footnote 96.

76 Think Airbnb.

77 Think Uber, Lyft, and Didi Chuxing.

78 This is not a new digital asset. Although we may not have been aware of it, we have all been paying with 'usage rights to our data' for services such as Gmail and Facebook.

79 This is nothing new: A key component of the financial-information business involves creating, selling, and enforcing 'usage rights to data' in the investment sphere. See the Introduction in 'SIX, 2019, Future of Financial Information'.

80 There is an infinite number of data-based assets, because they can be defined very narrowly as 'specific usage right of some specific piece of data for some specific amount of time for some specific purpose'.
Observe that the European Union's General Data Protection Regulation (EU-GDPR), which took effect in 2018, requires service providers to request consent from data subjects to process their data by indicating the purpose of the data processing. The consent to data processing is therefore restricted to a specific purpose.

81 Instead of being simply shown advertising, advertisers would pay the recipient for being shown the advertisement (pay for the 'right to their attention') in addition to the entity providing the place for the advertisement (pay for the 'usage right to this place'; see also footnote 109).
The privacy-focused web browser Brave not only blocks/hides ads, it will also pay users to see adds. The goal is to replace the white spaces of blocked ads on webpages with different ads. If the user consents to being shown different ads, then Brave sells the right to advertise on these white spaces to advertisers, and splits revenues with the user (70 percent). See e.g., Wired, 2019, The Brave Browser Will Pay You To Surf The Web (24 April 2019).
Facebook is arguably thinking of this as well: "One idea under discussion is Facebook paying users fractions of a coin when they view ads" (Wall Street Journal, 2019, Facebook Building Cryptocurrency-Based Payments System, 2 May 2019).

- Usage rights of some billboard at some future sports event or of some spot on a website (advertising rights[82]),[83] or of some place in some future movie (product-placement rights).
- Access/usage rights to (collection of) songs,[84] books,[85] movies,[86] etc.[87]
- Large companies issue priority rights to some future product,[88] and rights to revenues of some specific product line.
- Local producers (bakeries, restaurants, bars) issue ownership rights (equity), and rights to future revenues.[89]
- Contractual rights against a legal or natural person.
- Ownership rights and (commercial) usage rights to intellectual property (e.g., patents, trademarks, copyrights), or to digital data (see below).

Airbnb creates "usage right to your apartment" and then makes these rights tradable on a digital platform.

The underlying infrastructure is **fully programmable,** which enables anyone to easily write self-executing **digital contracts** on top of digital assets. These digital contracts then themselves become digital assets that can, for instance, be traded and collateralized.

82 Also known as 'right to some third-party's attention'.

83 Selling 'usage right to some spot on a website' has been the core business model of some of the best-known big tech companies (read: Google and Facebook). They run mini auctions for the 'usage right to advertising spots' on their digital services/websites.

84 Think Spotify.

85 Think of the 'Kindle version' or the 'audiobook version' on Amazon's marketplace.

86 Think of your movies in iTunes.

87 Even when you click 'buy now' for some of those digital things, you do not really 'buy an ownership right' – you only buy an 'access/usage right to the digital thing' that is limited to the distributor's digital sphere' and that can be revoked any time: "Your iTunes movies, your Kindle books – they're not really yours. You don't own them. You've just bought a license that allows you to access them, one that can be revoked at any time … Microsoft made the announcement in April that it would shutter the Microsoft Store's books section for good … it's going to remove all purchased books from the libraries of those who bought them … Microsoft will refund customers in full for what they paid, plus an extra $25 if they made annotations or markups … [Furthermore, although originally] intended as an antipiracy measure, DRM now functions mostly as a way to lock customers into a given ecosystem, rather than reading or viewing or listening to their purchases wherever they want." (Wired, 2019, Microsoft's eBook Apocalypse Shows The Dark Side of DRM, 30 June 2019).

88 Tesla's pre-order campaigns are perhaps the most famous example of such rights.

89 Besides providing access to capital, owners of such rights also act as ambassadors for the local producers.

This infrastructure allows anyone to easily **unbundle** existing digital assets and bundle them to **create new digital assets**. Take, for example, a debt contract with interest payments and final payment of the nominal value. The existing digital asset is the "right to repayment". We can now sell/trade this digital asset, or we can partition it into smaller identical pieces (each giving a right to a share of the repayment). But we can also unbundle it more creatively: we could, for example, only sell the right to the first three interest payments. The **self-executing** nature of these digital contracts and the encoding of rights/obligations ensure that there is no counterparty risk against people creating digital contracts on top of other digital contracts. In the example above, the person buying the right to the first three interest payments will automatically receive those cash-flows when the credit taker makes those payments.[90] Anyone can thus be a structurer.[91]

All these digital assets and their rights are registered on digital ledgers. Whether they amount to central or (permissioned) distributed ledgers will depend on the preferences of the participants, and will hence vary from context to context.[92] We do not expect all countries, industries, and players to agree on a single (centralized or distributed) ledger and hence do not expect a unique master ledger underlying the entire digital sphere.[93] An intermediary layer above these different digital ledgers provides a connectivity gateway/aggregator to all these different ledgers (one-stop access) and makes the experience appear seamless to the users.[94]

90 In other words, a person creating digital contracts on top of other digital contracts has no way of influencing the payment flows.

91 A structurer designs financial products by combining various other financial products (e.g., securities, options, indices, derivatives).

92 Note that even systems running as central ledgers are likely to rely on a distributed-ledger technology (e.g., blockchain): Distributed Ledger Technology (DLT) may act as a natural focal point amongst decision-makers in different corporations (facilitating access to budget); permissioned DLT may benefit from a vibrant community of permission-less-DLT open-source developers and researchers; and participants may want the freedom to switch between 'run as central ledger' and 'run as distributed ledger'.

93 These different (centralized or distributed) ledgers may nonetheless function like those via so-called 'Hashed Timelock Contracts', which allow 'atomic cross-chain swaps'.

94 This intermediary layer automates the construction and signing of the 'Hashed Timelock Contracts' mentioned in footnote 120.

Several drivers underlie the explosion in digital assets. Here are just a few:

- Digital representation empowers people to monetize their assets. It facilitates the lending, sharing, trading/exchanging, collateralization, and usage as means of payment of the underlying real-world assets. Optimal monetization of one's own assets and the associated increased competition on the supply side is especially demanded by those struggling to make a living from their jobs (gig-economy participants, easily-automatable jobs) – which includes many in younger generations.[95]
- Digital representation facilitates investing in one's community or village to support the local economy.[96]
- Digital representation of all real-world assets allows to derive people's true risk exposures.
- Digital representation furthermore increases the investment universe by opening investment opportunities that either did not exist, were difficult to access, or were restricted to a subset of investors[97] (democratization of investment universe).

A creditor can instantly unbundle the debt contract and resell the rights to the first three interest payments – without the buyers of these interest-payment rights having any counterparty risk against this creditor.

95 See footnote c.

96 Although a person could already approach a local business and ask them whether they can buy a stake in the company, we see three limiting factors that could be resolved by digital representation: a person may not want to talk about money and their wealth by entering into a discussion with the local business, as such information could rapidly spread in smaller communities; a person may not want to enter into lengthy contract negotiations regarding the terms and conditions of such an investment; and a person may want the peace of mind knowing that they will be able to exit/resell their investment in the future (i.e,. existence of a secondary market providing liquidity).

97 In the absence of digital representation, investors had to go through human intermediaries (brokers) to access investment opportunities. This was much more cumbersome and the broker could easily restrict access to its best clients (by not sharing the investment opportunities with all their clients).

- The rise to popularity of permission-less distributed ledgers[98] during the 2010s **fueled people's imagination** regarding what can be represented digitally.
- The meteoric rise of the market capitalizations of data-driven businesses (e.g., Google, Facebook) has made the value of data a popular topic and therewith **established "data as digital asset" in people's minds**.
- Digital representation increases the value of **Augmented Reality (AR) and geo-location-based solutions**, and vice versa.[99]

EXPLOSION IN PRIVATE DIGITAL DATA

Ever more digital data are produced and collected. This has been an ongoing process for a while, but the **tipping point in the exponential growth curve has finally been reached**. The world produces/collects more data in a day than it produced before the start of the 21st century.[100] **The value of digital data continues to increase**, driven most notably by the demand from AI (Artificial Intelligence) solutions manufacturers (better algorithms), from advertisers (better targeting), and from investors (better investment decisions). The **sources of this digital data are broad and diverse.** Digital representation (digitized/digital assets) has exploded. Contracts are entered and signed in digital form. People wear sensors in all shapes and places for self-optimization and self-monitoring. Social interactions (e.g., chat, influencing) take place in the VR (Virtual Reality). Real world experiences are augmented with a digital layer (ubiquitous Augmented Reality) to provide additional information and to interact with the objects themselves. Furthermore, AR (Augmented Reality) devices record, analyze and digitally store their surroundings. Self-driving cars' computer-vision cameras film and store everything and everyone they pass on the street. Games are played online on mobile devices and in fully-immersive environments (VR). Movies are interactive and thus produce even more behavioral data.[101]

98 Most notably, the Bitcoin blockchain, and Ethereum blockchain.

99 See subsection 'Ubiquity of digital user interfaces'. Kevin Kelly, 2019, Welcome to the Mirrorworld, Wired, March 2019, page 76, "Augmented reality is the technology underpinning the … [digital representation of everything]; it is the awkward newborn that will grow into a giant."

100 The data produced in 2017 and 2018 amounts to 90% of the world's data. See Forbes, 2018, How Much Data Do We Create Every Day? The Mind-Blowing Stats Everyone Should Read (where platforms are connected to platforms, to digital services and digital User Interfaces (UI) (which may themselves amount to plat-forms). August 2018).

101 Interactive films give audiences choices during the movie (e.g., 'Bandersnatch' of the Black Mirror series on Netflix). The moments are arguably chosen to maximize behavioral insights from audience selections: "Do we seek chaos? Play it safe?". See Wired, 2019, Netflix and Choose (21 January 2019).

People increasingly want to keep their data undisclosed/ confidential because of privacy concerns and/or because they want to optimally monetize their data.

