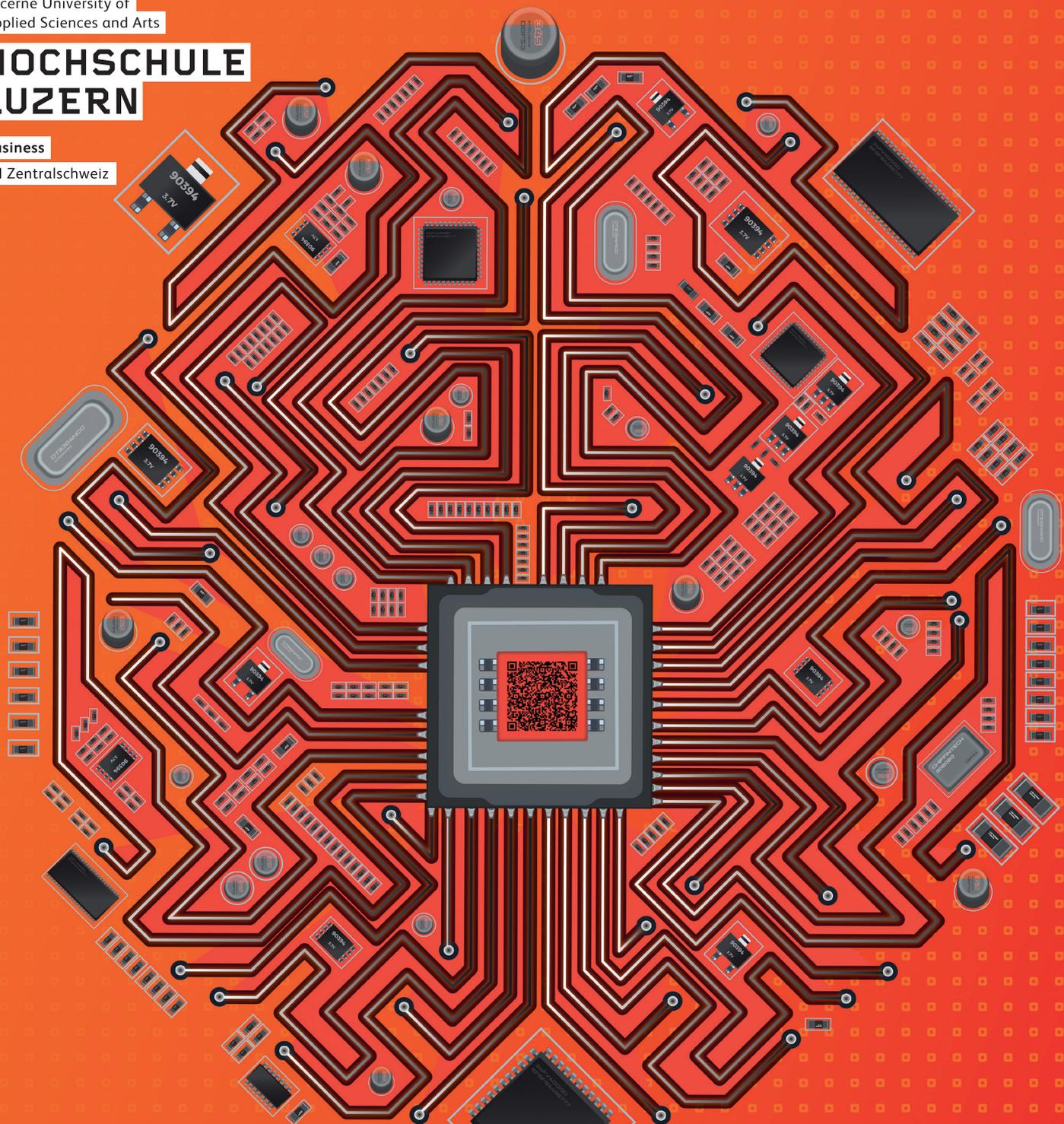


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IFZ FinTech Study 2020

An Overview of Swiss FinTech

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Institute of Financial Services Zug IFZ

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IFZ FinTech Study 2020

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1. Preface

Switzerland continues to offer excellent conditions for FinTech companies, with the FinTech sector witnessing its fourth consecutive year of growth in 2019 as a result. As of the end of 2019, Switzerland was home to a total of 382 FinTech companies. Almost two-thirds of these companies are located in the cantons of Zug and Zurich, the two locations internationally recognised as centres for crypto and traditional finance, respectively. But not only is the Swiss FinTech sector growing continuously, it is also becoming increasingly mature, a development which is underlined by the growing average number of employees and total funding of Swiss FinTech companies. Furthermore, Swiss FinTech companies appear to be increasingly positioning themselves as technology providers for their customers, which is reflected in the growing relevance of IT-driven revenue models, in particular the Software-as-a-Service model, in the sector. Despite the developments of growth and maturity in the industry, the sector is not exempt of challenges, with customer acquisition still being perceived as the most pressing issue. One reason for this is that Swiss banks are rather reluctant to adapt to new technologies: Run-the-bank activities are considered more relevant than change-the-bank activities, which include the implementation of FinTech solutions. However, the emergence of the first challenger banks in Switzerland and the increasing offer of financial services by competing BigTech and FinTech companies could reinforce the innovation pressure on traditional financial institutions in the future.

The present study constitutes the fifth edition of the IFZ FinTech Study and aims to analyse the FinTech environment while capturing the developments in the global market in the year 2019 and highlighting those particularly relevant to the Swiss market. Having partially adopted the FinTech Grid as a new methodological approach in last year's study, the present study is fully based on this new approach.

The first part of the study, which is covered by chapters 2 to 6, includes the main analysis framework which is sought to be updated on an annual basis. Following the description of the main concepts, descriptions, and methodologies in Chapter 2, the third chapter examines the FinTech environment based on the PEST approach and highlights particularly relevant topics in the political/legal, economic, social, and technological dimension, respectively. Chapter 4 provides the results of the annual update of the FinTech hub analysis, which seeks to assess the quality of different cities around the world as FinTech hubs as well as identify the characteristics of a hub which most encourage FinTech activity. Providing an overview of FinTech companies which were active in 2019 are Chapter 5 and Chapter 6, with the former presenting FinTech companies across the globe and including a first attempt to derive industry benchmarks to value companies in the sector, while the latter focuses on Swiss FinTech companies.

The second part of the study includes a series of deep dives into related topics. Chapter 7 presents the results of the fourth edition of the CIO Barometer survey, which aims to capture developments and trends in Swiss banks' IT departments. The eighth chapter introduces a recently established asset taxonomy, covering not only crypto assets, but also traditional assets. The results of a survey conducted among retail banking customers, in order to identify their needs and demands in terms of digital customer channels, are presented in Chapter 9. The entire study ends with the conclusion and outlook in Chapter 10 and the factsheets of the 152 FinTech companies which participated in this year's study in Chapter 11.

At this point, we would like to thank everyone who contributed to the fifth edition of the IFZ FinTech Study, with a very special thanks going to our sponsors *Finnova*, *Inventx*, *Swiss Bankers Prepaid Services*, and *Swisscom* for their financial and content-related support. A further thanks goes to the participating FinTech companies and bank CIOs for their highly appreciated efforts. Last but not least, a special thanks goes to all the authors for their important contributions to the present study.



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2. Definition & Framework of the FinTech Ecosystem

By Thomas Ankenbrand, Denis Bieri & Nicola Illi, Institute of Financial Services Zug IFZ

This chapter provides the definitions and describes the frameworks and concepts relevant to the present study.¹ In a first step, the term and scope of FinTech is defined with the help of our classification system, the “FinTech Grid” (see Subchapter 2.1). This concept was introduced in last year’s study with the new feature of being able to distinguish between the product areas of FinTech business models on the one hand, and their underlying technology on the other. In a second step, this chapter offers a short introduction into the PEST analysis framework applied to examine the FinTech ecosystem (see Subchapter 2.2). How the different FinTech business models in Switzerland are evaluated is explained in a third step (see Subchapter 2.3), followed by the description of the methodology applied in order to capture current challenges posed to the FinTech companies in the final subchapter (see Subchapter 2.4).

2.1. Definition of FinTech

Throughout the previous editions of the IFZ FinTech Study, the definition of the term “FinTech” remained the same for reasons of consistency.² This year, however, the definition is adapted slightly by removing the requirement of FinTech being a *software* solution. The aim of this change is to be able to include, for example, certain quantum computing companies or providers of hardware wallets for cryptographic assets in our database. With the implementation of this slight change the definition of FinTech for the present study reads as follows:

FinTech is defined as solutions for innovative products, services, and processes in the financial industry, improving, completing, and/or disrupting existing offerings. Hence, FinTech companies are firms whose main activities, core competencies, and/or strategic focus lie in developing those solutions.

Many different definitions of the term FinTech exist, with each highlighting a collection of specific aspects

of the term. In the present case, several important defining elements can be identified. First, in order to be classed as FinTech according to the above definition, the solution must incorporate a certain degree of innovation. With this requirement, the above definition seeks to distinguish between FinTech solutions and other solutions in the financial industry and to thus identify solutions that have the potential to improve, complete and/or disrupt existing solutions. As an example, some comparison and information platforms are not considered FinTech according to our definition if they lack a certain degree of innovation. Second, the above definition of FinTech covers solutions aimed at the financial industry and thus excludes InsurTech and PropTech solutions. Crowdfunding platforms for real estate and RegTechs that consider the financial industry the main focus of their business model, however, are considered in-scope. As a third defining element of our definition of FinTech, the age of a company is not of importance, as incumbent companies as well as start-ups are considered. In order to be included in the analysis of the Swiss FinTech market in Chapter 6, each FinTech company must have a legal domicile in Switzerland. Due to the time frame of the present analysis, however, companies legally incorporated after December 31, 2019, are not included.

Though the main FinTech classification framework in the past three editions of the IFZ FinTech Study focused on a six-part classification model, last year’s edition also introduced the new concept of a “FinTech Grid” (see Figure 2.1). While the initial framework categorised FinTech companies into the areas of *Payment*, *Analytics*, *Banking Infrastructure*, *Distributed Ledger Technology*, *Deposit & Lending*, and *Investment Management*, the FinTech Grid takes a more structured approach across two different classification dimensions. The new approach seeks to counteract the issue of the fusion of product and technology FinTech categories by separating them clearly. The first dimension of the FinTech Grid classifies the FinTech companies according to their main product which is classed as either a (i) *Payment*, (ii) *Deposit & Lending*, (iii) *Investment Management* or (iv) *Banking Infrastructure* solution. Meanwhile, the second dimension

¹ This chapter is based on Chapter 2 from the IFZ FinTech Study 2018 (Ankenbrand, Bieri, & Dietrich, 2018) and IFZ FinTech Study 2019 (Ankenbrand, Bieri, & Dietrich, 2019).

² The two previous editions of the study are available online (see IFZ FinTech Study 2018 and IFZ FinTech Study 2019).

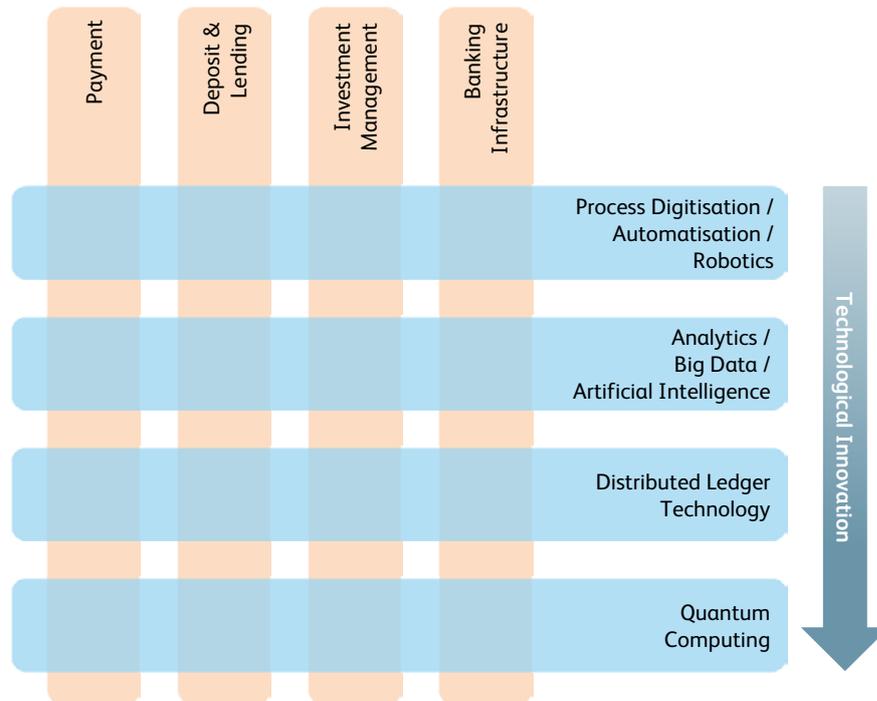


Figure 2.1: FinTech Grid

of the FinTech Grid refers to the underlying technology of the solution and comprises the following four groups: (i) *Process Digitisation / Automatisations / Robotics*, (ii) *Analytics / Big Data / Artificial Intelligence*, (iii) *Distributed Ledger Technology*, and (iv) *Quantum Computing*. The order from the first to the last mentioned technological category follows the degree of innovation associated with each category.

2.2. PEST Approach

The PEST analysis offers an appropriate framework to examine the FinTech ecosystem and is thus applied again in this year's study, as it was in the previous editions of the IFZ FinTech Study. PEST is an acronym for the four underlying dimensions that the analysis seeks to examine, which are the political, economic, social,

and technological environment. The political dimension is defined as all the political as well as legal factors deemed relevant to the industry. In the concrete case of the present study of the FinTech environment, factors such as the regulatory framework affecting FinTech companies or current initiatives can be mentioned as examples. The economic dimension can be understood as all the factors of an economy which have the potential to impact FinTech companies. In this year's economic analysis, factors such as the availability of funding or support measures (i.e., incubators, accelerators etc.) are described. The definition of the social dimension covers the social aspects of an ecosystem such as the diversity within and attitudes towards the FinTech industry, two aspects which are examined in the present analysis. The final dimension of the PEST analysis seeks to cover all technological

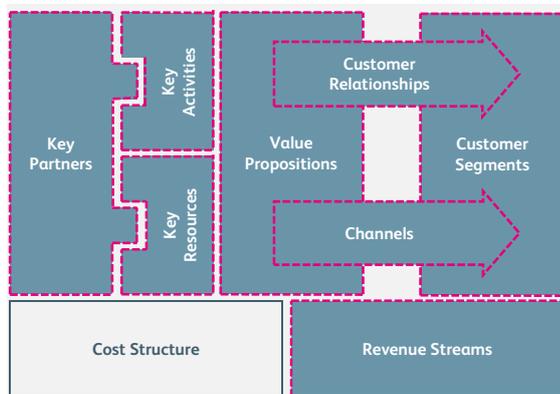


Figure 2.2: Business Model Canvas based on Osterwalder and Pigneur (2010)

aspects affecting the industry, of which factors such as recent technological innovations and developments are described in this study.

The PEST analysis is applied as the underlying methodological framework both for the analysis of the FinTech environment (see Chapter 3) and the quantitative analysis of global FinTech hubs (see Chapter 4).

2.3. Business Model Canvas

In line with the previous editions of the IFZ FinTech Study, this year's study also bases the evaluation of different FinTech business models on the Business Model Canvas from Osterwalder and Pigneur (2010). This framework offers the advantage of a structured approach in assessing a company's business model with the evaluation of the nine different building blocks illustrated in Figure 2.2. In the present case, the Business Model Canvas acts as an underlying framework in the construction of the company factsheets, which are presented in Chapter 11. With the exception of the building block "Cost Structure", which is excluded from the company factsheet for reasons of confidentiality, all of the eight remaining building blocks are incorporated in the factsheet illustrated in Figure 2.3 (see the cells highlighted in pink in

Company Website							
Year of foundation		Valuation					
Headquarters		Total funding		«Key Resources»			
Product category Tech category ³		Employees ... of which in CH		«Key Resources»			
Company description «Value Proposition»							
Board members							
Management team							
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

Figure 2.3: IFZ FinTech company factsheet

³ As described in Subchapter 2.1, all companies are classified across both a product and a technological dimension.

both Figure 2.2 and Figure 2.3), though “Customer Relationships” and “Channels” are treated as a single block.

The empirical analysis in Chapter 6 is based on the Business Model Canvas. It is applied to a database of Swiss FinTech companies, which first had to be completed and updated. Therefore, publicly available information on all the companies qualifying as in-scope under Subchapter 2.1 was gathered in an initial step, and then transferred to the individual company factsheets. Each of these companies were then asked to verify and complete the information contained in the factsheet. Only the verified factsheets are illustrated in Chapter 11 of this study. In the following, the individual eight building blocks incorporated in the company factsheet are explained in further detail.

Key Partners

Often, companies must rely on the cooperation with other parties to be able to deliver their value proposition successfully. These key partners usually complete the company in providing resources or know-how the company itself lacks. In the specific case of the FinTech industry, financial institutions acting as key partners can, for example, counteract the lack of an established customer base or regulatory status. In identifying key partners for individual FinTech companies, important partners for the industry in general can be detected.

Key Resources

The key resources can be understood as the most relevant assets a company needs in order to operate successfully, such as physical, financial or human capital. These assets are necessary to fulfil the key activities of a company’s business model. In the case of the analysis of the Swiss FinTech industry, a focus is set on the financial capital by identifying the amount of funding, as well as human capital with the number of full-time equivalents.

Key Activities

The key activities of a company are crucial in fulfilling the value proposition. The key activities in the company factsheets distinguish between “programming & engineering”, “marketing & finding clients”, and “operative business & serving clients”. The distinction between

“programming & engineering” and “marketing & finding clients” lies in the possibility of focusing either on the development or the marketing of a product or solution in order to establish a customer base. With a customer base already established, the focus can then be set on serving the client and operating the daily business (“operative business & serving clients”). Note that these key activity areas may not be mutually exclusive.

Value Proposition

The value proposition of a company forms the core of a business model. All the surrounding building blocks seek to achieve the defined value proposition. It outlines the elements of a company’s offering, as well as how it intends to differentiate itself from the competition, whilst satisfying the customers’ needs. In the case of FinTech companies, technology-driven solutions are often key in achieving a level of differentiation compared to established solutions. Capturing the value proposition in the company factsheet is the company description.

Customer Relationships / Channels

Customer relationships and channels describe how a company communicates and interacts with its customer segments. As these two building blocks are closely related, they are treated as one single block for the purpose of the present company analysis. In the case of FinTech companies, the relationship with the customer is classified as either digital, personal, or a combination of both approaches. With an entirely digital strategy, all services can be realised over a platform, website or other scalable digital communication channel, without the involvement of personal communication. When implementing a personal communication channel, customers rely entirely on the direct communication with an employee. In the case of the hybrid approach, a company interacts with its customer through a combination of both digital and personal communication channels.

Customer Segments

A specific group of customers can be categorised as a customer segment. These are the groups the company aims to provide services or products to, based on its value proposition. The present analysis differentiates between national and international⁴ customers on the one hand, and businesses (B2B) and private individu-

⁴ International includes national customers too.

als (B2C) on the other. As a result, four possible customer segments are identified: national B2B, international B2B, national B2C, and international B2C. Though the geographic focus of the customer segments (i.e., national, international) are mutually exclusive, the customer groups to which a FinTech company provides (i.e., B2B, B2C) are not. In this way, we also account for business models for companies that serve both businesses and private individuals as customers (B2B & B2C).

Revenue Models

The revenue model defines how a company generates income from its business activities. On the one hand, FinTech companies can apply the same revenue models typically implemented by banks such as interest, commission, or trading. On the other hand, they can choose to use revenue models more common to the software industry such as licencing fees, Software-as-a-Service (SaaS) offers or subscriptions. Some FinTech companies may also choose to implement alternative revenue models such as selling advertising space or (analysed) data. As in the case of the key activities, the revenue models listed in the company factsheet may not be mutually exclusive as some FinTech companies may choose a combination of revenue models in their approach.

2.4. Sentiment Analysis of FinTech Companies

As in the 2018 and 2019 editions of the IFZ FinTech Study, a sentiment questionnaire was created and dis-

tributed among the in-scope Swiss FinTech companies. The goal of the questionnaire is to capture the most pressing challenges posed to the industry, as perceived by the FinTech companies. The “Survey on the Access to Finance of Enterprises in the Euro area” was conducted by the European Central Bank (ECB) in 2017 among the countries in the European Union and serves as a basis for the sentiment questionnaire. The seven potential challenges posed to the industry are illustrated in Figure 2.4, which the questioned companies were asked to evaluate in their intensity on a scale from one (not pressing) to ten (extremely pressing). The findings of the sentiment analysis are presented in Subchapter 6.2.

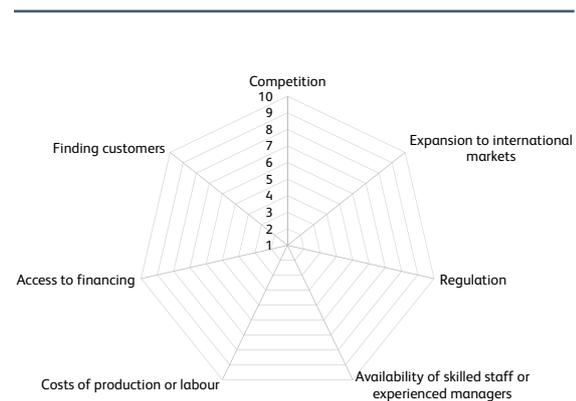


Figure 2.4: Challenges faced by the Swiss FinTech sector

3. The FinTech Environment

In this chapter, the FinTech environment is analysed by applying the PEST approach described in Subchapter 2.2. While some sections are specific to Switzerland, others assume a global view.

3.1. Political & Legal Environment

By Daniel Haerberli, Benedikt Maurenbrecher & Urs Meier, Attorneys-at-Law, Homburger AG

FinTech companies, which are domiciled in Switzerland or approach Swiss-based clients, need to carefully analyse financial market regulation, in order to determine whether their activities trigger regulatory requirements. Switzerland's¹ regulatory² framework governing activities of FinTech companies consists of various federal laws and implementing ordinances. This subchapter outlines key elements of Swiss financial market law.

- The *first part* provides an overview of two new federal laws, which change the Swiss financial market architecture fundamentally: the Financial Services Act (Section 3.1.1.1) and the Financial Institutions Act (Section 3.1.1.2).
- The *second part* then discusses Switzerland's FinTech specific regulation (Section 3.1.2.1) as well as select federal laws, which usually are important in the context of FinTech related activities (Section 3.1.2.2).
- Finally, the *third part* highlights certain aspects of the current framework applicable to distributed ledger technology ("DLT") (Section 3.1.3.1) and summarises the cornerstones of the Swiss DLT draft law, which might enter into force already in 2021 (Section 3.1.3.2).

3.1.1. New Swiss Financial Market Architecture – FinSA and FinIA

On January 1, 2020, the Financial Services Act ("FinSA") and the Financial Institutions Act ("FinIA") entered into force.

The FinSA primarily establishes rules on how financial services have to be provided and how financial instru-

ments have to be offered. The FinIA introduces a comprehensive supervisory regime covering portfolio managers, trustees, managers of collective investment schemes, fund management companies and securities firms.

FinSA and FinIA impact both "traditional" financial service providers and FinTech companies. For FinTech companies, in particular the following new elements may be important.

- The provision of portfolio management or investment advice may trigger requirements to comply with rules of conduct (Section 3.1.1.1.2.2.) or organisational rules (Section 3.1.1.1.2.3.), even if such services are provided into Switzerland on a pure cross-border basis, and portfolio management activities may trigger licensing requirements (Section 3.1.1.2.);
- companies looking for funding in Switzerland may need to ensure compliance with the new prospectus regime (Section 3.1.1.1.2.6.).

Below, these and other selected elements of the FinSA and the FinIA are summarised.

3.1.1.1. Financial Services Act (FinSA)

With regard to FinSA, FinTech companies need to assess in a first step whether their activities are within the scope of application of this law (Section 3.1.1.1.1). If this is the case, a series of requirements may apply, in particular with regard to client segmentation, rules of conduct, organisational requirements and prospectuses (Section 3.1.1.1.2). Non-compliance with FinSA requirements may lead to criminal charges and fines.³ Furthermore, if the relevant individual or legal entity is subject to prudential supervision in Switzerland, non-compliance may also have regulatory consequences.

3.1.1.1.1. Scope of Application

FinSA covers financial service providers, client advisers and manufacturers, and providers of financial instruments.⁴

¹ This contribution does not discuss any regulatory frameworks of jurisdictions other than Switzerland. It goes without saying that activities in other jurisdictions or targeting clients based in other jurisdictions than Switzerland may trigger regulatory authorisation or licensing requirements under such foreign laws too.