Cities are riddled with sensors and cameras (smart cities) and internet-connected devices (IoT – Internet of Things) to monitor and optimize. Devices in homes have digital capabilities such as voice-interfaces and internet connectivity (smart homes). Machines and product lines in manufacturing plants have exact digital copies to constantly monitor their status and predict maintenance (to minimize downtime). Tractors combine satellite and drone images with on-board cameras to optimally spray fertilizers. The promise of fully-tailored services also prompts people to give away even more personal digital data. **Whatever we do, we create digital data**. Virtually all customer journeys are embedded in a digital ecosystem.[102]

This data provides ever-deeper insights into people's preferences, emotional triggers, fears, aspirations, or prejudices. As such, it provides **ever-greater potential for manipulating choices, loss of privacy, and blackmailing**.[103]

People **want to keep their data undisclosed/confidential** because of privacy concerns[104] and/or because they want to optimally monetize their data[105]. They have, for example, employed one or more of the following strategies. They have *kept their data at the edge*: the data is collected, stored, and processed solely on the local device.[106] They have *generated noise to hide their data* ("differential privacy"): the local device generates noise before sending the data out.[107] And they have *required end-to-end encryption of their data*: the local device encrypts the data before sending it out (the service provider cannot see the data because it does not have the decryption key).[108] **Service providers may therefore no longer readily have access to the activity data of their users**.

102 See subsections 'Ubiquity of digital UI (User Interfaces)'.

103 See subsection 'Increased importance of trustworthiness' for examples of such adverse usage of data.

104 See subsection 'Increased importance of trustworthiness'.

105 Keeping their data private increases the value they can extract by selling ownership/usage rights to third-parties (data-as-digital-assets).

106 Think of the time when you used Microsoft Windows before the internet. Think of your touch ID or face ID on the iPhone where the biometric data are only stored and processed locally. Think of some smart-home applications that you may not want to connect to the internet. This more generally captures what is referred to as 'edge AI'.

107 When asking a question on Google search or to Amazon's Alexa, the local device could randomly generate many alternative questions and send all of them simultaneously out for processing by Google or Amazon. When searching for a product on Amazon, many randomly generated search requests could be sent out, and when clicking on a product, many different product selections could be sent out. The local device would act as an intermediary layer with the random alternatives being generated on the local device itself (i.e., at the edge).

108 In 2019, Facebook announced it will shift towards an end-to-end encrypted communication model. Its CEO and founder, Mark Zuckerberg, believes that users will increasingly demand such end-to-end encryption. "As I think about the future of the internet, I believe a privacy-focused communications platform will become even more important than today's open platforms," noting that signs for this shift were already apparent. "We already see that private messaging, ephemeral stories, and small groups are by far the fastest growing areas of online communication" (Mark Zuckerberg, 2019, A Privacy-Focused Vision for Social Networking, Facebook, 6 March 2019).
In the e-commerce space, this could take the following shape: a user might start (possibly in full anonymity, behind a VPN) his/her journey on Amazon's e-commerce platform to find a product, then switch to Amazon' end-to-end encrypted communication channel to directly contact a seller and bilaterally agree on the terms (without Amazon ever knowing about any of this), and finally engage a third-party payment service to transfer the money to the seller. (Insofar as the seller uses Amazon's warehouses and logistics, Amazon would, however, eventually know about the sale.)

CHANGING BUSINESS MODELS

The developments discussed thus far will significantly impact the profitability of many existing businesses. The changes **may invalidate one's existing value propositions and business models** (threats, disruptions) and/or **may provide new business opportunities**.

The following provides a non-exhaustive list of aspects to be considered when assessing existing or developing new business models.

Be absolutely client centric: just because something is technically feasible, does not mean customers will value it.

- Although *perfectly-tailored contextual services* are feasible, some customers may accept less tailoring due to privacy considerations.
- Although *high agility, speed, and lower costs* are feasible by partnering with a wide set of externals (open innovation, outsourcing), some customers may prefer slower pace and accept higher costs due to privacy/security considerations.
- Although *embedded services* are feasible, some customers may prefer less convenience due to privacy/security considerations.
- Although *fully-digital UIs (User Interface)* are feasible, some customers may prefer the human touch.

Go beyond simply accumulating user data. Digital data is no longer a ready source of comparative advantage. Service providers' (aggregated) user data is no longer a unique asset and yields no profits by itself as users can share their data with third-parties.[109] Business models must go beyond collecting user data to be profitable.

Operating a platform is less likely to be profitable. Platform operators may no longer be able to capitalize on aggregated (anonymized) data of the user activity on their platforms: privacy-preserving measures may prevent them from seeing this data.[110] And even if they see the data, they may not be the only ones seeing it (not a unique asset).[111] Network effects may no longer yield a lock-in for platform operators to benefit from.[112] Finally, platform operators may not own the customer relationship UI (User Interface).[113]

109 See footnote 31 and the text surrounding it.

110 See footnote 106 and the text surrounding it.

111 See footnote 34 and the text surrounding it.

112 See footnote 33 and the text surrounding it.

113 See footnote 23 and the text surrounding it.

Technical lock-ins do not exist anymore (zero technical switching costs),[114] but switching costs may not be null. **Build a strong brand and emotional ties** to produce emotional switching frictions in the form of exclusivity, quality reputation, and trustworthiness. **Own the customer relationship UI (User Interface),** which facilitates building emotional ties and brand awareness and may allow capturing advertising revenues.[115]

Greater efforts should be put into figuring out where **human interaction** still adds value to the customer, because the so-generated (non-digital) data are more likely to be unique and because the interaction naturally creates an emotional connection. But even where AI (Artificial Intelligence) based UIs ("smart chatbots")[116] are prevalent, an emotional connection may be possible by **creating a genuine, consistent and distinct personality for the chatbot** that captures what the brand stands for.[117]

Accumulating user data is less likely to be profitable by itself ... Operating a platform is less likely to be profitable by itself.

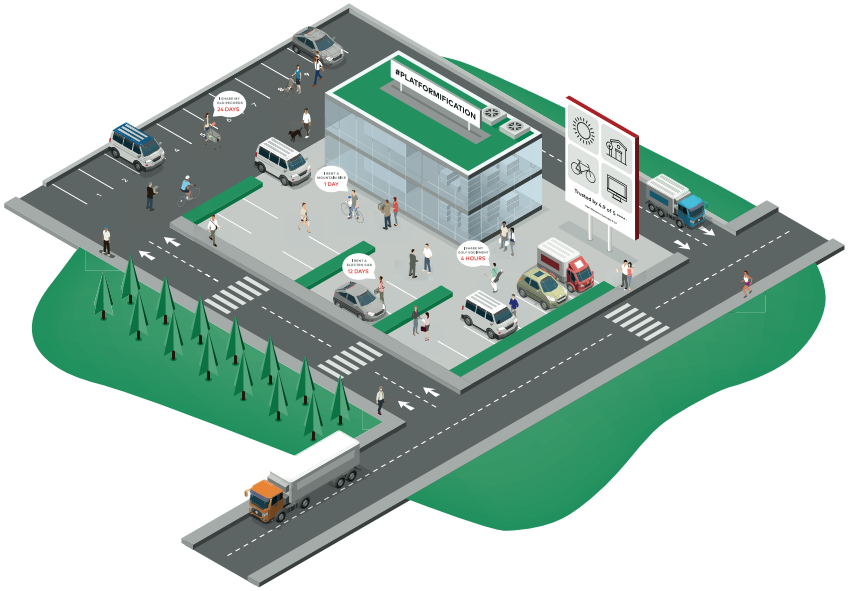
Build value propositions around digital privacy – As security and privacy considerations become more important to customers, value proposition around privacy preservation are likely to emerge. **Become a trusted brand**.

114 See footnote 22 and the text surrounding it.

115 See footnote 24 and the text surrounding it.

116 See subsection 'Ubiquity of digital UI (User Interfaces)'.

117 Inspiration can be found from virtual influencers in the fashion industry. Take, for instance, Noonoouri, a fashion avatar (influencer), with a clear personality, style, and behaviors. 'She' has reached a fan base of several 100k (inclusive real-world fashion icons) and has been on the cover of prominent fashion magazines. Another example is the 23-year-old Japanese girl Erica, who is an Artificial Intelligence (AI) generated robot that was, for example, featured in a Gucci WeChat campaign in China (Jing Daily, 2018, Are Virtual Influencers Coming to China's Luxury Market?, 10 August 2018).
Consider also the case of Japan where Artificial Intelligence (AI) based avatars from video games already acted as 'friends' and 'social companions' in 2019. See e.g., WIRE, 2018, Decoding Digital Marketing: Szenarien zu Zukunft der Mensch-Maschine-Interkation (October 2018), page 22.



Build value propositions around digital privacy and trust as security and privacy considerations become more important to customers ... Own the customer relationship to facilitate building a strong brand.

Trustworthiness may become a differentiator in many services as security and privacy considerations become more important to customers.[118] More specifically, **trusted partners** are ever-more demanded in the increasingly complex digital sphere.[119]

- Customers can tailor the digital sphere to their individual needs and preferences (individualization).[120] This complete freedom will overwhelm many people, who will seek trusted partners to help them orchestrate and manage their digital exposure (e.g., pre-select, curate, bundle).[121] They will also seek trusted digital-identity providers to help them easily authenticate across services from different providers with a single login.[122]
- To help customers *manage their digital exposure*, trusted partners help keep the data safe.[123] They ensure that their rights are respected in the digital sphere; for example, by guaranteeing that the digital data is only used/processed insofar as consented or that the data is deleted if requested.[124]
- To help customers *orchestrate their digital presence*, trusted partners provide an overview of all their digital assets ('digital wallet') and digital contracts.[125] They provide a one-stop shop to orchestrate their interoperability.[126]
- To *help them make better decisions*, trusted partners provide guidance through the noise of digital data.[127] They certify the truthfulness of digital data in a world wherein humans can no longer make such distinctions.[128]

118 See subsection 'Increased importance of trustworthiness'.

119 See footnotes 108, and 121 and the text surrounding them.

120 See subsection 'The empowered digital customer'.

121 See also subsection 'Explosion in private digital data'.

122 Digital identities are expected to become the most valuable commodity in the future. See e.g., Eric Schmidt, Jared Cohen, 2013, The New Digital Age: Reshaping the Future of People, Nations and Business (Random House: New York, NY), page 36, "Identity will be the most valuable commodity for citizens in the future, and it will exist primarily online."