² This contribution focuses on regulatory aspects. There are other legal aspects which might be relevant for FinTech companies and FinTech related activities such as questions concerning tax law, contract law, intellectual property or data protection. Such legal aspects are not covered herein.

³ Articles 89 et seqq. FinSA.

⁴ Article 2 para. 1 FinSA.

Individuals as well as legal entities qualify as a *Financial Service Provider* and are subject to FinSA, if they provide Financial Services (see definition below) on a commercial basis in Switzerland or to Swiss-based clients.⁵ Consequently, a FinTech company must in particular assess the following:

1. Are Financial Instruments (see definition below) involved and do the activities constitute Financial Services?
2. If that is the case: are these Financial Services provided on a *commercial basis*?
3. And if that is the case, too: are these Financial Services provided *in Switzerland* or to *Swiss-based clients*?

When assessing whether a certain activity qualifies as a Financial Service under the FinSA, in particular the following definitions are important:

- *Financial Instruments* under the FinSA are equity and debt securities, including bonds, units in collective investment schemes, structured products, derivatives and certain types of deposits.⁶
- *Financial Services* under the FinSA are the following activities: (1) acquisition or disposal of Financial Instruments, (2) receipt and transmission of orders in relation to Financial Instruments, (3) management of Financial Instruments (portfolio management), (4) provision of personal recommendations on transactions with Financial Instruments (investment advice), and (5) granting of loans to finance transactions with Financial Instruments.⁷

Merely offering Financial Instruments does, in principle, not qualify as a Financial Service. However, there is currently only limited guidance with regard to the question under what circumstances a certain activity would be considered as a mere offer and hence not a Financial Service.

A commercial activity is an independent economic activity pursued on a permanent, for-profit basis. Financial Services are presumed to be provided on such *commercial basis* if the relevant Financial Service Provider (i) either provides Financial Services to more than 20 clients or (ii) promotes the provision of Financial Services in advertisements, prospectuses, circulars or electronic media (irrespective of whether there are 20 clients or less).

Financial Services are deemed to be provided *in Switzerland* in particular if the Financial Service Provider is either (i) domiciled in Switzerland or registered in the Swiss commercial register; (ii) domiciled abroad but maintains at least a factual branch or representative office in Switzerland; or (iii) domiciled abroad but sends client advisers to Switzerland, which then address clients in Switzerland (e.g., during road shows).

In any case it must be noted that for the purposes of the FinSA, having a physical presence in Switzerland is not required - it is also sufficient to merely render Financial Services to *Swiss-based clients*, i.e., on a pure cross-border basis.

The latter has in particular an impact on FinTech companies domiciled abroad, which to date engage in activities in the Swiss market without having any “boots on the ground” in Switzerland. For example, such a foreign FinTech company providing online services relating to portfolio management or investment advice to Swiss-based clients may be subject to requirements under the FinSA. In this context, it must be noted that the requirements under the FinSA largely mirror requirements set out in corresponding regulation of the European Union (“EU”)⁸, but that there are nonetheless notable differences and therefore a FinTech company compliant with EU rules is not automatically compliant with Swiss rules.

⁵ Article 3 let. d FinSA.

⁶ Article 3 let. a FinSA.

⁷ Article 3 let. c FinSA. Note: Article 3 para. 3 FinSA exempts from the definition of Financial Services the provision of advice regarding the structuring or raising of capital as well as the provision of advice in the context of mergers and acquisitions or the acquisition or sale of participations and the services related to such advice.

⁸ MiFID II, Prospectus Directive, PRIIPs.

However, there are certain exemptions in the FinSA, which specifically aim at foreign Financial Service Providers. Pursuant to a *reverse-solicitation* exemption, the FinSA does for example not apply to:

- Financial Services provided by a foreign Financial Service Provider as part of an already existing client relationship (e.g., an existing portfolio management or investment advisory agreement) that has been entered into at the express initiative of a Swiss-based client; and
- Financial Services provided by a foreign Financial Services Provider that have been expressly requested by a Swiss-based client on such client's own initiative.⁹

3.1.1.1.2. Key Elements

Key elements set out in the FinSA concern client segmentation (Section 3.1.1.1.2.1), rules of conduct (Section 3.1.1.1.2.2), organisation (Section 3.1.1.1.2.3), client advisers (Section 3.1.1.1.2.4), the ombudsman scheme (Section 3.1.1.1.2.5) and prospectuses (Section 3.1.1.1.2.6).

Most of these key elements under the FinSA are subject to a two-year phase-in period and must therefore be applied at the latest as from January 1, 2022.

3.1.1.1.2.1. Client Segmentation – Retail / Professional / Institutional

If a FinTech company qualifies as a Financial Service Provider, it needs to allocate each of its clients – as part of the onboarding process – to one of the following segments: retail, professional or institutional:¹⁰

1. *Retail Clients*, also called private clients, are all clients who are not Professional Clients (as defined below).
2. *Professional Clients* are: (a) financial intermediaries as defined in the Swiss Banking Act, the Swiss Financial Institutions Act and the Swiss Collective Investment Schemes Act; (b) insurance companies as defined in the Swiss Insurance Supervision Act; (c) foreign clients subject to prudential supervision equivalent to the persons mentioned under let. (a) and let. (b); (d) central banks; (e) public entities with

professional treasury operations; (f) occupational pension schemes, and other institutions whose purpose is to serve occupational pensions, with professional treasury operations; (g) companies with professional treasury operations; (h) large companies (companies which exceed two of the following parameters: (1) balance sheet total of CHF 20 million, (2) turnover of CHF 40 million and (3) equity of CHF 2 million); and (i) private investment structures with professional treasury operations created for high-net-worth Retail Clients.

3. *Institutional Clients* are Professional Clients as defined in 2. (a)-(d) above, as well as national and supranational public entities with professional treasury operations.

Depending on the client segment, different duties and hence different levels of “client protection” apply. Consequently, in order to limit the impacts of the FinSA, a FinTech company may opt to limit its activities to Professional Clients and /or Institutional Clients.

Some clients can declare that they waive certain client protection provisions (so-called “opting out”) and some other clients can declare that they want to benefit from a higher level of protection (so-called “opting in”).¹¹ Any such declaration to “opt-out” or “opt-in” must be in writing (e.g., a physical letter) or in another manner verifiable by text (e.g., an email or WhatsApp message).¹²

The client segmentation requirement under FinSA is subject to a two-year phase-in period. It will therefore apply as of January 1, 2022, only.¹³

3.1.1.1.2.2. Rules of Conduct

The FinSA sets out rules of conduct, which cover amongst others A) information duties, B) suitability and appropriateness checks, C) documentation and accountability duties as well as D) duties regarding transparency and due care.

A) Information Duties

The information duties aim at giving clients a clear overview of the services and products offered by the

⁹ Article 2 para. 2 FinSO.

¹⁰ Article 4 FinSA.

¹¹ Article 5 FinSA.

¹² Article 5 para. 8 FinSA.

¹³ Article 103 para. 1 FinSO.

Financial Service Provider. There are general and specific duties and information may be provided either in writing or electronically, e.g., via a website. If provided electronically, it must be ensured, however, that clients may at all times access, download and save such information to a durable medium (e.g., a hard disk).¹⁴

If Retail Clients are involved, the information duties apply to the full extent. Professional Clients may waive *general* information duties.¹⁵ For Institutional Clients, the FinSA provides for a blanket non-application of the information duties.¹⁶

B) Suitability and Appropriateness

If a FinTech company provides portfolio management or investment advice, it needs to meet the appropriateness or suitability test requirements set out in the FinSA, also if such services are (in whole or in part) provided through an automated or semi-automated “robo-advice” system.

- Suitability: When providing portfolio management or investment advice while taking into account the client’s entire portfolio (so-called “Portfolio-Related Investment Advice”), a Financial Service Provider needs to inquire about the relevant client’s financial situation and investment objectives as well as its knowledge and experience.¹⁷
- Appropriateness: When providing investment advice for individual transactions without taking into account the client’s entire portfolio (so-called “Transaction-Related Investment Advice”), a Financial Service Provider needs to obtain information on the client’s knowledge and experience and must ensure, before recommending a Financial Instrument, that the recommendation is appropriate for that client.¹⁸
- If a Financial Service Provider is only involved in the mere execution or transmission of a client’s order, it

does not need to conduct such suitability or appropriateness checks.¹⁹ Nevertheless, prior to providing such mere execution or transmission service, the client needs to be informed about the fact that there will be no appropriateness or suitability checks performed.²⁰

If Retail Clients are involved, these duties apply to the full extent. With regard to Professional Clients, certain alleviations are set out in the FinSA: a Financial Service Provider may, unless there are indications to the contrary, in particular assume that Professional Clients have sufficient knowledge and experience as well as the capacity to bear the risks when assessing suitability and appropriateness.²¹ For Institutional Clients, the FinSA provides for a blanket non-application of the information duties.²²

C) Documentation and Accountability Duties

The FinSA requires Financial Service Providers amongst others to record (i) the information collected from and the services agreed with and provided in Switzerland or to clients in Switzerland as well as (ii) the results of suitability and appropriateness checks.²³ Generally, Financial Service Providers are free how they organise such documentation and purely digital solutions are possible.²⁴ In any case, however, a Financial Service Provider needs to be in a position to render account to a client within, as a rule, ten business days after a client requested to obtain his files. Furthermore, documentation needs to be stored for at least ten years.²⁵

If Retail Clients are involved, the duties concerning documentation and accountability apply to the full extent. Professional Clients may waive the duties to some extent.²⁶ For Institutional Clients, the FinSA provides for a blanket non-application of the information duties.²⁷

¹⁴ Article 9 para. 3 FinSA and article 12 FinSO.

¹⁵ Article 20 para. 2 FinSA.

¹⁶ Article 20 para. 1 FinSA.

¹⁷ Article 12 FinSA.

¹⁸ Article 11 FinSA.

¹⁹ Article 13 para. 1 FinSA.

²⁰ Article 13 para. 2 FinSA.

²¹ Article 13 para. 3 FinSA.

²² Article 20 para. 1 FinSA.

²³ Article 15 para. 1 FinSA; Dispatch FinSA | FinIA, 8959. Cf. article 25 paras. 5 et seqq. MiFID II.

²⁴ Dispatch FinSA | FinIA, 8959 et seq; Pre-consultation report FinSO, 27.

²⁵ Article 18 FinSO; Dispatch FinSA | FinIA, 8959 et seq.

²⁶ Article 20 para. 2 FinSA.

²⁷ Article 20 para. 1 FinSA.

D) Transparency and Due Care

Financial Service Providers must uphold the principles of good faith and equal treatment. They need to implement systems and procedures that are appropriate with regard to their size, complexity and business activities and ensure the protection of clients' interests and the equal treatment of their clients. In particular, they have to ensure (i) that client orders are registered and allocated promptly and correctly, (ii) that comparable orders are executed in the order in which they are received, unless this is not in the client's interest or not possible due to the nature of the client's order or the market conditions, (iii) that in case orders are pooled, the interests of the clients involved are safeguarded and (iv) that Retail Clients are informed of any material difficulties which could affect the correct execution of their orders.²⁸

Furthermore, the FinSA requires that client orders are executed in the best interest of the client. Financial Service Providers shall ensure the best execution of client orders in terms of cost (taking into account, *inter alia*, any inducements provided by third parties), timing and quality. In order to satisfy this requirement, they shall define and review annually the criteria necessary for the selection of the execution venue (in particular, the price, costs, efficiency and probability of the execution and settlement) and implement appropriate internal directives.²⁹

If Retail Clients are involved, the duties concerning transparency and due care apply to the full extent and even Professional Clients may not waive these duties. Only for Institutional Clients, the FinSA provides for a blanket non-application of the information duties.³⁰

3.1.1.1.2.3. Organisation

Financial Service Providers must ensure that they fulfil their duties under FinSA through internal regulations and an appropriate organisation of operations. They

must amongst others (i) define internal rules that are appropriate to their size, complexity and legal form, as well as to the Financial Services they offer and the risks associated therewith; and (ii) select their employees carefully and ensure that they receive training in the rules of conduct as well as in the skills they need to carry out their specific tasks.³¹ Furthermore, the FinSA also provides for organisational requirements with regard to outsourcing,³² conflicts of interest,³³ compensations from third parties ("inducements"),³⁴ and employee transactions.³⁵

Today, there is significant legal uncertainty concerning the question whether organisational requirements set out in the FinSA only apply to Swiss Financial Service Providers or to foreign Financial Service Providers as well.