123 For example, by providing security solutions for the smartphone: "The fact that users typically hold all their information on their phone, and that smartphones are now used for two-factor authentication – one of the most widely used cybersecurity tools – increases the security risk if the device is lost or stolen." (WEF, 2019, Here are the biggest cybercrime trends of 2019, March 2019).

124 Enforcement of the 'right to be forgotten' is far from straightforward: "While you can delete your Facebook account relatively easily, getting these firms [third-party services having had access to your FB data] to remove your information is time-consuming, complicated, and sometimes impossible." (Wired, 2019, The Wired Guide To Your Personal Data – And Who Is Using It, 15 February 2019).

125 Including an overview of all of one's subscriptions (durations, cancellation periods) and of one's insurances (inclusive help with over-coverage and coverage gaps).

126 See subsection 'The empowered digital customer'.

127 There is simply too much digital data for a single human being to make sense of it all.

128 Advanced deep learning algorithms have been used to create fake images and films (referred to as 'deepfakes') of such high quality that humans cannot spot fakes. Deepfakes have prominently been used to create fake political speeches as well as copies of art pieces.

- To help customers *establish digital anonymity/privacy*, trusted partners provide infrastructure and intermediary services that allow their clients to benefit from fully-tailored digital services while preserving their privacy.[129]

Facilitate and encourage unbundling – Unbundling of services yields better UX (User Experience) and tailoring for clients.[130] Clients may therefore gravitate to services offering such unbundling.

Scale is still relevant but can generally be sourced – Technological advances (e.g., interoperability, cloud solutions, privacy-preserving systems[131]) have increased the scope of outsourcing/partnering by reducing transaction costs. There are two types of scale effects: *scale-based cost reductions* (economies of scale) and *scale-based quality improvements* (network effects, data-based insights and algorithms).[132]

Ever more local (niche) plays become viable by sourcing scale.

Players can outsource all non-differentiating activities/processes to partners which can provide these scale effects (managed services, utilities).[133] Players can source data sets from data subjects and/or large service providers.[134]

Due to this indirect access to scale (cost-wise, data-wise), **local (niche) plays become increasingly viable:** products/services that could only be

129 The trusted partners could, for example, help encrypting the data or adding noise to the data.

130 See footnote 25 and the text surrounding it.

131 By ensuring privacy, the costs associated with losses/misuses of data shared (or made available) with third-parties are eliminated.

132 An example where the amount of data (scale) improves the service quality (faster service) is arguably the transportation industry. Take the company 'Lyft': "Every Lyft ride provides valuable data that helps the company improve its dispatch and routing software" (Walter Frick, 2019, The Strategy Question at the Center of Lyft's IPO, HBR, 26 March 2019).

133 The key criterion in selecting such a partner is whether this partner's economies of scale are among the best in the world. For certain services, there will only be a handful of players globally. Additional criteria are whether the partner will exhibit operational excellence and make the necessary investments to maintain and innovate.

134 Data subjects have control over the data they produce and can make that data available to third parties. See Subsection 'The Empowered Digital Customers'.

offered at loss in the past may become profitable. An increased demand for tailored services would broaden the scope of niche plays. An increased demand for local anchoring as counterbalance to the abstract global structures would also broaden the scope of niche plays for local players.[135]

Interoperability is a must **(interoperability imperative)** – Services are likely to be embedded in customer journeys:[136] interoperability is necessary to integrate one's services in third-party digital UIs (User Interface) and to integrate third-party services in one's own digital UIs. Even if customers do not value interoperability now, one should prepare for possible changes in customer preferences.[137] Finally, interoperability is very likely to become mandated by law.

A modern micro-services-based IT is necessary for agility, innovation, and cost efficiency. A micro-services-based infrastructure facilitates experimentation (innovation) by enabling any employee to add new elements, recombine existing ones, and/or access/leverage data throughout the organization. It is furthermore much more economical because it substantially reduces maintenance costs,[138] upgrading costs, and integration costs (e.g., Mergers & Acquisitions, internal innovation).

CHANGING BUSINESS ECOSYSTEMS

We define a **business ecosystem** as the *system of services and actors that are closely linked to and thus surround a customer journey.*[139] They directly or indirectly create value for the customer journey. And these services and actors may or may not interact directly with each other.

Business ecosystems are characterized by **four archetypal roles.**[z] The consumers/users, the providers, the orchestrator, and the various contributors.[140]

135 Foreseeing a demand for local anchoring: WIRE, 2018, Decoding Digital Marketing: Szenarien zur Zukunft der Mensch-Maschine-Interaktion (October 2018), page 28.

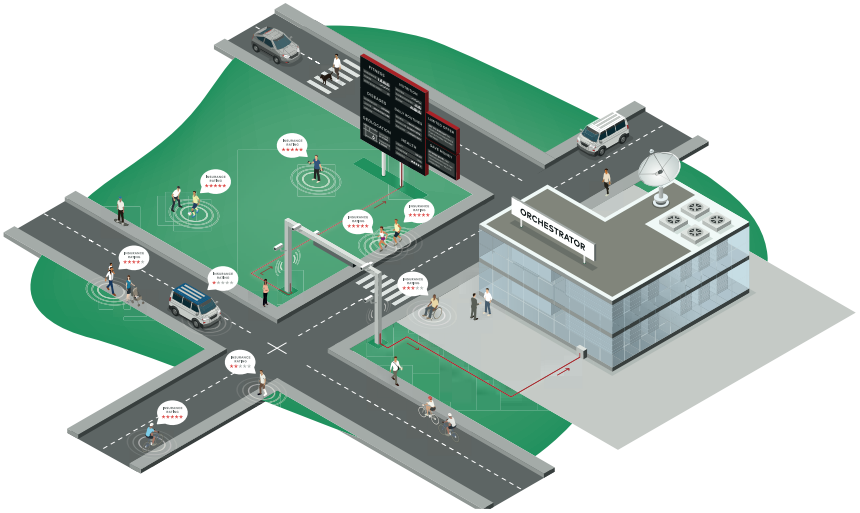
136 See subsection 'Ubiquity of digital UI (User Interfaces)'.

137 See subsection 'Changing behaviors' for some behavioral changes.

138 Instead of having to deal with an entire monolithic system all its complex interdependencies, maintenance can be performed separately on each individual element. The teams do not need to coordinate, as all interdependencies are transparently captured by the Application Programming Interfaces (API).

139 We thus follow a *customer-centric definition of business ecosystems.*
The concept of 'business ecosystems' was introduced in James F. Moore, 1993, Predators and Prey: A New Ecology of Competition, Harvard Business Review (May-June Issue). He defines a business ecosystem as "An economic community supported by a foundation of interacting organizations and individuals – the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem.", see James F. Moore, 1996, The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems (Harper Business: New York, NY), page 26.

140 A 'contributor' supports the consumers/users, the providers, and/or the orchestrator.



A business ecosystem is the system of services and actors that are closely linked to and thus surround a specific customer journey. A business ecosystem is hence always linked to a specific customer journey and may change dynamically over time as customer behaviours, needs, and technologies evolve.

Multiple players may compete to orchestrate the business ecosystem surrounding a given customer journey. Different players may orchestrate the customer journey for different client segments.[141] Different players may orchestrate different elements of the customer journey for a given client segment. Or a single player may orchestrate every element of all segments.

Ecosystems are dynamic and in constant flux. The developments discussed thus far will **fundamentally alter the structure of ecosystems**: customer interactions change, players change, roles evolve, supply chains change, speed and agility change, etc. In the following, we only mention some of these structural changes.

Competitors change (players change) – New players may enter ecosystems because **new needs** appear along the customer journey and/or because **new technologies or new business models** provide better solutions for existing needs.[142] Players from different industries and/or different ecosystems enter each other's turf and become competitors in addressing specific needs (**permeable boundaries**).

A famous example for permeable boundaries has been the leveraging of one's customer data. Players may take advantage of their (anonymized) client data base to offer superior services (more-tailored, less costly) in other ecosystems.[143] Service providers can lessen this threat by acquiring the data themselves (full interoperability and data-subject sovereignty over the data make it possible).[144] Note that even if users prevent services from seeing their activity data,[145] this permeable-boundary threat does not disappear: It would only level the playing field, as all players would need to acquire the data in the same way.

Partners change (players change) – Rather than looking at players from different industries and/or different ecosystems as competitors, players can partner to take advantage of **synergies in the data they each hold**.

141 Two orchestrators can coexist. Think Google and Apple acting as orchestrators by operating mobile-phone platforms (Android and iOS operating systems) open to third-parties. They are acting, and arguably competing, as orchestrators in the same ecosystem (more correctly ‚in the same ecosystems' since the services span across different customer journeys).

142 *New technologies*: The shift to digital UIs opens the door to players providing great digital UX without needing physical/geographical proximity. Interoperability opens the door to players focusing on specific elements in the value chain (unbundling). Machine learning and digital data open the door to players holding enormous data sets on customers.
New business models (business model innovation): Digital UIs open the door to players operating digital platforms.

143 McK, 2017, Competing in a World of Sectors without Borders, McKinsey Quarterly (July 2017). Examples include: social-network data (behaviours, preferences, etc.) may help assess the likelihood of repaying a loan better than traditional means and may allow to price it in real time; consumption-history data (healthy food, physical fitness gear/services, etc.) may provide valuable information for health/life insurers' pricing; a driver's heart rate, hours of sleep in previous night(s), focus while driving (or distracted by talking/texting) may provide valuable information for car insurers' pricing.

144 See subsection 'The empowered digital customer'.

145 They may do so due to security and privacy considerations. See footnote 106 and the text surrounding it.

Platformification (roles evolve) – Digitalization of ecosystems enables private parties to set up **matchmaking platforms for the various players in the ecosystem to interact**.

These few examples show that service providers must understand the shifts ahead in their industries as well as in the broader business ecosystem(s). This will help them assess and decide which business ecosystems they should play in and which specific role(s) they should play (**ecosystem strategy**). To be sure, service providers may have different roles in different ecosystems, and these roles may change over time.[146]

146 Airbnb, for example, acts as orchestrator in one ecosystem and contributor in another ecosystem: On the one hand, it acts as orchestrator in the ecosystem personal vacation by connecting travelers (guests) with real-estate providers (hosts). On the other hands, it acts as contributor in the ecosystem for professional travelling to fairs where e.g., the 'Hannover Messe' acts as orchestrator by connecting professional travelers with exhibitors and with Airbnb(which provides its real-estate listings close to the 'Messe').