The duties regarding organisational requirements are subject to a two-year phase-in period and therefore apply as of January 1, 2022, only.³⁶

3.1.1.1.2.4. Client Advisers

Under the FinSA, the two concepts of "Client Advisers" and "Financial Service Providers" must strictly be kept apart: Client Advisers are *natural persons* (i.e., not legal entities) who perform Financial Services either on behalf of a company or in their own capacity as Financial Service Provider.

With regard to Client Adviser, the following aspects need to be kept in mind:

- *Knowledge and Expertise of Client Advisers*: If a FinTech company qualifies as a Financial Service Provider, its Client Advisers will need to possess the requisite knowledge with regard to Swiss rules of conduct (see Section 3.1.1.1.2.2 above) and a level of expertise appropriate for their activities. This requirement is subject to a two-year phase-in period and will there-

²⁸ Article 17 FinSA and article 20 FinSO.

²⁹ Article 18 FinSA and article 21 FinSO.

³⁰ Article 20 para. 1 FinSA.

³¹ Article 21 et seq. FinSA and art. 23 FinSO

³² Article 23 et seq. FinSA.

³³ Article 25 FinSA.

³⁴ Article 26 FinSA.

³⁵ Article 27 FinSA.

³⁶ Article 106 para. 1 FinSO.

fore apply as of January 1, 2022, only.³⁷ If a foreign Financial Services Provider acts on a pure cross-border basis, such Swiss requirements regarding knowledge and expertise do, in our current understanding, only apply to Client Advisers who actually render Financial Services to Swiss-based clients. Nonetheless, most foreign Financial Service Providers will likely need to establish a “Swiss Desk”, i.e., designate specific employees / Client Advisers who are familiar with the Swiss rules of conduct and meet all requirements set out in FinSA.

- *Client Adviser Register*: The following Client Advisers need to be registered in the so-called Client Adviser Register (*Beraterregister*) in order to be allowed to carry out their activity in Switzerland: (i) Client Advisers of Swiss Financial Service Providers, which are not subject to prudential supervision (i.e., independent client advisers) and (ii) Client Advisers of foreign Financial Service Providers, which are either not subject to prudential supervision abroad or which provide Financial Services to Swiss-based Retail Clients.³⁸

Persons having only very limited contact with clients or potential investors do not qualify as Client Advisers and are thus not subject to these requirements concerning knowledge and expertise as well as concerning the Client Adviser Register. The same applies to employees of a Financial Service Provider who merely support the provision of Financial Services. Examples of such supporting activities include, *inter alia*, the dispatch of product documentation following the expression of interest by a client, the arrangement of an appointment for a client with his Client Adviser or the support of technical processes with respect to electronic customer portals or websites of a Financial Service Provider.

3.1.1.2.5. Ombudsman Scheme

Financial Service Providers need to accede the Swiss ombudsman scheme.³⁹ This requirement is subject to

a phase-in period of six months,⁴⁰ which will start once an ombudsman’s office has been recognised.⁴¹ As of the date of this study, no such office has yet been recognised.

3.1.1.2.6. Prospectus Requirements

The FinSA introduces a comprehensive new prospectus regime, which *inter alia* provides for a requirement that prospectuses need to be approved *ex ante* by a new regulatory body. The regulatory body will be licensed and supervised by FINMA. As of the date of this study, no such regulatory body has yet been recognised.

In principle, the requirement to publish an approved prospectus applies to all public offerings in or into Switzerland and to all securities that are to be admitted to trading on a trading venue (see Section 3.1.2.2.2 below) in Switzerland. However, the FinSA contains a series of exemptions and there is for example no requirement to prepare a prospectus if the public offering is addressed exclusively at Professional Investors or if it is addressed at fewer than 500 investors.

Under the FinSA, an offer is any invitation to purchase a Financial Instrument if such invitation contains sufficient information on the terms and conditions of the offer and the Financial Instrument itself.⁴² Therefore, FinTech companies providing information relating to Financial Instruments on an internet-based platform need to be aware in particular of the following:

- The publication of information relating to Financial Instruments on a platform alone should not *per se* be regarded as an offer but the manner in which access to the platform is structured will be decisive.
- If information on the Financial Instrument can only be accessed by the interested client / investor on an internet-based platform via a search entry (e.g., when searching for ISIN / Valor or product name), no offer from the FinTech company operating this in-

³⁷ Article 104 FinSO.

³⁸ Client Advisers of foreign Financial Service Providers that are subject to prudential supervision abroad are exempted from this registration requirement to the extent that their activities in Switzerland are directed exclusively at Institutional Clients and / or Professional Clients (Article 31 FinSO).

³⁹ Article 77 FinSA.

⁴⁰ Article 95 para. 3 FinSA.

⁴¹ Article 108 FinSO.

⁴² Article 3 let. g FinSA.

- internet-based platform (reverse solicitation) will be deemed to have been made. The result of the search should not have any other legal consequences than an (oral or written) information on a financial instrument at the request of an interested investor.
- Also, if the client / investor must first log in with his password on an internet-based platform, it can be assumed that no offer will be made by the FinTech company operating this internet-based platform.
 - However, it must be noted that in both scenarios mentioned above a reverse solicitation constellation will only be at hand if no advertising by the “provider” or one of its representatives in relation to the specific Financial Instrument preceded the actions of the investor.⁴³

3.1.1.2. Financial Institutions Act (FinIA)

The FinIA introduces new uniform rules regarding licensing requirements for financial institutions. *Financial Institutions* as defined in FinIA are: (1) portfolio managers; (2) trustees; (3) managers of collective assets; (4) fund management companies and (5) securities firms (formerly securities dealers).

Instead of a sectorial approach, the FinIA follows a “pyramid approach”, implementing a rather light touch regulation for portfolio managers and trustees and increasingly more strict regimes for managers of collective assets, fund management companies and securities firms.

The FinIA defines common core requirements that need to be met by all Financial Institutions. They all need for example an appropriate organisation (risk management, effective internal control system, etc.) and must be effectively managed in Switzerland. Furthermore, both the Financial Institution itself as well as the persons in charge of their administration and management must enjoy a good reputation and safeguard proper business conduct.

For FinTech companies, the key changes introduced by FinIA are likely the following:

- *Portfolio managers* (e.g., independent external asset managers) are now subject to prudential super-

vision. Such supervision will be conducted by an independent supervisory organisation that itself will be licensed by *FINMA* for this purpose. As of the date of this contribution, no such supervisory organisation has yet been licensed.

- *Securities firms* require a license from *FINMA* and are subject to supervision as well as a series of specific regulations. A FinTech company qualifies as a securities firm if it engages, on a commercial basis, in either (a) dealing in securities in its own name but on its clients’ account, or (b) short-term transactions in securities on its own account and either thereby potentially threatens systemic stability or acts as member of a trading venue, or (c) acting as a market maker by engaging in short-term transactions in securities while setting public bid and ask prices (permanently or on request).⁴⁴ Depending on the relevant business model and activities, FinTech companies may in particular qualify as own-account dealers.

As far as regulatory licensing requirements are concerned, the Swiss regime is largely based on the so-called principle of territoriality (*Territorialitätsprinzip*). Therefore, as long as a FinTech company is domiciled abroad and provides Financial Services into Switzerland on a pure cross-border basis, i.e., without establishing a physical presence in Switzerland, this does (with a few exceptions) not trigger Swiss regulatory licensing requirements under the FinIA. But such activity may, however, trigger the application of requirements under the FinSA (see Section 3.1.1.1 above).

3.1.2. Other Key Regulation

This subchapter summarises key elements of the Swiss FinTech Specific Regulation (Section 3.1.2.1) and provides an overview on select Swiss federal laws (Section 3.1.2.2), which are – besides FinSA and FinIA (see Section 3.1.1 above) – oftentimes important in the context of FinTech related activities.

3.1.2.1. FinTech Specific Regulation

The Swiss FinTech specific regulation comprises three “pillars”: the so-called FinTech license (Section 3.1.2.1.1), a regulatory innovation area (“sandbox”) (Section 3.1.2.1.2) and the settlement account exemption (Section 3.1.2.1.3).

⁴³ Article 3 para. 6 let. a FinSO.

⁴⁴ Article 41 FinIA.

3.1.2.1.1. FinTech License

Since January 1, 2019, the Swiss Banking Act (“BA”) provides for two types of licenses: (i) the regular banking license and (ii) the license for persons pursuant to 1b BA, i.e., the so-called FinTech license (sometimes also referred to as “banking license light”).

Before the FinTech license was introduced, only fully-fledged banks were allowed to (i) accept deposits from the public on a professional basis or to (ii) recommend themselves publicly for doing so. Given that generally all liabilities vis-à-vis clients qualify as *deposits* and since for example accepting deposits from more than 20 persons may already qualify as acting on a *professional basis* (see Section 3.1.2.2.1 below), certain business models of FinTech companies would have required a regular banking license.

With the FinTech license, companies not engaging in the classic banking business (interest rate differential business; *Zinsdifferenzgeschäft*), e.g., by using short-term deposits for long-term lending or investments, now have a viable alternative. The FinTech license is attractive to companies that are mainly active in the financial sector but which (i) may limit their operations to accepting deposits of less than CHF 100 million and which (ii) do not need to invest these funds nor pay interest thereon. Hence, the license may for example be attractive for companies offering payments services or platform funding services.

However, there is a series of aspects that have to be taken into account when considering applying for a FinTech license. In order to obtain the license from *FINMA*, the company must go through a rather lengthy (depending in particular on the complexity of the business model and the quality of the license application) approval process⁴⁵, which is, however, less burdensome than the licensing process for a regular banking license. In this process, the company needs to show that it meets amongst others requirements regarding (i) organisation and audit, (ii) corporate governance (the board of directors must for example consist of at least three persons) and (iii) capital (e.g., minimum capital of 3% of the deposits accepted from the public, i.e., up to CHF 3 million, but at least CHF 300,000).

Furthermore, once the FinTech license is granted, any deposits held by the company must be either (i) kept separated from the assets of the company itself or (ii) recorded in the company’s books in such a way that they can be shown separately from the company’s own funds at any time (if the company opts for the latter option, a more comprehensive audit is required).⁴⁶

If the maximum deposit threshold of CHF 100 million is exceeded, the company must notify *FINMA* within 10 days and must file a regular bank license application within 90 days.⁴⁷

Finally, holders of a FinTech license are required to inform their clients comprehensively about the risks of their business model, their services and the technologies used. Furthermore, the company’s clients need to be informed about the fact that their deposits with the company are not protected by the Swiss deposit insurance regime. Solely mentioning this information in general terms and conditions is insufficient and if the information is made available electronically, it must be ensured that clients may at any time view, download and save such information. Also, the information must be made available *prior* to entering into the agreement with the client and the client must have had enough time to understand the information prior to concluding the contract.⁴⁸

3.1.2.1.2. “Sandbox”

The “sandbox” exemption allows engaging in activities which under former regulation would have triggered bank licensing requirements. Companies accepting deposits from the public are deemed *not* to be acting on a commercial basis, provided

- (i) the deposits accepted do not exceed the threshold of CHF 1 million;
- (ii) the company does not engage in the interest rate differential business (*Zinsdifferenzgeschäft*); and
- (iii) the depositors are informed prior to depositing the funds that the company accepting the funds is not supervised by *FINMA* and that the funds are not protected by the Swiss deposit insurance regime.

⁴⁵ See the *FINMA* guidelines for FinTech licence applications (*FINMA*, 2018a) (version of December 3, 2018), which are available in German, French as well as English.

⁴⁶ Article 14f BO.

⁴⁷ Article 1b para. 6 BA.

⁴⁸ Article 7a BO.

As per April 1, 2019, the above criteria regarding the “sandbox” have been amended. Under the former regulation, companies acting within the “sandbox” were neither allowed to invest the deposits accepted nor to pay interests. Under the current regulation, it is now possible to invest the deposits accepted, provided always that the threshold of CHF 1 million is not being exceeded and that the company does not engage in the interest rate differential business.

If the deposit threshold of CHF 1 million is exceeded, the company must notify *FINMA* within 10 days and must file a regular bank license application within 30 days. During the interim period between the filing of the license application and *FINMA*’s decision on the request, the other conditions still need to be met, i.e., no interest may be paid on such deposits and the information duties vis-à-vis depositors must be fulfilled. Also, *FINMA* may on a case by case basis decide that no further deposits may be accepted until the end of the license application process.⁴⁹

If the company chooses to inform its customers about the lack of *FINMA* supervision and the lack of deposit insurance protection via its website, certain requirements must be met. First, the information must be displayed separately from other information. Therefore, solely mentioning it in general terms and conditions is insufficient. Second, this information must be displayed in text and in reproducible form. Third, the company’s customers need to expressly confirm that they took note of the information.

The “sandbox” exemption is designed to create a safe space, where FinTech companies in particular shall be able to test their business ideas and provide certain financial services without becoming a regulated entity under Swiss banking regulation. However, it must be noted that companies engaging in activities within the “sandbox” are still likely to be subject to anti-money laundering regulation (see Section 3.1.2.2.4 below) and may therefore nonetheless need to adhere to a series of regulations. Therefore, the “sandbox” must not be misunderstood as a “regulation free” area.

3.1.2.1.3. Settlement Accounts Exemption

Funds held in customer accounts of securities firms, dealers of precious metals, portfolio managers or similar companies which exclusively serve the purpose of settling customer transactions do not qualify as deposits and do therefore not trigger bank licensing requirements, provided the funds are not interest-bearing and provided they are forwarded within a relatively short time of up to 60 days. The exemption in particular facilitates the operation of funding platforms and allows certain other business models which before were not possible without a banking license.

3.1.2.2. Select Federal Laws

The Swiss regulatory framework relevant for FinTech companies is, apart from the FinSA (see Section 3.1.1.1 above) and FinIA (see Section 3.1.1.2 above), in particular shaped by the following federal laws and their implementing regulation:

- the *Banking Act* (“BA”), which regulates banking activities / deposit taking as well as the supervision of banks and of holders of FinTech licenses (see Section 3.1.2.1.1 above);
- the *Financial Market Infrastructure Act* (“FMIA”), which governs the organisation and operation of financial market infrastructures (*inter alia*, trading venues and payment systems) and the conduct of financial market participants in securities and derivatives trading;
- the *Anti-Money Laundering Act* (“AMLA”), which regulates the prevention of money laundering and terrorist financing and the due diligence in financial relationships and transactions;
- the *Consumer Credit Act* (“CCA”), which governs consumer credits, i.e., loans granted on a professional basis to individuals for purposes other than business or commercial activities; and
- the *Collective Investment Schemes Act* (“CISA”), which governs in particular the approval requirement for foreign and Swiss collective investment schemes.

The following sections provide a high-level overview of this regulatory framework applicable to banks (Section 3.1.2.2.1), trading facilities (Section 3.1.2.2.2), pay-

⁴⁹ Article 6 para. 4 BO.

ment systems (Section 3.1.2.2.3), anti-money laundering (Section 3.1.2.2.4), consumer credits (Section 3.1.2.2.5) and collective investment schemes (Section 3.1.2.2.6).

3.1.2.2.1. Banks

In Switzerland, only licensed banks and holders of FinTech licenses (see Section 3.1.2.1.1 above) are allowed to accept deposits from the public on a professional basis or to recommend themselves publicly for doing so.⁵⁰ Furthermore, only licensed banks (but not mere holders of a FinTech license) may use or refer to the term “bank” or “banker” in their company name, their company purpose or in advertisement for their company.⁵¹ Any unauthorised acceptance of deposits or advertising of such services may be subject to criminal punishment.⁵²

Generally, a company is considered to be a bank, amongst others,⁵³:

- (i) if it is mainly active in the financial sector; and
- (ii) if it accepts deposits from the public in an amount *higher* than CHF 100 million on a professional basis or recommends itself publicly for this purpose;⁵⁴ or accepts deposits from the public in an amount of *up to* CHF 100 million on a professional basis or recommends itself publicly for this purpose and re-invests these deposits or pays interest on them.⁵⁵

A company is *active in the financial sector* if it renders or procures financial services, in particular, by engaging in the deposit or lending business, securities trading, investment or portfolio management for itself or for third parties.⁵⁶ The requirement to accept deposits from the public *on a professional basis* is generally met (see “sandbox” exemption; Section 3.1.2.1.2 above), if an individual or legal entity (a) continuously accepts more than 20 deposits from the public or (b) recommends

itself publicly for this purpose (regardless of whether the company actually continuously accepts more than 20 deposits from the public or not).⁵⁷

Generally, all *liabilities* *via-à-vis* clients qualify as deposits.⁵⁸ There are, however, a number of exemptions. Amongst others, the following liabilities are exempt, i.e., are not considered deposits:⁵⁹

- funds provided in consideration of a contract providing for the transfer of property or the rendering of a service (e.g., prepayments that form part of the consideration for a purchase agreement are exempt, but granting a loan with a duty to repay is not exempt);
- funds which are transferred as a security;
- credit balances on client accounts of securities dealers, precious metal dealers, portfolio managers or similar companies which solely serve the purpose of the settlement of client transactions, provided no interest is paid on these funds and provided they are forwarded within 60 days;
- funds that to a small extent are fed into a payment instrument or a payment system and that are exclusively being used for future purchases of goods or services, provided no interest is paid on these funds;
- bonds and other debt instruments that are standardised and issued *en masse* or uncertificated rights with the same function (book-entry securities) if, at the time of the offer, investors are informed in a certain form⁶⁰ about (1) the name, registered office and the purpose of the issuer as set out in a brief description, (2) the interest rate, issue price, subscription period, payment date, maturity and redemption terms, (3) the most recent annual financial statements and consolidated financial statements together with the audit report and, if more

⁵⁰ Article 1a and 1b BA.

⁵¹ Article 1 para. 4 BA.

⁵² Article 46 and 49 BA; Article 44 FINMASA.

⁵³ Companies are also considered to be banks if they refinance themselves significantly with loans from several banks that do not own any qualified/significant shareholdings in them in order to finance any number of persons or companies with which they do not form an economic unit of their own and in any manner possible; see article 1a let. c BA.

⁵⁴ Article 1a let. a BA.

⁵⁵ Article 1a let. b BA.

⁵⁶ Article 4 para. 1 let. a BO. Furthermore, holding companies owning predominantly participations in companies active in the financial sector are themselves considered active in the financial sector; article 4 para. 1 let. b BO. Finally, significant group companies (Wesentliche Gruppengesellschaften) as defined in article 3a BO are deemed to be active in the financial sector too; article 4 para. 1 let. c BO.

⁵⁷ Article 6 para. 1 BO.

⁵⁸ Article 5 para. 1 BO; FINMA-Circular 2008/3, para. 10.

⁵⁹ Article 5 para. 3 BO.

⁶⁰ See article 64 para. 3 FinSA. E.g., electronically via the issuer’s website.

than six months have passed since the balance sheet date, the interim financial statements, if any, of the issuer and the guarantor, (4) the collateral provided and (5) the representation of bondholders, insofar as this is included in the investment conditions.

Furthermore, the following deposits are *not* considered to be deposits *from the public*:⁶¹

- deposits from domestic and foreign banks or other companies under state oversight;
- deposits from shareholders owning qualified shareholdings (more than 10% of the share capital or the votes) in the debtor and any parties affiliated or related with such shareholders;
- deposits from institutional investors with professional treasury departments.

Activities of FinTech companies may involve accepting deposits from the public (e.g., if a FinTech company accepts funds from investors and subsequently transfers funds to its clients). In order to reduce the risk to engage in regulated banking activities, the following may need to be considered:

- FinTech companies may decide to refrain from taking any funds in the first place.
- If deposits are involved, the FinTech company may stay within the ambit of the “sandbox” exemption (see Section 3.1.2.1.2 above) or it may avoid accepting more than 20 deposits from the public and refrain from recommending itself publicly for this purpose.⁶²
- FinTech companies may provide a clause in the relevant agreements obliging their clients to refrain from accepting more than 20 deposits from the public or recommending themselves publicly for this purpose.
- If deposits are involved, the FinTech company may try to ensure that only exempt liabilities are in fact involved. This would, for example, be the case if credit

balances on client accounts solely serve the purpose of the settlement of client transactions and if no interest is paid on these funds.⁶³

- FinTech companies may also decide to issue bonds or other debt instruments and, at the time of the offer, to inform investors in compliance with article 5 para. 3 let. b BO as well as article 64 para. 3 FinSA (see above).
- Finally, FinTech companies may consider obtaining a FinTech license (see Section 3.1.2.1.1 above), which allows them to accept deposits from the public up to CHF 100 million.

3.1.2.2.2. Trading Facilities

Trading venues, i.e., stock exchanges and multilateral trading facilities, are regulated financial market infrastructures.⁶⁴ They require a license from *FINMA*⁶⁵ and are subject to a series of specific regulations.

- A stock exchange is an institution for multilateral securities trading *where securities are listed* and whose purpose is the simultaneous exchange of bids between several participants and the conclusion of contracts based on non-discretionary rules.⁶⁶
- A multilateral trading facility is an institution for multilateral securities trading whose purpose is the simultaneous exchange of bids between several participants and the conclusion of contracts based on non-discretionary rules *without listing securities*.⁶⁷

Hence, the key difference between the two types of trading venues is that at a stock exchange *listed* securities are being traded whereas at a multilateral trading facility *unlisted* securities are being traded.

Under Swiss law, “securities” (*Effekten*) are instruments, which are:

- (i) standardised;
- (ii) suitable for mass trading and;
- (iii) either certificated securities (*Wertpapiere*), uncertificated securities (*Wertrechte*, derivatives⁶⁸ or intermediated securities (*Bucheffekten*).⁶⁹

⁶¹ Article 5 para. 2 BO.

⁶² Whether for example the mere publication of credit requests via crowdlending platforms constitutes a public recommendation to accept deposits is still open. To our knowledge, FINMA does not seem to be interpreting the law this way.

⁶³ Article 5 para. 3 let. c BO; See also the FINMA Fact sheet Crowdfunding (2020).

⁶⁴ Article 2 let. a sec. 1 and 2 FMIA.

⁶⁵ Article 4 para. 1 FMIA.

⁶⁶ Article 26 let. b FMIA.

⁶⁷ Article 26 let. c FMIA.

⁶⁸ Derivatives are “financial contracts whose value depends on one or several underlying assets and which are not cash transactions”. See article 2 let. c FMIA and article 2 paras. 2 to 4 of the Financial Market Infrastructure Ordinance (“FMIO”).

⁶⁹ Article 2 let. b FMIA and article 3 let. b FinSA.

Typical examples of securities include not only shares, bonds, notes and other debt instruments, but may for example also include fractions of a loan if such fractions are standardised and suitable for mass trading.

An instrument is deemed to be standardised and suitable for mass trading if it is (a) either publicly offered and has the same structure (interest, maturity) and denomination (amount) or (b) if it is placed with more than 20 investors and has not been specifically created for a particular counterparty / investor.⁷⁰ It is important to note that not only listed instruments but also unlisted instruments qualify as securities.

Even if no securities are traded, an institution or trading platform can still qualify as a so-called organised trading facility (“OTF”). According to the Swiss law definition, OTFs⁷¹ are establishments for:

- multilateral trading in securities or other financial instruments whose purpose is the exchange of bids and the conclusion of contracts based on discretionary rules;
- multilateral trading in financial instruments other than securities whose purpose is the exchange of bids and the conclusion of contracts based on non-discretionary rules;⁷² and
- bilateral trading in securities or other financial instruments whose purpose is the exchange of bids.

FinTech companies operating a platform that allows for trading of shares, standardised debt instruments or other financial instruments, including securities issued in the form of tokens (see Section 3.1.3.1 below), might therefore qualify as regulated trading venues. Should a particular business model include such activities, the main question will oftentimes be whether the relevant FinTech company qualifies as an MTF (if securities are involved) or as an OTF, and hence requires a license as a bank, securities firm or trading venue.⁷³

3.1.2.2.3. Payment Systems

Payment systems are regulated financial market infrastructures.⁷⁴ A payment system is “an entity that clears and settles payment obligations based on uniform rules and procedures”.⁷⁵

Specific duties of payment systems (e.g., regarding settlement and liquidity) have been set out in the implementing ordinance of the FMIA.⁷⁶ A payment system (see with regard to the Libra project Section 3.1.3.1 below) requires a license from FINMA⁷⁷ if (a) this is necessary for the proper functioning of the financial market or the protection of financial market participants and (b) if the payment system is not operated by a bank.

Operating a payment system may involve deposit taking. However, there is a “safe harbour rule”⁷⁸ which might be relevant for FinTech companies in this context. Funds that to a small extent are fed into a payment instrument or a payment system and that are exclusively being used for future purchases of goods or services may not qualify as deposits, provided no interest is paid. The following requirements must be met:⁷⁹

- (i) the funds may only be used for future purchases of goods or services;
- (ii) the maximum account balance per customer may not exceed CHF 3,000 at any time; and
- (iii) no interest may be paid.

If these requirements are met, the liabilities involved are not deemed to be deposits and hence no banking license is required.