Strategic Implications I:

General Implications for Financial Institutions

By setting the stage and presenting the most probable scenario, we described the general foundation and the predominant aspects of life in 2030. Then, in addition to key themes, we captured the aspects with the greatest impact and relevance from a "financial institutions perspective". We described changes predominantly from the customer standpoint.

Digging deeper with an awareness of "what could and will happen in the next few years", the crystal ball, as must be expected, is bound to be cloudy; this makes the idea of prediction challenging. Of course, this imperfection – as postulated in the previous chapter – doesn't deter us from offering you a prognostication.[147]

HOLISTIC UNDERSTANDING OF THE CUSTOMER

It is not appropriate anymore to consider customers and their needs only from a "financial point of view". Financial services are the functional instrument to fulfill specific desires in different life situations – as mentioned in Context I: "Setting the Stage".

Costumer wishes are often strongly connected to safety concerns and the continuation of an acquired status of living and overall well-being.

Costumer needs are often based on emotions, which makes qualification difficult, especially when need fulfillment should be accomplished by machines. Whenever logic is involved, machines will do better. Whenever

147 The phrase "in the next years" is chosen on purpose. We trust the described impact (on customer, operations) will be existing in 2030 in greater extent but is already palpable as you read this paper.

emotions are involved, humans will have the edge. It would be ill-advised to compete against technology when trying to reach specific goals faster.

Financial institutes need to understand themselves and their customers. **This deeper understanding will suggest and facilitate appropriate solutions that answer customers' expectations.** Creating successful products and services will only be possible in cooperation between customer and supplier.

Rethinking Segmentation

Today's rigid customer segmentation is not suitable anymore; there might be as many segments as customers.

With digital opportunities at their fingertips, customers will receive mass customized services, at a low cost. Customer segmentation needs to be envisioned from the vantage point of the customer, and from that of the financial provider. Currently, customer segmentation is often based solely on income and not on further implicit expectations. **Segmentation will be more mass individualized.** Fluid segmentation will allow to segment customers based on – potentially temporary – needs and customer-chosen modules.

New technologies substantially reduce the prices of many financial products and services, which can now be sold across traditional customer segments.

In the past, financial institutions tended to refuse an automated incoming-call-distribution, as this was considered impersonal. Today's technological possibilities allow bots, chats, offering optimized self-services. These services will be common throughout all customer segments.

Since more data offer additional information, it is possible to attract and target a potential customer based on various categories and at an earlier stage. If needed and so desired, customers will then be serviced on a more individualized basis in a second stage.

Pricing still matters: Customers might choose the "all in one flat fee", or the "pay per requested service fee". **Customers could also pay with new values, or new "currencies"**, such as customer insights or personal data derived from the personal finance manager.

Rethinking Physical and Digital Touch Points

Banks as well as insurance companies constantly questioned and adapted their physical- and digital-store concept. In lockstep with the increased technical possibilities (such as online banking), the personal appearance of a customer at a branch continuously decreased. The physical visit to a store is often no longer a compelling necessity. The manual transfer of rent, insurance, and other expenses from one bank account to another no longer requires personal appearance anywhere. **Financial services are, first and foremost, not a physical trade or delivery service. Hence the physical contact on-site will probably decline further.**

Today, branches are being reduced and online offers increased. This trend leads to an increase in self-service rates through online services, and physical multipurpose service (formerly called vending) machines – for those who still need and want physical delivery. This trend is not driven by the customers, but by a desire and need for efficiency in order to reach specific customers segments. **The store concept will receive a much more fluid and infinite design.** There might be branches serving as anchor, but it is the customer who will define his/her desired place of advisory service, be that in a branch office, in a coffee shop, on a train, or at the customer's house.

Clients are in the driving seat. They choose their preferred touch point(s), digital or not, and can seamlessly switch between them, at any time.

The omnichannel approach and the natural and seamless channel switch remain important and will be adapted to customer needs. As of today, we believe that **the omnichannel concept for 2030, which offers physical contact points, as well as online and mobile worlds, will dominate the customer journey, by continuous, empathic and personalized customer service delivery – targeting the fulfillment of customer experience.**

Enabling the Customer

Companies offer their customers goods with an intrinsic value – even in cases where the invested resources in the provision of services could be evaluated financially.

The concept of "Service Dominant Logic" already describes that **customer and company are equal partners when it comes to the creation of value of a service.**[aa] This means that the customer also has to bring appropriate qualifications and information to the table. We assume that a higher value will be generated if the customer already has corresponding financial expertise to formulate his needs. **Financial literacy will therefore continue to be a major priority in the future.**[148]

MAINTAIN AND LEVERAGE POSITION AS TRUSTED PARTNER

Given that banking and insurance services – as we know in 2019 – are a commodity (like telecom services in earlier years), many **financial services become exchangeable**. After all, why not trust a 30-year-old tech company with a high track record and a lot of good experiences to provide banking services instead of the 200-year-old institution our great-grandparents used to trust?

An increasing flood of information, uncertainty, complexity, and speed of change lead to a stronger demand for trusted partners. People demand and rely upon trusted partners ever more frequently and in ever more areas of life. The increase in services and information and the fact that people can only process limited amounts of information leads to a continuously diminishing attention span, which in turn leads to delegating decisions to trusted partners.

Maintaining and expanding existing trust will continue to be one of the main challenges in the future. In addition to aspects such as reliability, added value and convenience, the ability to create social values and transparency is becoming an increasingly important factor when trying to generate trust. **A 360-degree view of the brand becomes more and more important**. Not only from a customer service point of view; instead, a more comprehensive overall view will be required. This means, for example, that employees must also be seen as customers.

148 Definition OECD: "A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing." (http://www.oecd.org/daf/fin/financial-education/49319977.pdf)

The desire for best price offers for the implementation of services with adequate quality has not waned.

In recent years, new companies have already positioned themselves by working directly in the various areas of the customer's life and by contributing directly to the fulfilment of respective needs. **Depending on their experience, they have already been able to build strong relationships between customers and suppliers.** A solid basis for trust has thus already been established.

This was also supported by, for example, ordering physical goods and delivering them to the customer to his full satisfaction, which offered the customer tangible proof of quality.

On this (trust) level, the company's own services – e.g., financial services – are now being expanded to offer a uniform service (one-stop shop) on the one hand, and to generate new sources of revenue on the other.

As a result, **from "good experiences", the consumer might learn to increasingly trust institutions** that, in 2019, did not yet appear in top positions of the "list of trust" in the corresponding studies. **As customer behavior adjusts and adapts to the automated decisions making process, trust will be built and enforced.**[149]

Strong increase in the demand for trusted partners. Trustworthiness will, most notably, be driven by the strength of the brand, quality of past personal experiences, perceived impartiality, and/or degree of service transparency.

The significance of user experiences is changing as well. In principle, trust is created by moderation/simplification – yet this can quickly become condescending. **Brands, however, remain the "#1 Trust Generator".** This means that the brand that builds the customer interface and ensures the successful fulfillment of customer needs with the end customer will gain and build trust.

149 See also the following example from '21 Lessons for the 21st Century – by Yuval Noah Harari': " Yet even in allegedly free societies, algorithms might gain authority because we will learn from experience to trust them on more and more issues, and will gradually lose our ability to make decisions for ourselves."

But what happens in a difficult economic environment? For example, are P2P lending providers still able to deal with major outages? However, they could also be the engine needed to boost economic capacity. **Trust forms when providing support in times of crisis.**

Ensuring complete service transparency is increasingly becoming a competitive factor. If the trend continues and financial services will not change significantly in the future, it will be even more important to provide complete transparency regarding service performance and pricing. This is associated with the disclosure of fees, including their composition/justification. This requires the ability of clear pricing of all elements that are part of a service. This increases the pressure to provide services that set themselves apart from the competition on the one hand and provide clear added value for the customer on the other hand – not even mentioning the need to provide services even more efficiently.

SIMPLE, INSTANT, ANYTIME, ANYWHERE, AND ANYHOW

New businesses need to be simple and self-explanatory. Digitalization simplifies on the customer's behalf. If the new business doesn't fit into this scheme, the battle for the customer is lost. **The customer's attention span offers only one chance.** If the product seems too complicated or the user experience doesn't work, the customer is lost before he ever was on board.

New businesses need fast, secure and automated services wherever possible. Instant gratification plays an ever increasing role as the customer is accustomed to having demands met instantly. Why should he wait until the next day? Requests should – wherever possible – be automated to quickly or instantly meet customer expectations. Furthermore, automated processes keep the cost down.

Convenience and simplicity stay central aspects. **Customers expect constant availability, interaction, simplicity and communication based on "one-click".**

In conclusion, we believe that in retail financial services, financial providers cannot differentiate themselves by their financial products. In addition, the retail segment will be much more price driven (caused by neo banks and challenger banks offering free retail banking products). Hence retail banking as we know it today will be unprofitable.

MASS CUSTOMIZED SERVICES AND PRODUCTS

Advisory services will be available to everyone in 2030. Based on needs and partially backed by automated and digitized services, **"self-advisory" (get informed and/or administrative services) will be widely accepted in 2030.** Therefore it will be possible to invest even a small amount of money. Hence the investment universe will increase thanks to "elements" of crowd solutions such as peer lending.

At the same time, we believe that customers will be treated (served/advised) on a much more individual level than they are today. To keep the costs (of individualization) as low as possible, automation will continue. **While services will be offered individually, they will consist of the smallest possible, highly standardized elements that can be bundled into a package.** An increasing degree of self-services with edutainment and gamification elements helps customers stay in touch with the company brand. We see gamification aspects are more common in everyday processes than in decision-making processes that already show a high degree of emotionality, such as the path to one's own home.

Customers will use mobile contact points more frequently. **The personal contact to a human individual will remain important, because such interaction generates and ensures trust.** This is particularly true since the technology will likely not yet be mature and sophisticated enough to offer the desired individualization or the emotional empathy.

The **complete unbundling** due to interoperability requires absolute clarity about where value is created/captured and requires a clear **focus**.