3.1.2.2.4. Anti-Money Laundering

Ensuring compliance with anti-money laundering regulation, i.e., the Anti-Money Laundering Act (“AMLA”) and implementing regulation, is often one of the key regulatory challenges for FinTech companies, both or-

⁷⁰ See article 2 para. 1 FMIO.

⁷¹ Article 42 FMIA.

⁷² The term “non-discretionary rules” means that the operator of the trading facility has no discretion as to how interests may interact. Hence, the operator of the trading facility does not have discretion over how a transaction is to be executed.

⁷³ Article 43 para. 1 et seq. FMIA.

⁷⁴ Article 2 let. a sec. 6 FMIA.

⁷⁵ Article 81 FMIA.

⁷⁶ Article 82 FMIA i.c.w. article 66 et seqq. FMIO.

⁷⁷ Article 4 para. 2 FMIA.

⁷⁸ Article 5 para. 3 let. e BO.

⁷⁹ FINMA-Circular 2008/3, para. 18.1.

ganisationally and financially. Swiss anti-money laundering regulation is based on three key elements:

- supervision of financial intermediaries either directly by *FINMA* or by self-regulating organisations, which are themselves *FINMA*-supervised;
- due diligence, reporting, identification and record-keeping requirements applying to all financial intermediaries; and
- sanctions in case of non-compliance.

Article 305^{bis} of the Swiss Criminal Code (“SCC”) contains the criminal provision that prohibits all forms of money laundering. It states that “[a]ny person who carries out an act that is aimed at frustrating the identification of the origin, the tracing or the forfeiture of assets which he knows or must assume originate from a felony or aggravated tax misdemeanour is liable to a custodial sentence not exceeding three years or to a monetary penalty”.

Financial intermediaries may be divided into two groups:

- Financial intermediaries belong to the “*banking sector*” if they are subject to comprehensive, prudential regulation under special legislation covering the whole range of their activities. Under these special laws, a financial intermediary is supervised in its activities by the appropriate regulatory authority designated in each of these laws. Such financial intermediaries are for example banks, holders of a FinTech license, portfolio managers, trustees, securities firms, insurance companies or certain payment systems.⁸⁰
- Financial intermediaries belong to the “*non-banking sector*” if they “on a professional basis accept or hold on deposit assets belonging to third parties or assist in the investment or transfer of such assets”.⁸¹ According to a non-exhaustive list, this definition covers in particular persons who: (i) carry out credit transactions (in particular in relation to consumer

loans or mortgages, factoring, commercial financing or financial leasing), (ii) provide services related to payment transactions, in particular by carrying out electronic transfers on behalf of other persons, or who issue or manage means of payment such as credit cards, (iii) trade for their own account or for the account of others in banknotes and coins, money market instruments, foreign exchange, precious metals, commodities and securities (stocks and shares and value rights) as well as their derivatives, (iv) manage assets, (v) make investments as investment advisers or (vi) hold securities on deposit or manage securities.⁸² Before engaging in business activities, such financial intermediaries must join a self-regulatory organisation recognised by *FINMA*.⁸³

Many activities typically conducted by FinTech companies, as for example business models involving holding or depositing assets on behalf of clients, are subject to anti-money laundering regulation. Basically, there are four approaches for FinTech companies to handle anti-money laundering regulation:

- (i) they may completely refrain from financial intermediation activities;
- (ii) they may cooperate with a regulated financial intermediary, such as a bank, as far as financial intermediation activities are required;
- (iii) they may join a self-regulatory organisation and comply with anti-money laundering regulation; or
- (iv) if they are financial intermediaries belonging to the “*non-banking sector*”,⁸⁴ they may structure their business model in such way that they provide their services only to financial intermediaries belong to the “*banking sector*”⁸⁵ or to foreign financial intermediaries who are subject to equivalent supervision.

Apart from a few exceptions,⁸⁶ all *professional* financial intermediaries are subject to the AMLA. A financial intermediary is generally deemed to engage in financial intermediation on a professional basis.⁸⁷

⁸⁰ Article 2 para. 2 AMLA.

⁸¹ Article 2 para. 3 AMLA.

⁸² The Anti-Money Laundering Ordinance (“AMLO”) and *FINMA*-Circular 2011/1 set out further details as to when the professional practice of financial intermediation is subject to supervision.

⁸³ Article 14 para. 1 AMLA.

⁸⁴ Article 2 para. 3 AMLA.

⁸⁵ Article 2 para. 2 AMLA.

⁸⁶ Article 2 para. 4 AMLA.

⁸⁷ Article 7 para. 1 AMLO.

- if its activity generates a gross revenue of more than CHF 50,000 per calendar year;
- if it enters into business relationships with more than 20 contracting parties per calendar year that are not limited to a one-time activity or if it maintains at least 20 such relationships per calendar year;
- if it has unlimited power to dispose over assets belonging to others exceeding CHF 5 million at any point in time; or
- if it executes transactions of a total volume exceeding CHF 2 million per calendar year.

The financial intermediaries' duties are set out in AMLA⁸⁸ and implementing ordinances and regulations.⁸⁹ Key duties are:

- duty to personally identify the client, i.e., the contracting party;
- duty to identify the beneficial owner / economic beneficiary of the assets;
- duty to re-identify the beneficial owner / economic beneficiary of the assets in certain circumstances;
- specific clarification / verification duties amongst others with regard to transactions or business relationships with heightened risks;
- duties relating to documentation of transactions and verifications as well as relating to record keeping;
- duty to implement organisational measures, e.g., regarding training of employees and controls;
- duty to report cases of suspicions of money laundering to the *Money Laundering Reporting Office Switzerland* ("MROS").

Under certain circumstances and provided that specific requirements are met reduced duties may apply.

3.1.2.2.5. Consumer Credits

The Consumer Credit Act ("CCA") applies to consumer credits, i.e., loans granted to individuals on a professional basis for purposes other than business or commer-

cial activities. As per April 1, 2019, also loans granted on a non-professional basis may be subject to the CCA, provided they are granted in cooperation with a crowdlending broker (*Schwarmkredit-Vermittler*), e.g., an operator of a crowdlending platform.⁹⁰

Therefore, FinTech companies may need to take into account the special regulations relating to consumer credits. The following duties / rights under the CCA may be of particular importance:

- duty to obtain a license in order to be allowed to grant or broker loans to consumers on a professional basis;⁹¹
- restrictions relating to the advertisement for consumer credits;⁹²
- requirements regarding the form and content of consumer credit agreements;⁹³
- duty not to exceed the maximum effective annual interest rate set by the *Swiss Federal Council*;⁹⁴
- duty to check the consumer's creditworthiness⁹⁵ as well as the right to access the information made available by the Credit Information Office (*Informationsstelle für Konsumkredit*).⁹⁶

3.1.2.2.6. Collective Investment Schemes

Collective investment schemes are "funds raised from investors for the purpose of collective investment, and which are managed for the account of such investors".⁹⁷ Generally, collective investment schemes regulation must be considered whenever a particular business model of a FinTech company entails the pooling of funds or risks in connection with an investment.

An entity or a financial product qualifies as a collective investment scheme if the following criteria are met: (1) funds (2) that are raised from (more than one) investors (3) for the purpose of being collectively managed (4) for the account of such investors, (5) whereby the investors' investment needs are met on an equal basis.

⁸⁸ See article 3 et seqq. AMLA.

⁸⁹ The agreement relating to the Swiss banks' code of conduct with regard to the exercise of due diligence (VSB 16) is of particular importance. It contains a detailed set of rules in connection with the identification of clients and beneficial owners.

⁹⁰ Article 2 let b. CCA.

⁹¹ Article 39 CCA.

⁹² Article 36 et seqq. CCA.

⁹³ Article 9 et seqq. CCA.

⁹⁴ Article 14 CCA.

⁹⁵ Article 22 CCA, article 28 et seqq. CCA.

⁹⁶ Article 23 et seqq. CCA.

⁹⁷ Article 7 CISA.

Due to the entry into force of the FinSA (see Section 3.1.1.1 above) and the FinIA (see Section 3.1.1.2 above) the Swiss regulatory framework applicable to collective investment schemes changes fundamentally. The licensing requirements as well as the supervision of fund management companies and managers of collective assets is now covered by the FinSA. Furthermore, the rules regarding the acquisition or disposal of units in collective investment schemes as well as the offering of such financial instruments will, subject to phase-in periods, be governed by the FinSA. It must be noted, however, that units in collective investment schemes are the only Financial Instrument covered by the FinSA that will be subject to additional product-specific supervisory rules. These product-specific rules, such as the approval requirement for collective investment schemes, will continue to be set out in the CISA and its implementing regulation.

3.1.3. DLT and Blockchain – Current and Future Swiss Regulatory Framework

Recently, Switzerland saw remarkable developments towards a “next phase” of distributed ledger technology (“DLT”) and blockchain related business activities:

- In August 2018, *FINMA* granted the first asset manager of collective investment schemes license to a company focusing on investment management in the area of crypto-assets (*Crypto Fund AG*);
- In November 2018, the world’s first exchange traded product for investments in crypto-assets was launched on the *Swiss stock exchange SIX* (by *Amun AG*);
- In August 2019, *FINMA* granted banking as well as securities dealer licenses to two companies focusing on products and services relating to digital assets (*Sygnum Bank AG* and *SEBA Bank AG*);
- Finally, *SIX Digital Exchange AG* (“SDX”), a subsidiary of the *Swiss stock exchange SIX*, is continuing to build a fully regulated trading, settlement and custody infrastructure for digital assets and other market participants like *aura AG* are very active in the field of tokenization of traditional financial instruments such as shares too. In this context, it must also be noted that in October 2019 the *Swiss stock exchange SIX* announced a cooperation with the *Swiss National Bank*,

which aims at exploring technological options to make *digital central bank money* available for the trading and settlement of tokenized assets. The technological basis shall be provided by *SDX*, using distributed ledger technology.⁹⁸

The attitude of Switzerland’s federal government, the *Federal Council*, and *FINMA* towards developments such as DLT and blockchain was and still is positive. This holds true even though projects such as the global currency *Libra*⁹⁹ may, according to one member of the Swiss federal government, in their envisaged form and given the international concerns raised currently not (yet) be licensed in Switzerland.¹⁰⁰

In December 2018, the *Federal Council* published a detailed report covering the legal framework for DLT and blockchain in Switzerland. The report concluded that the existing Swiss legal framework is basically “fit” for technical developments such as DLT and blockchain. Nonetheless, a need for selective improvements was identified.

Only a few months later, the *Federal Council* had an initial draft law prepared, which then went through a comprehensive public consultation process. Based on feedback received, the *Federal Council* published the finalized draft law concerning DLT and blockchain (“DLT Draft Law”) on November 27, 2019.

In 2020, the DLT Draft Law will be submitted to the *Swiss Parliament* for adoption and an entry into force in 2021 seems possible.

This subchapter first discusses select aspects of the current Swiss regulatory framework applicable to DLT and blockchain (Section 3.1.3.1). Then the cornerstones of the DLT Draft Law are summarised (Section 3.1.3.2).

3.1.3.1. Current Regulatory Framework

A key element of the current Swiss regulatory framework applicable to DLT and blockchain is the categorisation of tokens introduced by *FINMA* in its “ICO Guidelines” of February 16, 2018.¹⁰¹ *FINMA*, as well as apparently the *Federal Council*, distinguish the following categories of tokens:

⁹⁸ See SIX Media Release of October 8, 2019 (SIX, 2019).

⁹⁹ See the *Libra White Paper* (Libra, 2019a).

¹⁰⁰ See NZZ of December 27, 2019 (NZZ, 2019).

¹⁰¹ See Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICO’s), published February 16, 2018 (FINMA, 2018b).

- *Payment tokens* (according to *FINMA*, synonymous with “pure” cryptocurrencies), are tokens which are intended to be used, now or in the future, as a means of payment for acquiring goods or services or as a means of money or value transfer. Such cryptocurrencies do not give rise to any claims towards an issuer or a third party. Consequently, according to the prevailing view, these tokens are “purely factual intangible assets”. Examples of such cryptocurrencies are bitcoin (including numerous “altcoins” built upon the basic technical framework used for bitcoin) or Ether.
- *Utility tokens* are tokens that are intended to provide access digitally to an application or service by means of a DLT-based infrastructure.
- *Asset tokens* represent assets such as a debt or equity claim against the issuer. Asset tokens promise, for example, a share in future company earnings or future capital flows. In terms of their economic function, therefore, such tokens are analogous to equities, bonds or derivatives. Tokens which enable physical assets to be traded on a DLT-infrastructure also fall into this category according to *FINMA*.