SEAMLESS EMBEDDING OF FINANCIAL SERVICES IN CUSTOMER JOURNEYS

Finance is a means to an end in specific contexts and **will be fully integrated in the respective customer journeys.**[150]

Customer Journey Today:

Customers care about all steps in the process. Financial services are mostly separate journeys that have their own interface to the customer.

150 See pages 88–89.

Customer Journey 2030:

Customer needs are increasingly being met by end-to-end services. Financial services as we know them today will be largely integrated into the services. Mostly they don't have an interface to the customer.

- Ever more financial services (payment and financing) will be invisible because people start trusting the selection mechanism of the third-party/algorithm which, over time, has learned from the individual's (personal) choices.
- **Loss of customer interface** – Services deliver end-to-end. The financial customer interface will be integrated and mostly, there will no longer be a separate interface for financial services. From the customer's perspective **one-stop-shop-aggregators** do the job.
- Financial services from different providers can be put together.
- Greater need for capabilities that enable seamless integration of third-party services.
- **Change of current business models –** Degree of openness/ partnering with third-parties may vary across business verticals and client segments.
- **Contractual binding will be lower** – If unhappy or presented with better offers, customers can quit quickly and easily.
- Decrease in loyalty to financial institutions as a result of the afore-mentioned topics.

Financial institutions must **therefore develop the capability to seamlessly embed their services** into customer journeys. They therefore have an interconnectivity/interoperability imperative.

Financial services are embedded wherever the customer is, on whatever digital UI the customer uses, and in whichever application the customer desires. Embedding increases the risk for financial institutions to loose the customer interface, but opening up (open banking) is necessary for their survival. Financial institutions must therefore develop this capability – interoperability imperative – and find solutions to not lose the customer interface.

Because of embedding, many financial services will lose visibility, and may even become completely integrated into the delivery service. The service automatically checks liquidity, and if liquidity is guaranteed, it will automatically initiate the payment process (depending on customer settings and instructions).[151]

Since we expect that some financial services will be invisible and seamless and might fade into the background ever more, and we assume that customers don't want to go to branches or deal with financial services, financial institutions need to step into customer's life areas in a near-banking, near-insurance or similar fields. Positive, unique, true and memorable customer experience is required. The company or financial institution **needs to reposition itself at the center of the customer's life for financial and other needs.**

Considering the **C2C-Economy** (Customer to Customer) as well: More and more people want to use things occasionally and as needed instead of possessing them permanently.

CLEAR ECOSYSTEM STRATEGIES AND PARTNERSHIPS

We expect that in the future, (financial services) **organizations will team up in ecosystems** to build digital customer experiences that leverage transactional and further data such as mobile, big data, analytics and more. For this, banks and insurers need to co-operate with partners, suppliers, small and medium size businesses, telecom firms and other digital companies and prosumers to deliver new products and services.[152]

The digital sphere amounts to a completely open and flexible platform.[153] This is what has been referred to as '**open banking**' or '**open finance**'.

151 For example, face recognition in combination with purchase action will adequately process payment. And to reduce customer pain-points, 'products home delivery', for example, will be offered automatically, after purchase is confirmed.

152 A prosumer is a portmanteau of 'producer' and 'consumer' and denotes a person who consumes and produces (a part of) a product or service.

153 See subsection, 'The empowered digital customer'.

OPERATIONAL EFFICIENCY

A significant degree of economies of scale, despite size, self-reliance and global challenges, are forcing financial service providers to increase efficiency. Automation and optimizing processes remain among the most promising ways to increase efficiency.

Incumbents face the burden of a **legacy system that can become a bottleneck in the digital world**. From a business perspective, cleaning up the engine room almost never generates a positive business case as it will neither produce additional income nor result in cost reductions that compare to the cost of modernizing. But old IT can result in serious cybersecurity vulnerabilities. When facing a new digital reality, where the fast eat the slow (rather than the big eating the small), this poses serious limitations on future business development. **The only way to handle legacy IT and clean up the spaghetti code is to tackle the issue head-on.**

With digitization, Swiss financial institutions increasingly need to compete with foreign companies. Big(tech) players can easily come to Switzerland – because they already have customer relationships and/or already benefit from economies of scale thanks to their large customer base.

We also expect further consolidation in Swiss financial providers' middle and back offices to remain competitive.

Financial institutions need to upgrade their legacy IT systems in order to compete on prices, exhibit sufficient agility and speed, and leverage the value lying in their data.

Strategic Implications II:

Four Pillars of Value Creation

This section discusses the strategic implications for each of the four pillars of value creation.[154] We will focus on the end customer rather than on B2B (Business to Business) relationships.

PROTECTING VALUE

Traditionally, financial institutions store and secure assets (such as currencies or securities) in containers – as accounts and deposits. Sometimes physical items are stored in safes.

Insurers protect the loss of value in the event of negative events and the secure storage and administration of financial assets (e.g., securities in deposits or money on accounts). This service, which is still provided today by established financial institutes and financial services, will change.

PROTECTION OF DIFFERENT VALUES

The increasing digitalization of tangible and intangible assets and the growing need to protect one's own identity and confidential data against data loss and malicious system manipulation are creating new perspectives. Cyber-attacks or new cases of liability in autonomous systems require

154 See pages 16–17.

new coverage concepts. **The protection of data (security and privacy) becomes increasingly valuable – but is expected.** It means, that people expect services and infrastructure to provide top-in-class (cyber-)security.

For economic and financial protection, trust in the government is and will be more important than trust in the financial institutions. This makes **Switzerland an ideal place to protect value in the future**. When protecting privacy, trust in the financial institutions is and will be more important. Therefore, it will be important, for financial institutions to build an undisputed reputation as a trusted partner.

People demand protection beyond traditional assets (securities, currencies), from data security and privacy, to reputation, to any digitally-represented rights to (digital and non-digital) assets.

Banks and insurance companies are predestined to protect data and offering trust. Financial institutions could help to keep what matters most safe: real estate, commercial venture's intellectual property, art collections, even health and security, as well as privacy.

WALLET AS UNIVERSAL SOLUTION TO "ACCESS" AND "CONTROL" OF YOUR DIGITALIZED VALUE

The preservation and increase of wealth remain a promising discipline in the future. Know-how and competences from clients and Fintech Companies are offering promising and fortuitous possibilities.

At the same time, the question arises whether the existing range of accounts and custody accounts meets future requirements. How are assets mapped and valued?

In 2030, much more so than today and in the wake of 2019, accounts for currencies and securities will be commodities and not differencing factors. We think the trend goes toward a flexible "container" to control digital assets (and also values).

This container – let's call it **"digital wallet" – will have the purpose of offering access to and control of different kinds of values.** Customers will be able to organize and customize their wallets based on their needs. For instance, it will be possible to instantly add or remove sub-containers with an individual label (such as "holidays") for its own saving target. The managing of the wallet must follow customer expectations and be convenient and intuitive. In selected areas – such as "living" – this can already be ensured by means of smart-home aspects.

The wallet is not an isolated solution but can be offered by a single provider. **It is capable to interact adequately with different customer needs in different ecosystems without compromising the (stored) values (let's call it "digital vault").**

Driven by regulation, or voluntary opening, systems connect "digital wallets", "data access", and "service possibility" offered within the same and different ecosystems. In doing so, the digital application will offer a wider range of services and a huge increase in convenience to customers.

Zero technical switching costs between digital vaults and/or "application interface-enabled" digital wallets will allow clients to switch seamlessly and benefit from the increased ecosystem versus service landscape.

INDIVIDUALIZED, PROACTIVE RISK-MANAGEMENT AND RECOVERY-SERVICES

Insurance coverage is increasingly individualized and seamless. This will be based on the increase in produced and analyzed data on the one hand, and on the increase in devices connected to the network on the other. **The result is an ever increasing number of data-based and personalized offerings, which depend on the respective context** (e.g., situation and time).

These insurance offerings will not be limited to damage insurance alone but will focus also or even predominantly on prevention and the relevance and significance of the topic in question. As a result, the insurance does not stand for a possible claim, but positively influences life. **Active loss prevention is increasingly coming to the fore.**

Even if many activities are made proactively, **professional recovery services will continue to be indispensable in the future.**

FACILITATING THE EXCHANGE OF VALUE

Networks will facilitate the exchange of tangible-/intangible-capital capital. Consumers taking part on the market will be able to exchange goods and services. Participants will act as the infrastructure ensuring wide distribution, availability, efficiency and acceptance on any value transferred.

PAYMENT AND FINANCING THE INVISIBLE BACKBONES

In general, capital transfer – today represented by monetary payment processes – is the natural inflow or outflow of assets from any "digital wallet". Those "digital wallets" will serve as repository reference and tool to process any transfer. Transfers will happen by the touch of a finger – instantly, or pseudo instantly – at least for the same asset class, or the common agreed-upon representations. **Today's conventional payment process will happen in ways that are less materialized.** Plastic debit-/credit-cards will be substituted by digital representations. Digital representations will allow consumers to integrate solutions into smartphones, wearables and to internet connected devices. Usability will be driven mostly by natural human capabilities: voice-recognition and -control. Authentication will be based on biological factors. **Value transfer of products and services will happen stealthily in the background.**

The customer can choose to make digital payments invisible. They happen in the background, automatically triggered by digital UIs (User Interface), connected devices, and apps.

In 2030, POS (Point of Sale) will have integrated payment processes into the product and into the service selection process, thereby making checkout obsolete. Amazon Go and Microsoft already launched a working store concept.[ab] Buying an apple in a store combined with face-, voice- or any other biometrical recognition, will automatically initiate the payment process upon leaving the store. **Technology will support the customers by offering convenience during the buying process.**

The financing business will remain important, whether to secure investment capital (e.g., for larger investments) or to secure liquidity (e.g., in the event of seasonal fluctuations in orders). In addition to property and rent, financial institutions need comprehensive answers regarding the financing of co- and temporary ownership or shared housing. **Credit ratings will be automated. In addition to income and wealth as we know it today, various aspects will be considered.** For example, other data "from outside" (e.g., behavior on public platforms) will be included in the evaluation criteria – provided that the data protection guidelines and ethical and moral principles have been considered. Based on previous data and wishes, the customer will be offered an automatic and nonetheless individualized offer. **Digitally represented assets will increasingly serve as collateral.** Individuals may be able to collateralize part of their property, split in small assets, to make them investable for anyone. Financing services will be embedded and automated in the customer journey by the market participants themselves.