FINMA points out that tokens may fall into more than one of these three basic categories: such *hybrid* tokens are, for example, asset tokens or utility tokens, which at the same time also qualify as payment tokens.

On September 11, 2019, *FINMA* published a supplement to its “ICO Guidelines”, which focused exclusively on “stable coins” (“Stable Coins Guidelines”).¹⁰² These Stable Coins Guidelines were published against the background of a request of the *Libra Association*, i.e., the not-for-profit entity domiciled in Switzerland, which fosters the development of the planned global currency Libra.¹⁰³ The *Libra Association* had asked *FINMA* for an assessment of how the Libra project, in particular the issuance of the Libra “stable coin”, would likely be treated under Swiss financial market law. *FINMA* took this opportunity to not only provide its initial views on Libra, but to publish the comprehensive Stable Coins Guidelines, which indicate how *FINMA* will likely assess projects involving such tokens linked to assets.

FINMA pointed out that it will continue to apply a “substance over form” approach as a general principle,

also with regard to “stable coins”, just as it did and still does with regard to any other kinds of tokens. *FINMA* furthermore mentioned that the design and the technical details of “stable coins” vary substantially. Nonetheless, according to *FINMA*, “stable coins” may on a high-level be categorised based on (i) the type of “underlying” or asset backing the coin and (ii) the rights which holders of such coins have:

- *Currency backed coins*: If a stable coin is backed by currencies and the holders of such a coin have a right towards the issuer to redeem the coin at a fixed price (e.g., 1 coin for 1 CHF), such issuer may be deemed to accept deposits from the public and hence licensing requirements under the Banking Act might be triggered (see Section 3.1.2.2.1 above). If a coin is backed by a *basket* of currencies and if the holders of such coin have a right towards the issuer to redeem the coin at the current value of such a basket (net asset value), such coin may qualify as a unit in a collective investment scheme and hence trigger licensing requirements under the Collective Investment Schemes Act (see Section 3.1.2.2.6 above). Also, such currency backed stable coins might constitute a payment system (see Section 3.1.2.2.3 above).
- *Commodities backed coins*: If a stable coin is backed by commodities, the regulatory consequences depend on the type of commodity and whether the holders of such a coin have only (i) a contractual claim against an issuer or whether they have (ii) a right in rem with regard to the underlying commodity. In the latter case, financial market regulation does generally not apply and the stable coin does in particular not qualify as a security, if certain requirements are met. If the coin only grants a contractual claim, however, this likely triggers requirements under the Banking Act (if the commodities are precious metals) or the coin may qualify as a security or a derivative (if the commodities are other commodities than precious metals). Furthermore, such commodity backed stable coins may possibly also constitute units in collective investment schemes.
- *Real estate backed coins*: If a stable coin is backed by real estate, such a coin constitutes likely a unit in a collective investment scheme and hence triggers licensing requirements under the Collective Investment Schemes Act (see Section 3.1.2.2.6 above).

¹⁰² See *FINMA* media release of September 11, 2019 (*FINMA*, 2019).

¹⁰³ See the *Libra White Paper* (*Libra*, 2019a).

- *Securities backed coins*: If a stable coin is backed by a single security (e.g., shares of a particular company), then the coin as such will likely qualify as a security, too, and may, depending on the specifics of the individual case, constitute a derivative or even a structured product. If the coin is backed by a *basket* of securities, however, it will in most cases constitute a unit in a collective investment scheme (see Section 3.1.2.2.6 above).

It must be noted that these *FINMA* guidelines are of indicative nature only and not legally binding. In any case, however, the particularities of a “stable coin” project will need to be assessed based on the relevant details of the envisaged design of the token and the legal relationships between the parties involved.

With the regard to the questions, whether a particular token (or coin) is a Financial Instrument (see Section 3.1.1.1. above) for the purposes of the FinSA, the following must be noted:

- Whether a token is a Financial Instrument or not depends on its economic function and, derived from this, what rights are being represented by or linked to that particular token. Consequently, it must be assessed on a case-by-case basis whether a particular token is a Financial Instrument or not.
- *Asset tokens*, *hybrid tokens* and *stable coins* granting their holders for example participation and voting rights in a corporation or rights to the repayment of debt are likely Financial Instrument for the purposes of the FinSA.
- *Payment tokens* are to date not treated as securities by FINMA and are generally¹⁰⁴ no Financial Instruments for the purposes of the FinSA
- *Utility tokens* too are currently not treated as securities by FINMA, provided (i) their sole purpose is to confer digital access rights to an application or service and (ii) the tokens can actually already be used in this manner when they are issued. Such “pure” utility tokens, which neither partially nor exclusively functions as an investment in economic terms, are

also no Financial Instruments for the purposes of the FinSA.

3.1.3.2. DLT Draft Law

The cornerstones of the DLT Draft Law of November 27, 2019, are the introduction of so-called Uncertificated Register Securities (*Registerwertrechte*) (Section 3.1.3.2.1), an envisaged new license category for operators of DLT trading venues (*DLT Handelsplattformen*) (Section 3.1.3.2.2) and the introduction of rules governing the segregation of crypto-assets and data in insolvency (Section 3.1.3.2.3).

3.1.3.2.1. Uncertificated Register Securities

The DLT Draft Law proposes the introduction of a new concept of so-called “Uncertificated Register Securities” (*Registerwertrechte*), which aims at increasing legal certainty in connection with the “tokenisation” of rights and financial instruments. If this concept will be introduced as currently envisaged, Swiss law would provide for the possibility of an electronic registration of rights that has the same functionality and entails the same protection as a negotiable security.

Legal positions admissible as underlying rights of such Uncertificated Register Securities include rights against issuers, such as contractual claims or membership rights (e.g., shares in a corporation). Consequently, asset tokens, utility tokens, hybrid tokens as well as “stable coins” (see Section 3.1.3.1 above) may be issued in the form of Uncertificated Register Securities. Payment tokens, i.e., cryptocurrencies, however, may not be issued in this form since they do not give rise to any claims, which could serve as an underlying right.

In order to create Uncertificated Register Securities the involved parties (e.g., the issuer of an instrument as debtor and the holders of the instrument as creditors) need to enter into a registration agreement (*Registrierungsvereinbarung*). Based on this agreement the relevant right (i) is entered into a so-called “Register of Uncertificated Securities” (*Wertrechtregister*) and (ii) may exclusively be asserted based on and transferred via this register.

¹⁰⁴ Payment tokens may constitute deposits (Einlagen) and could therefore potentially be in scope of article 3 let. a ciph. 6 FinSA: “Financial Instruments are (...) deposits whose redemption value or interest is risk- or price-dependent, (...)”.

The register used has to meet certain minimum requirements:

- (i) the register must, by means of technical procedures, grant the creditors, but not the debtor, actual power of disposal (*Verfügungsmacht*) over their rights;
- (ii) the register's integrity must be ensured by implementing the appropriate technical and organisational protective measures that prevent unauthorised changes (e.g., joint administration by several independent parties);
- (iii) the content of the registered rights, the functioning of the register itself and the registration agreement need to be recorded either directly in the register itself or in accompanying data linked to the register;
- (iv) creditors must be able to view the information and data which concerns themselves and they must be able to verify, without third party support or intervention, the integrity of the content of the register concerning themselves.

In its dispatch of the DLT Draft Law, the *Federal Council* mentions certain existing DLT-systems that are currently deemed suitable to fulfil the statutory minimum requirements. Both permissionless (e.g., Ethereum) as well as permissioned (e.g., Corda, Hyperledger Fabric) systems are mentioned in this (non-exhaustive) list.

Should the DLT Draft Law enter into force as currently planned, it will also allow to bridge the new framework with the "traditional" book-entry securities (*Bucheffekten*) concept. In particular, it will be possible to register Uncertificated Register Securities with a "traditional" custodian (e.g., a bank) and to subsequently book them into a "traditional" securities account. Hence, Uncertificated Register Securities could easily be transferred to the "old world", if desired.

3.1.3.2.2. DLT Trading Venues

Under current Swiss law, there are three categories of trading facilities: stock exchanges, multilateral trading facilities and organised trading facilities (see Section 3.1.2.2.2 above). Due to certain reasons, these categories

are deemed unsuitable for trading involving crypto-assets, e.g., because retail clients may to date not have direct access to stock exchanges or multilateral trading facilities. Instead, these trading venues are currently only open to holders of a securities firm license and certain other regulated participants.¹⁰⁵

In the DLT Draft Law, the *Federal Council* therefore proposes to introduce a new license category for (centralised) financial market infrastructures. These so-called "DLT Trading Venues" (*DLT-Handelssysteme*) may offer services in the areas of trading, clearing, settlement and custody of DLT-based assets not only to regulated financial market participants but also to unregulated corporates as well as individuals, potentially including retail clients.

A license as a DLT Trading Venue can be obtained by trading venues that allow for the simultaneous exchange of offers between several participants and the conclusion of contracts based on non-discretionary rules and, in addition, provide for: (1) the admission of unregulated corporates or individuals; (2) the custody of DLT Securities based on uniform rules and procedures; or (3) the clearing and settlement of trades in DLT Securities based on uniform rules and procedures.

"DLT Securities" (*DLT-Effekten*) are securities that are suitable for mass trading and either have the form of (i) Uncertificated Register Securities (*Registerwertrechte*) or the form of (ii) other uncertificated securities (*Wertrechte*) held in distributed electronic registers and which, by means of technical procedures, grant the creditors, but not the debtor, the actual power of disposal over the uncertificated securities.

Payment tokens as well as (mere) utility tokens that do not serve an investment purpose may not constitute DLT Securities since they are not considered securities in the first place. However, a DLT Trading Venue may also permit the trading of payment and utility tokens that do not qualify as DLT Securities.

¹⁰⁵ Article 34 para. 2 FMIA.

The licensing requirements for DLT Trading Venues are largely modelled after the existing requirements for traditional trading venues (i.e., stock exchanges and multilateral trading facilities). However, they are modified by adding specific rules with respect to, for example, the admission of participants and the admission of DLT Securities. Furthermore, the Federal Council may establish, or delegate authority to *FINMA* to establish, additional requirements for certain types of DLT Trading Venues, e.g., for DLT Trading Venues that will admit retail investors as participants and probably need higher standards of customer protection. However, the DLT Draft Law also gives discretion to the Federal Council to grant relief, or delegate authority to *FINMA* to grant relief, from certain requirements applicable to DLT Trading Venues that are considered “small” in terms of number of participants or trading and custody volume, respectively.

3.1.3.2.3. Insolvency

Crypto-assets (*kryptobasierte Vermögenswerte*) such as cryptocurrencies and tokenised financial instruments are often stored with third party custodians, such as for example exchanges or wallets providers.

It is currently unclear whether crypto-assets held by a custodian on behalf of a client will be segregated in bankruptcy, especially if the creditor or investor does not hold (any) private key(s). The DLT Draft Law therefore proposes to introduce a new segregation regime that will allow the segregation of crypto-assets for the benefit of the relevant creditors or investors, if certain requirements are met, including, in particular, the following:

- First, the relevant custodian must have the obligation vis-à-vis the relevant creditor or investor to keep the crypto-assets available for him at all times. This means that the custodian may, for example, not use such crypto-assets for proprietary business or own-account transactions.
- Second, the crypto-assets will only be segregated if they can be either (i) unambiguously allocated to the individual creditor or investor (however, there will be no need that such allocation occurs directly on the relevant DLT-system itself) or (ii) allocated to a community and it is evident what share of the joint holdings belongs to a given creditor or investor. The latter option will allow a pooling of crypto-assets held for several creditors or investors.

In addition, the access to data in insolvency in general shall be regulated too. Under current Swiss law it is not clear whether digital data stored by a third party custodian (e.g., a cloud provider) may be segregated from the bankruptcy estate, if such a custodian becomes insolvent. The *Federal Council* therefore proposed an amendment to Swiss insolvency law, which would establish a right to request segregation of digital data regardless of whether such data has any (market) value or not (e.g., a holiday picture). The person requesting such segregation must show that it has a particular entitlement to the data to be segregated (e.g., a statutory or contractual claim). Furthermore, the person requesting segregation might pay a fee in advance, which will then be used to cover the costs of the data retrieval and segregation.

3.2. Economic Environment

By Thomas Ankenbrand, Denis Bieri & Nicola Illi, Institute of Financial Services Zug IFZ

As for any industry, the general economic environment affects the degree to which FinTech companies are able to conduct business successfully. Different factors describe the economic environment, though the present subchapter focuses on three factors judged as particularly relevant for the FinTech sector. Of course, factors such as interest rates, exchange rates or the national GDP also affect the FinTech industry but will not be examined in further detail here. In a first step, the size of the market to which FinTech solutions may apply and the competition the Swiss FinTech companies are faced with is examined and estimated. In a second section, the financing aspect of both the Swiss and the global FinTech industry is examined, thereby taking a closer look at the venture capital, token sales, and exits in the industry. A third section, which focuses on Switzerland, addresses frameworks that seek to support and encourage FinTech companies such as incubators, accelerators, challenges, and awards.