Financial institutes will lose the face to the customer for services which generated high frequency (e.g., daily) interaction, as the exchange network will take over. Service of payment- and finance-operations will be expected but no longer be seen as differentiating factors.

AUTOMATED DECISION TRIGGERED BY REAL-WORLD EVENTS

Financing will be offered and combined, if needed, with the purchase process. Depending on the given and/or chosen settings, customers will have the option to withdraw from the financing contract within a respective statutory period.

Pay-per-use services will increase. Insurance benefits will be booked instantly and for the time needed. The execution of transactions will be supported by AI (Artificial Intelligence). AI will help to define what will be generally accepted. **Transactions will increasingly be linked to conditions that are themselves linked to events, thus executing automatically.** This interaction will be encouraged by the fact that devices are connected to the internet and then will allow activities that meet defined contractual conditions. Areas from the IoT (Internet of Things) – especially geolocation and sensor technology – will massively accelerate this development. In some areas – such as trade finance[ac] – this could be supported by decentralized solutions.

NEW TRADABLE ASSETS AND DIRECT ACCESS TO MARKETPLACE

In terms of trading business, the role of financial and intermediation institutions might remain the same. For a long time, financial institutions have acted as market makers rather than brokers and will continue to do so, connecting primary (e.g., issuing venues for financial products, ECM/DCM – Equity Capital Markets/Debt Capital Markets, book building) and secondary markets (e.g., trading venues for financial products, data brokers) and organizing the efficient exchange of assets.

On the one hand, however, new tradable asset classes will lead to higher activity. On the other hand, there will be more platforms that allow clients directly to the marketplace. The capability to take part in this network will clearly be a factor that determines success.

People demand seamless, direct, and instant digital tradability of rights to (digital and non-digital) assets. People want the option to digitally pay with any type of rights to assets — from rights to one's data, rights to a share of a mutual fund, to paying with a tweet.

Offering connectivity services will help financial institutions to build trust, as "facilitating the exchange of value" is where people interact most with their financial institutions. By offering value-added and intelligent services, financial institutions will be able to make profits, especially once these clients become wealthy (through their own work, or inheritance).

We expect platform operators to provide these services for zero profit in order to benefit from increased activity in their ecosystems (i.e., increased "value changes").

ADVISORY AND INTELLIGENCE

Advice and consideration from the perspective of banking services have so far also been customer-centric, albeit very rudimentary, especially in the retail segment. As mentioned in the previous chapter, customer segmentation needs to be reconsidered.

CHANGING DEMANDS ON CONTACT

As long as these consulting systems do not have the ability to handle complex situations, to interpret unspoken but emotionally visible situations, and to take the right measures (e.g., placing follow-up questions, show adequate human behavior reactions such as empathy), people will opt for human contact. However, interaction with humans will become more specialized.

Financial advisory must exhibit proficiency beyond generating financial return. Sustainability and social impact assessments increase in importance for those deploying capital.

The demands on the role of the human contact – whether to a call center or to a consultant in the same room – and the costs will increase and be passed on to the customer in the form of "pay per use" or "package costs with flat fee".

As a result, pricing will also be aligned, which will lead to even more personal support from the respective specialists. The specialist mentioned must himself be supported (presumably by a large number) by sophisticated systems that ensure optimal support and added value to justify the price.

In addition to the consultant's specialized skills (including holistic advice on all aspects of life), methodological skills (including an understanding of technology) and social skills (including meeting customers at eye level and being a moderator) will become increasingly important.

ADVISORY RECOMMENDATION AND SERVICE

Many consulting services will be performed automatically, which is made possible by mature AI-based technology. However, **due to comprehensive digital self-service and self-service options, physical contact will continue to decline.** Intelligent systems will quickly offer more and more consulting functionalities at an overall satisfying level.

Financial institutions' advisory services move beyond financial advisory. They provide life coaching and concierge services in order to ease people's lives, from advice on education, to choosing an employer, booking seats at a theatre, finding someone to mow the lawn, or best practices on privacy.

Beyond an orientation to the past and simply providing basic financial services advisory capabilities, a financial institution of the future will need to also provide purchase recommendations, health and dietary recommendations, travel and hospitality advice, and often also location and other circumstances.

This cannot be provided by a classical insurance or bank as per today's comprehension: **The importance of APIs (Application Interface) and a strong ecosystem collaboration will be key to the relationship. Being an advisor is being a life concierge.**

With extensive insight into the customer's life, the financial services firm of the future must provide reminders and **offer potential proposals to enrich or improve areas in the customer's life**. This may range from getting theater tickets to ordering milk for the empty fridge. It will include an early-morning delivery of "your upcoming day at a glance", most likely by voice, and the ability to answer questions in real time.

There will be a shift from consulting and asset management to “Personal Assistant”. The digitalization of material goods (e.g., pictures, cars, real estate) as well as immaterial goods (e.g., knowledge, rights or personal time) will lead to a more comprehensive asset management. **This will also lead to the fact that some assets can be traded as new classes and thus new ways for investments will develop.** Asset management remains important but becomes more comprehensive.

FROM ADVISOR TO COACH

To rethink the previous future concepts on finance and develop them further from a strategic perspective, we believe there will be a potential for financial institutes to offer even further and more holistic and integrated services. Starting with traditional financial services, there is room to develop the services of an integrated general “living counselor” for retail customers and for offering nontraditional financial services. We even think that **traditional financial advisory will become less important and will develop into overarching living counselling instead.** A financial institution can leverage its sales force and enter new business fields beyond financial services to ease customers’ lives. There are various business opportunities in fields close to financial services where financial service institutes can gain market access, as other industries diffuse into financial services. With this, chances increase that financial institutions can differentiate themselves from competitors as differentiating through basic services is no longer possible in 2030.

Financial institutions in 2030 will help customers achieve goals and dreams, from buying real estate to growing business to exploring the world in retirement or providing for grand-children to making a lasting social impact.

ACCESSING EXCLUSIVE VALUE

As already mentioned, we assume that marketplaces will be open more frequently. The demand for a pre-selection of services and selected or exclusive content will remain. The same applies to the management of (exclusive) communities.

REDUCED DIFFICULTY TO ACCESS ASSET CLASSES

In addition to tangible assets, intangible assets are becoming increasingly important. Particularly in the (today know as) Ultra-High-Net Worth area, there is the possibility of an **extended asset consideration** (e.g., focus on IP Rights Management) to create a more comprehensive consultation.

BUILDING COMMUNITIES

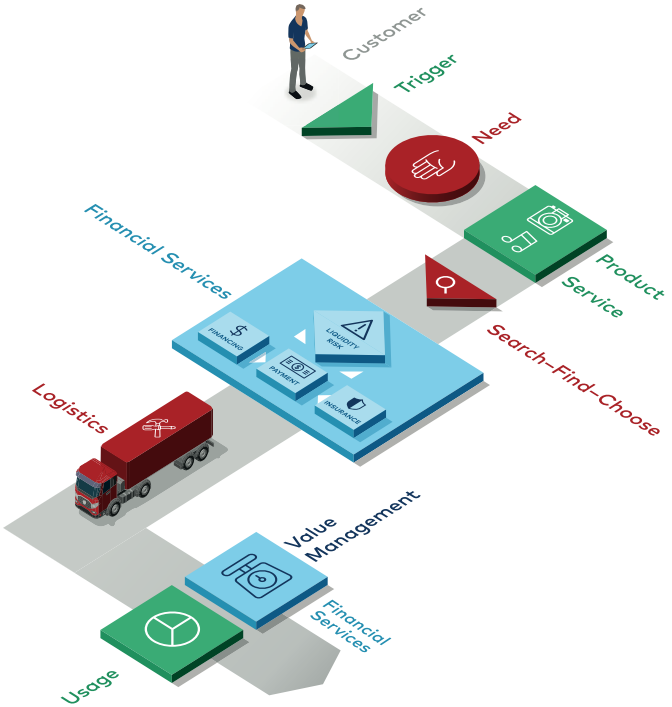
The management and promotion of social communities and the increasing enabling of **individual, emotional** (e.g., driven by sustainability and social impacts) and **personal investments** are expected as services in addition to material investments in the future. This, as well as the further development of existing platforms as ecosystems with different partners and AI-related capabilities, will lead to assets not only being managed, but to services equivalent to those of a personal assistant.

REDUCED LEVERAGING OF BROKER POSITION DUE TO DISINTERMEDIATION

Digital platforms increasingly require ecosystems with various partners. The successful provision of an end-to-end service will depend on several partners. The same applies to the associated creation and maintenance of trust.

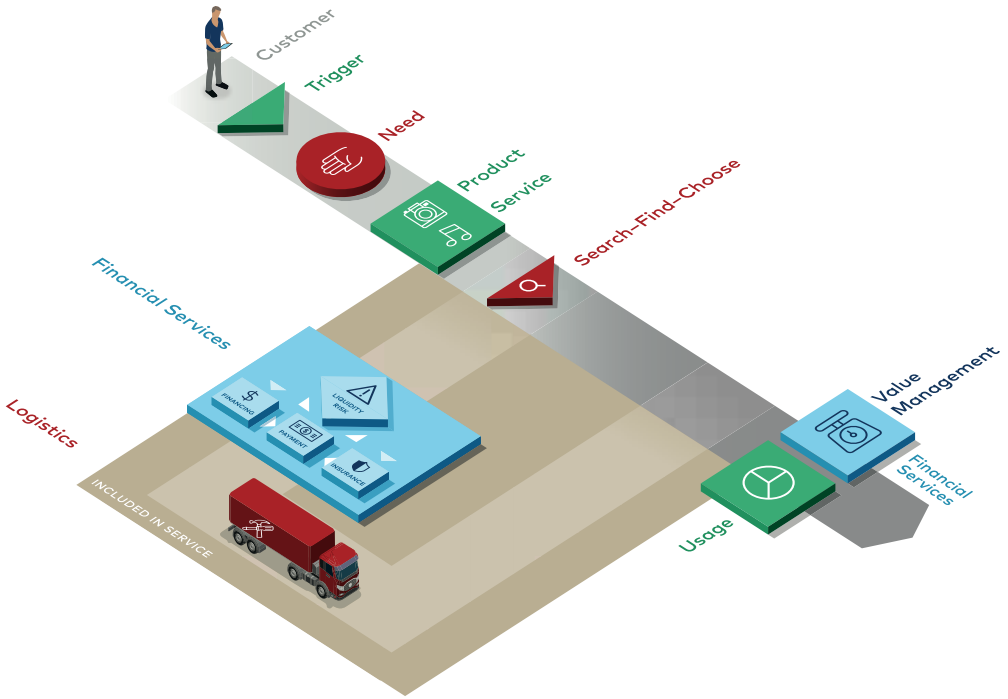
Due to increasing disintermediation, exclusivity is no longer ensured by securing a trusted third-party position or as a broker. **The provision of services with exclusive values will also require partnerships.**

CUSTOMER JOURNEY TODAY



Customers care about all steps in the process. Financial services are mostly separate journeys that have their own interface to the customer.

CUSTOMER JOURNEY IN THE FUTURE



Customer needs are increasingly being met by end-to-end services. Financial services as we know them today will be largely integrated into the services. Mostly they don't have an interface to the customer.

VERY HIGH PROTECTIONISM

Likelihood of occurrence: medium-probability scenario
Early-detection signals: citizens' movements; right wing parties voter win; increase in protectionist measures; aggravated trade and trade barriers

New protectionism and nationalism threatens globalization. The economy and free trade are at risk when trade in goods and services is restricted at borders because of isolationist policies. Economic development is declining. Since the disadvantages of protectionism is manifold, financial services have to become involved by keeping the global economy open.

SETTING THE STAGE

New protectionism, and nationalism threatens globalization. The free movement of goods or persons belong to the past of the 2010s. High hurdles (i.e., taxes on foreign goods) or almost unattainable or absurd requirements for work permits for foreigners prevent economic cross-border service offerings. International exchange, export, import, and collaboration decrease as domestic priority has been defined as the new credo. This in turn leads to more isolationist policies and protective economies.

Initiated on a national level, protests against free trade are forming worldwide. More and more citizens do not see themselves sufficiently involved, feel left out or left behind and fear cultural alienation as well as a further outsourcing of jobs abroad. To prevent extreme domestic tensions and to win voters, governments establish protectionist policies favoring domestic economy. At the same time, right-wing populist parties experience popularity in many countries.

We also see the climate crisis as a potential favorable factor for protectionism.[155] As a consequence of the climate crisis, (actual or perceived anxiety of) scarcity of resources including complete uninhabitability of certain strips of land will lead to more frequent and greater waves of migration. This in turn leads to more calls for protectionism. All this culminates in countries protecting their citizens, offering security by closing borders.[156]

In addition to the competition from other countries, national protesters also fear new technologies. As a result, in the wake of protectionism, technological development is being curbed digitization sees little to no progress. Governments introduce new and rather high taxes on labor-saving or labor-replacing products as well as services including process efficiency savings, automation initiatives and new technology.[157]

155 We will not go into details. Part of the climate crisis consists of various effects and co- or interdependent factors such as oil scarcity, shrinking biodiversity, scarcity of drinking water, raw material innovations, climate change, forest destruction, soil erosion and desertification, increasing environmental pollution, for example.

156 See https://www.tagesanzeiger.ch/wissen/natur/zu-heiss-fuer-menschen/story/11762616 with the reporting of increasing heatwaves between 2010 and 2018 in India. These heat waves were leading to more and more near inhumane heat not only for certain regions of India, but for the entire country and for a longer period of time. Meteorologists assume that the situation will continue to deteriorate. By the way, the underlying scenarios backed by MIT are above the goal of the Paris Climate Convention to keep the global temperature rise below 2 degrees until 2100.

157 In February 2018, the National Council (as well as the Federal Council) considers it inappropriate to examine the taxation of robots and AI Artificial Intelligence. (https://www.parlament.ch/de/services/news/Seiten/2018/20180228132915182194158159041_bsd122.aspx). It may sound absurd to tax innovation (think of a robot tax) from a liberal standpoint. There are two sides to it. Governments lack tax revenues they need for retraining programs for workers that are displaced by the machines and to feed up social security system (for more information please visit https://www.nytimes.com/2019/02/23/sunday-review/tax-artificial-intelligence.html and others).

As a result, there is no economic incentive for companies to invest in further digitization initiatives as manual labor is cheaper, tax free and keeps the people quiet – with "bread and circuses" measures.[158]

The demands on protectionism that start on a national level eventually grow and culminate in border closings. Governments revoke long lasting bilateral and multilateral trade arrangements leading to tit for tat and a domino effect.[159] The International Monetary Fund (IMF) sees increasing protectionism as a risk for the future growth of world trade and world GDP.

STRATEGIC IMPLICATIONS

The political and economic consequences of this development could be devastating: Declining exports, lower global economic growth, setbacks in the fight against global poverty, and increasing international tensions. However, the obvious disadvantages of protectionism could make it a temporary phenomenon equal to previous economic downturns. In the long run, no progress can be made in resource scarcity and protectionist isolation. Society stagnates, which will lead to people revolting again. After all, they already know what the world could be like. From our standpoint, the strategic implications can be summed up in the following points:

Financial institutions have to become involved in keeping the global economy open and help understand the implications of protectionism on the global market. Political systems as well as political rights and duties must be actively used or influenced at the state level. Companies must therefore present their views in coordinated fashion across and within sectors at a high or even the highest political level.

A healthy global economy that allows societies and companies to thrive and innovate must take a clear stand against protectionism, which in itself hinders, if not kills, global cooperation, growth and innovation.

Bringing back trust can therefore not only help the financial industry but also ensure people to trust (in politics and economy) and vote for more progressive and open governments that help the global economy to flourish.

158 The Ancient Roman government began the 'bread and circuses' program to prevent civil unrest within the large empire. The program sought to feed the poor and keep them entertained.

159 E.g., Donald Trump's "America first" in his inauguration speech and basic credo (https://www.bbc.com/news/av/world-us-canada-38698654/donald-trump-america-first-america-first), declining cohesion of EU, Brexit in 2019 or Unites States, India, Russia, Argentina each raising concrete protectionist measures starting annually since 2016.

THE RISE OF DECENTRALIZED SYSTEMS

Likelihood of occurrence: medium-probability scenario
Early-detection signals: loss of trust in governments; rising discontent with existing institutions; rising trust in code; substantial advances in permission-less Distributed Ledger Technologies (DLTs)

Unfulfilled desires for individuality, loss of trust in governments and technological advances drive the trend towards decentralized systems. Permissionless distributed ledgers replace custodians. Financial institutions focus on advisory services.

SETTING THE STAGE

Many of our common interactions in politics, business, and society are based on the idea that the centralization of power, resources and knowledge can be highly beneficial.[ad, ae, af, ag] Most countries have a form of centralized government (e.g., via a representative democracy) and exhibit a central bank dictating monetary policy.

However, a trend towards decentralized systems is apparent and will continue in the future. The underlying drivers of such a development are manifold. In our view, the following three dimensions are the main drivers:

- Unfulfilled desires for individuality. Individual expression is an innate human desire and need, even though its manifestation and degree are influenced by societal and cultural factors.[ah] Centralized systems, however, rely on some form of uniformity and have been unable to completely nurture and accommodate people's desire for individuality.
- Loss of trust in governments. Across much of the western world, public confidence in governments has plummeted. Governments cannot be trusted to uphold laws and enforce contractual obligations.
- Technological advances. The rise of the internet and the advent of permission-less distributed ledger technologies have increased the feasibility of decentralized systems.

Trust in technology has replaced trust in governments. Code and self-executing contracts ("smart contracts") running on permission-less distributed ledgers have become dominant.

STRATEGIC IMPLICATIONS

Digital assets are directly registered on these permissionless distributed ledgers. The ledgers become the custodians. Financial institutions may act as custodians by managing/securing people's private keys – but they will need a very strong reputation, as people don't trust the legal system to punish financial institutions. Because of this reputational entry barrier, financial institutions with a strong brand may continue to capture profits by helping people protect their value.

The roles of brokers and counterparties facilitating the exchange of value continue to be relevant, but are unlikely to be profitable.[160]

Advisory services will continue to be relevant and profitable. A strong brand (trustworthiness, reputation for quality) and unique insights/expertise continue to be differentiating tools in this world.

Financial institutions must commit budget and resources to internal ventures for experimenting with permission-less distributed ledgers. They must devise a list of potential acquisition targets and exhibit the necessary integration and M&A (Mergers and Acquisitions) capabilities to quickly move based on early detection signals.

In this context, it is worth remembering that less than twenty years ago, universities were considered the holy grail of knowledge.

160 See the most-probable scenario for the explanation of the loss of profitability.

DIGITAL DENIAL

Likelihood of occurrence: low-probability scenario
Early-detection signals: increasing state influence of global internet companies accompanied by a very high number of daily used connected devices

Digitalization made the world the safest place it has ever been. But it also made the world the most surveilled and controlled it has ever been. More and more people are escaping it. A new analogue world is emerging.

SETTING THE STAGE

After the internet found its way into the mass market in the 1990s, many people believed that global networking would eventually lead to a more democratic world, but they completely ignored the fact that it was only through global networking that the internet produced the largest and most influential corporations in history to date and thus made the world not more democratic, but rather more global.[161]

The growth of the number of internet users in much of the developed world will have experienced saturation in the 2020s but will not have come to a standstill immediately. Internet companies are therefore already investing in global connectivity solutions,[ai] which would enable them to provide internet access even to remote regions of the world, and by 2030 will ensure the establishment of a truly consistent and worldwide internet service. Today, internet companies with a social commitment and the mission to bring internet access to remote regions of the world are engaged in these efforts. Ultimately, however, these internet companies are profit-oriented and therefore global networking is less about a social conscience than it is about winning the race for the world's largest user base.

Through global networking, digitization encompasses all population groups and social classes worldwide, shaping not only their personal lives, but also their daily professional lives. That is, if their professions still exit. With the omnipresence of countless intelligently controlled devices, smartphones will rapidly lose their importance. People will live a life full of constant assistance and will be protected, monitored and externally controlled by algorithms. While these are advantages, these developments go hand in hand with a substantial increase in power and influence of global internet companies and their home countries, which collect and re-use data on people and their behavior to control and optimize daily processes.

This thoroughly optimized world will be the safest ever, because there are few accidents and little criminal activity, but people who elude this control become marginalized and are viewed as political enemies, wanted by the police and forced to live underground. However, this development means that the already influential Internet companies will become even more influential with the further global expansion and that monitoring possibilities will be further expanded. This in turn leads to people resisting and distancing themselves from the global digital world, hence turning (back) to a local and less digital world.

161 E.g., Amazon.com, Google/Alphabet, Facebook, Alibaba, and Tencent Holdings.

Looking back, development, as so often, has not been singular to one disruptive event, but was a change of multiple events and situations. This led to disruption we see today and will perceive in 2030.

The race for the total interconnectedness of the world went hand in hand with the worldwide influence of countries and their monitoring possibilities. Disputes such as those between the USA and China over Huawei in 2019 have increase in number, escalating at the end of 2020, when these disputes led to the isolation of individual networks, thus endangering the stability of the global internet.[aj] The resulting enormous economic damages were to blame for countless deaths. To make matters worse, this endangered the ability of some countries to survive. People's trust in the global internet dropped dramatically and mistrust in digitization spiked sharply as people became aware of the influence and dependency on the internet. this initiated a hard-political turnaround. Overall, society began to shake off digitization and started over.

There seemed to be no alternative to digitization. Unanimous opinion held that it was a global event that could not simply be reversed. Nevertheless, the development had overtaxed many people, leading some to choose the path of complete withdrawal from the influence of digitization. Rich and well-educated people allowed themselves time outs on a regular basis, consciously releasing themselves from "being connected", either for a few hours or for a weekend to spend their time in nature. Others disconnected completely. Initially, these so-called offliners could be defined as older people and a niche of conscientious objectors, although the older generation soon no longer existed as an independent offliner group as with the years they naturally disappeared. However, as Internet companies became more and more powerful, which, among other things, enabled them to save/buy smaller countries in economic difficulties, people started to realize this was not a development which they could agree with. At this time, a new niche of the offliners, which extended across all ages and social classes, began to grow rapidly. Resistance against the constant control and influence on daily life became a mass movement, arguing that digitalization has an increasingly negative influence on the lives of many and severely restricts their actions and freedom of movement through totalitarian control.[ak]

Additionally, over the years various countries digitized their law enforcement with Lethal Autonomous Weapons and created almost invisible weapons for their special forces, which they increasingly used for political goals and to eliminate their opponents. Beside the new offliner movement, this behavior nourished general mistrust and spurned underground movements around the world that aim to uncover these incidents and to stop an, in their minds, misguided development. This triggered a "cyber war" that shattered the confidence of the masses in the global internet while at the same time endangering the stability of the network and the

security of people. In a targeted attack, the world's largest database of user data could be published, and at the same time, another movement could succeed in deleting the more basic data of property in most of the world.

STRATEGIC IMPLICATIONS

From today's perspective, the probability of this extreme alternative scenario is rather low, but it cannot be ruled out, because it is equally unlikely that no unexpected major events will occur over a longer period.

What remains is the effort to maintain basic infrastructure functions by redundant systems or even isolated solutions. Thus, critical infrastructure can be protected, and resilience of critical systems can be increased. However, these efforts show a very high discrepancy between costs, acceptance and feasible measures.

Additionally, in such a scenario, the probability of a bank run is high, raising the demand for money in cash but due to the development of a cashless society, the availability of cash in 2030 would likely be reduced.

Furthermore, the probability of a sharp shift in advisory topics is high, as securing (by insurances or similar instruments) existing wealth will have a much higher priority.

WINNER TAKES ALL

Likelihood of occurrence: mid-probability scenario
Early-detection signals: increased dominance of a few BigTech companies, companies have never been able to rise and fall in such short periods of time, on a global scale

BigTech are integrated into all facets of our modern life. Financial companies that stuck with their established ways of operation have disappeared. Only collaboration and openness ensured success.

SETTING THE STAGE

The digital world introduced, through technology, new capabilities, removed entry barriers, and elevated customer expectations. Big data, AI (Artificial Intelligence) and DLT (Distributed Ledger Technology) save and aggregate data, to optimally fulfill customer expectations. BigTech companies are embedded in every facet of our modern lives and define changes, owning the interface to the customers. Virtual steward services communicate with consumers and define the interaction with the real world. Lifestyle banking with its offering of predictive, personalized products and services, is key during the process of modern banking experience.

Trust has the greatest importance in the interconnected global economy. Banks still garner financial trust.

The global economy is and will be ruled and regulated by internationally organized interest organizations. A limited number of companies will shape the future of worldwide economic organization and shape the future of worldwide economic transformation.

Technology focuses on availability, integrity and confidentiality. Fast/real-time, simple, reliable, consistent are factors of success that need to be considered when building products or services. Interoperability and privacy are the growing expectations of society and on the committed roadmap of all BigTechs. Privacy is an asset individuals expect tacitly – today and in the future. High security standards are therefore the obvious benchmark for all involved parties. Technological innovation is the financial servicing battleground of the economic future. FinTechs will grow and prosper primarily in the nontraditional financial field and penetrate traditional financial environments. BigTechs will not only dominate their core business but can also manage their own financial boundaries.

FinTechs set impulses and act as a catalysts for technological innovation. They will contribute to the aggregation of data and help to intermediate financial flow. FinTechs will heavily depend on alliances with BigTechs to transform their products and services into evolutionary financial products.

Data oligopolies, as well as single account currency eco-systems, will be one result of this evolution, connecting the infinite amount of diverse currency and asset possibilities. A geographical shift to heavily populated regions, in combination with domestic production, will drive the dynamics of worldwide economic growth. Old and new entrants, as well as new regulators will be dominant forces in the financial system – primarily influenced by the size and control span of their business. Only a few FinTechs survive this global transformation.

STRATEGIC IMPLICATIONS

Existing financial companies need to ally with growing FinTechs versus BigTechs to ensure their survival and global presence. BigTechs will be forced to offer diverse services to their customers. Today's BigTecs are some of the companies that are best positioned to lead the evolution in the technology and financial sector by continuously reinventing themselves and staying agile in their transformation. BigTechs deliver highly efficient services on a global scale. Today, traditional financial companies and banks have probably surpassed the limits of their economic survival and must also reinvent themselves.

BigTechs will disappear as fast as they appeared. They will dissolve due to contradictory and often random disruptive forces that allowed them to grow in the first place. Interest organizations as of regulations and territorial controlled ecosystems will break them down into smaller units to ensure own sovereignty. As a result, those control authorities will create new fertile ground where BigTech will re-emerge.

BigTechs should see financial institutions as friends and vice versa. In alliance, they both will prosper and survive. Collaboration among companies will ensure success in the not-so-distant future.

DIGITAL RESET

Likelihood of occurrence: low-probability scenario
Early-detection signals: exponential rise of big system failures and cyber-attacks with strong consequences, increasing number of incorrect data and resulting incorrect transactions

The highly interconnected digital ecosystem collapsed after a cyber-attack and had to be rebooted. Innovations take place in a controlled manner, while rebuilding is focused on privacy, security and stability.

SETTING THE STAGE

Privacy has always been an integral part of human nature. But we had given it up in exchange for the benefits of a digital life. A complete network required complete transparency. Advanced technology made it possible to get easy access to information on anything. Data was treated as a new currency. Those who had data had power and dominated the market. The cloud had become an extension of everyone, all information was seamlessly integrated into the world around us. But at the same time, this network increased the danger of cyberterrorism and manipulation, as the massive data volume could no longer be adequately protected.[al]

At the same time, the danger of overloading the system increased and led to errors and thus to serious consequences for the entire ecosystem. The danger of one of the biggest hacker attacks in history affected 90% of all people and organizations in the world. The entire digital ecosystem went to nearly zero.

Data were incorrect. Systems could no longer work properly. Digitalization, which had previously brought efficiency, security and convenience, became a symbol of inertia and uncertainty. Maintenance and troubleshooting costs exploded. The trust in existing systems was lost. But the awareness of the value of privacy and the possibility to make decisions autonomously was still important for humans.

A digital reset – initiated and supported by citizens and governments – took place.[am]

Governments had to create new laws and legal frameworks to avoid a renewed collapse. The reset was based on the state of research before the reset. But there were more rules and specifications concerning data architecture, communication principles, quality criteria, and quality implementation measures took place.

STRATEGIC IMPLICATIONS

Financial companies see themselves confronted with further regulations. Data protection and data security follow strict guidelines. Innovations – at least in the initial phase – only take place in a controlled manner. The focus is on security and stability as well as on zero-risk policies.

Financial services become a commodity. The business operations of financial institutions correspond to the state of the late 1990s. Differentiation takes place on a personal level as well as on the basis of what the “brand has left”.

IV.
APPENDIX

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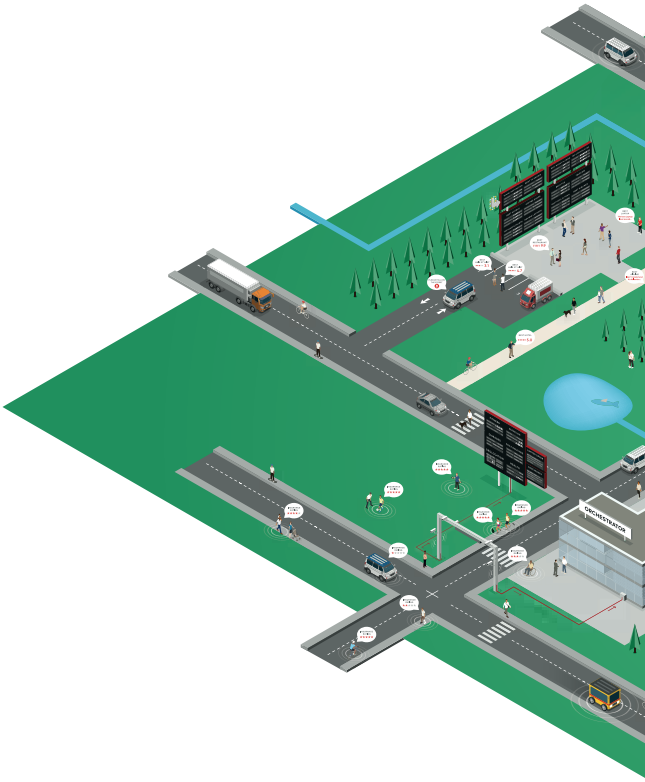

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