3.2.1. Market Size and Competition

Every company and industry needs a market it can provide its products and services to, as does the Swiss FinTech industry. A market provides the demand needed to absorb the supply of FinTech solutions. The size of the market gives an indication as to the potential distribution of the solution. Though the exact size of such a market is difficult to assess, a brief descrip-

tion of the current market volumes and characteristics in the pre-defined FinTech product areas of *Payment, Deposit & Lending, Investment Management, and Banking Infrastructure* provides a rough insight to the Swiss market. Starting with the Swiss payment services sector, it can be described as an industry focused on the domestic market, with private individuals as a main customer segment on the one hand. Providing for a small domestic market of around eight and half million potential customers (Federal Statistical Office, 2018) therefore, the market can be described as relatively small. On the other hand, there is a potential segment of corporates or banks. The second field is that of the deposit & lending industry which can also be considered to be focused primarily on private individuals or corporates as the main customer segment. In this area, however, market volumes are estimated to be considerably larger than in the payment industry. The volume of credit issued by Swiss banks to corporates as of the end of 2018 amounted to CHF 530.8 billion, while the volumes in mortgages amounted to CHF 1,010.2 billion as of the end of 2018 (SwissBanking, 2019). The investment management industry is considered the largest out of the four mentioned fields in terms of market volumes in Switzerland. The industry serves customers in both the domestic and international market, with cross-border business constituting a considerable part of the industry. As of the end of

2018, CHF 2.3 trillion were managed through cross-border customer relationships, a further CHF 3.3 trillion were managed for companies and institutional clients, and CHF 1.4 trillion were domestic private assets managed by the industry in Switzerland (SwissBanking, 2019). The banking infrastructure segment is difficult to measure, as it combines different business models. The boundaries between national and international markets are also becoming increasingly blurred, which is reflected in the business models of FinTech companies analysed in Chapter 6. One market segment is represented by the banks themselves. Here, the trend of a decrease in the number of institutions and employees continues, as illustrated in Figure 3.1.

Though the incumbent and established financial institutions still hold a majority of the market share in Switzerland, increasing demand for digitalisation and changing customer needs are providing FinTech companies with the opportunity to enter the market. FinTech companies often hold the advantage of being smaller and considered more agile than larger, more established financial institutions and can thus more quickly adapt to the increasing demand from customers for digital and future oriented solutions. In addition, FinTech are found to have a material cost advantage when compared to the operating expenses of traditional banks (McKinsey & Company, 2019a). A

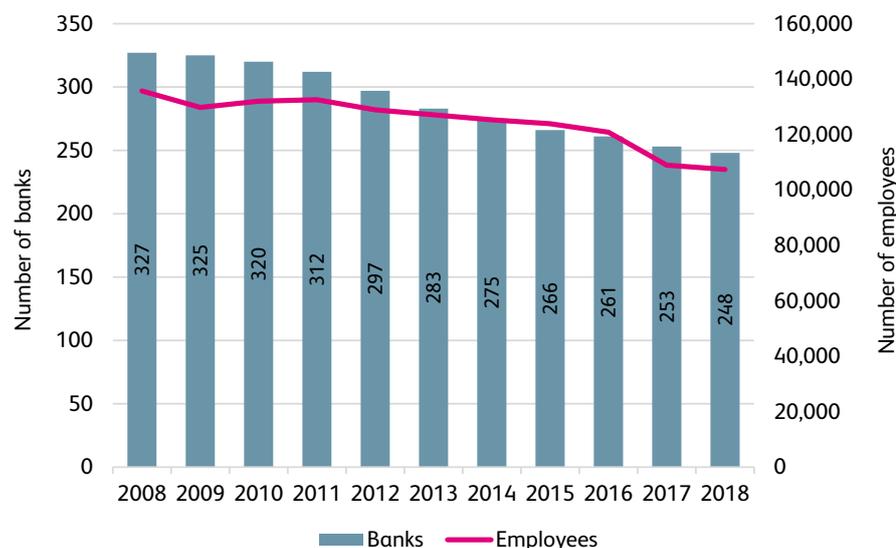


Figure 3.1: Number of banks and employees in the Swiss financial industry (Sources: Swiss National Bank (2019a; 2019b))

further advantage that FinTech companies hold is the fact that their business models are often built around a new technology from the beginning, whereas established companies must transform existing processes, making them less flexible (Deloitte, 2019). However, banks appear to be aware of the disadvantage created by their low level of flexibility, as in a recent survey among global retail banking executives, 32 percent stated the improvement of product agility as their top strategic priority by 2020 (The Economist & Temenos, 2019). In a comparison between the digital maturity of Swiss and European banks, though Swiss banks show a high degree of knowledge and insight in regards to digitalisation, they have yet to catch up on the actual implementation (Swiss Finance Institute & zeb, 2019). A further study concludes that although Swiss banks rank high in terms of digital maturity and the wide range of functionalities offered to their customers, they struggle to achieve good results in terms of user experience (Deloitte, 2018). This coincides with the results of the most recently conducted CIO Barometer, which shows user experience to be among the lower ranked priorities for IT departments at Swiss banks in relative terms (see Chapter 7 for further information). One possibility to allow Swiss banks to catch up in terms of their overall digital maturity and user experience could be the cooperation with FinTech companies. Many agree that the entrance of new actors in the financial industry should not be seen as a threat to the established financial institutions, but rather as an opportunity to benefit from the innovative ideas of FinTech companies and to establish a situation of healthy competition in the industry, thereby creating a win-win-win situation for customers, established companies, and FinTech companies at the same time (e.g., Swiss Finance Institute & zeb, 2019). This idea is supported by the results of a survey among Swiss banks in regard to their digitalisation strategies. A survey by the *Swiss National Bank* (SNB) among 34 Swiss banks examines how banks seek to respond to the trend of digitalisation and the presence of FinTech companies in the industry. Less than 20 percent of the surveyed banks view FinTech companies as emerging competition, while almost 40 percent see BigTechs and digital banks¹⁰⁶ as relevant competitors (Swiss National Bank, 2019c). This is also consistent with the results of the previous editions of the IFZ FinTech Study, which showed that the IT-driven revenue mod-

els of a large number of Swiss FinTech companies differ from those of traditional banks. In addition, among the larger banks included in the SNB survey, cooperation with FinTech companies is cited as the second most relevant strategy behind innovation measures within the bank (Swiss National Bank, 2019c). The Swiss financial industry witnessed a few such partnerships in the year 2019 such as *Vontobel* cooperating with *Taurus Group SA* to offer customers custodian services for crypto assets (Hody, 2019), *Hypothekarbank Lenzburg* partnering with *Token Suisse AG* in order to be able to offer new service products to crypto and blockchain companies (finews.ch, 2019), or *SIX Group AG* cooperating with *Billte AG* for its eBill solution (startupticker.ch, 2019a). On a global scale, partnerships between established banks and FinTech companies are already considered an efficient way of scaling banks' business models and already implemented by 79 percent of leading banks according to a global survey (McKinsey & Company, 2019a). According to a further global survey which examines banks as investors in FinTech companies, 31 percent of the respondents claim to invest in FinTech start-ups as part of their innovation strategy (The Economist & Temenos, 2019). Though newcomers to the industry are seen by many as innovation partners as opposed to competition, APIs must be developed to fully reap the benefits of cooperation (Landis, 2019). According to the results of a global study, as of recently, open banking functionalities are not yet being offered to a sufficient degree in Switzerland (Deloitte, 2018). By contrast, the implementation of the Payment Services Directive 2 (PSD2) in the European Union allows FinTech companies to provide their innovative solutions in EU member states, creating a potential threat to business in Switzerland. The *Swiss Bankers Association* has identified this issue and seeks to counteract it by working on resolving existing legal and data security questions related to the topic of open banking (Landis, 2019; for further information on open banking see Subchapter 3.4.2). The aim is to promote the creation of standardised APIs to facilitate the integration of FinTech and third party solutions into the banking system, thereby adapting to customers' demand for digital solutions and enabling banks to benefit from the FinTech ecosystem (Landis, 2019). A key factor to facilitating the adoption of new solutions through open banking is consumer education, for which the primary responsi-

¹⁰⁶ It should be noted that according to the definition of the present study, digital banks are also considered FinTech companies.

bility, as a major actor in the financial industry, lies with the banks (The Paypers, 2019). Resolving these issues would represent a further step in paving the way for FinTech companies in Switzerland to gain increased access to the Swiss market and enhance cooperation opportunities in the Swiss financial services market.

3.2.2. Venture Capital and Token Sales in FinTech

Venture capital (VC) and token sales are two forms of financing which have increasingly been sought by FinTech companies globally in the past years. As revealed in Figure 3.2, venture capital activity reached a record high in the year 2018, counting a total of 1,967 rounds with a total volume of USD 41 billion. At the time of writing, information on the global venture capital activity was only available for the first three quarters of the year 2019. Over this time period, a total of 1,387 venture capital rounds were conducted by FinTech companies globally, raising a total of USD 25 billion. This volume is therefore only slightly less than the total USD 27 billion raised in 2018, not including the USD 14 billion round by *Ant Financial* in the second quarter of 2018, and is already larger than the total annual venture capital volumes in the years 2015, 2016 and 2017.

Of the total USD 25 billion invested in the first three quarters of 2019, the largest share is accounted for by

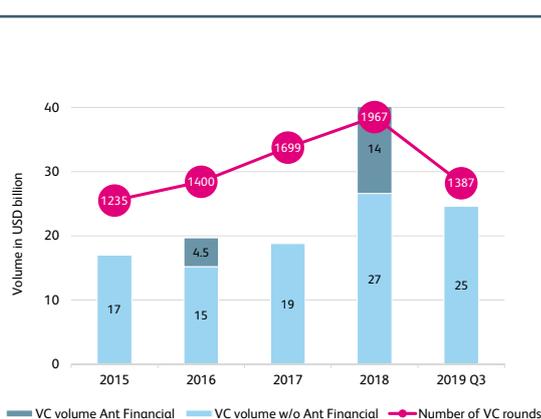


Figure 3.2: Global venture capital investments in FinTech (Source: CB Insights (2019a))

the Northern American region (56 %), followed by Europe (21 %), and Asia (16 %). When looking at the distribution of venture capital investment volume over the various stages of the company life cycle, it can be observed, on the one hand, that the largest share is invested in FinTech companies in the series B (and later) stage (43 %). Companies conducting seed and series A rounds, on the other hand, account for 31 and 26 percent, respectively (CB Insights, 2019a).

A similar development to the global venture capital activity can also be found for Switzerland. Following a record breaking year in terms of funding volumes in the Swiss FinTech sector in 2018, a slowdown in the funding volumes can be identified for the year 2019. Though they still increased compared to the year 2018, the number of funding rounds appear to be levelling out. As illustrated in Figure 3.3, a total of 74 funding rounds were conducted by Swiss FinTech companies in the year 2019, raising a total amount of roughly CHF 210 million.¹⁰⁷ This constitutes a nine percent increase in funding rounds and 35 percent decrease in funding volumes compared to the year 2018. Typically, seed capital is considered the initial capital infusion to enable to kick start a new business. Series A capital is thought to further develop a company's products and services and to allow early stage business operations. Having established a business model and conducted first business operations, series B capital is generally raised at a later stage of the business life cycle in order to expand the work force and market reach of a company – with high volumes in series B capital investments thus indicating an increased level of maturity of the business (Reiff, 2019). Taking a closer look at the funding volumes in Figure 3.3, a clear shift from seed capital towards series B funding can be observed. On the one hand, while the majority of the funding volumes in 2018 were attributed to seed capital, of which half was accounted for by a CHF 100 million seed capital investment in *SEBA Bank AG*, this type of capital only accounted for around eleven percent of the funding volume in 2019. On the other hand, series B funding rounds increased in volume in the year 2019 to a total of 21 funding rounds and accounted for over half of the total volume (59 %), while series A capital accounted for the remaining 30 per-

¹⁰⁷ The total amount of venture capital investments into Swiss FinTech start-ups amounted to CHF 360 million raised in 39 rounds, according to the Swiss Venture Capital Report 2020 (startupticker.ch, 2020). However, this includes the two series B investment rounds of a total of CHF 300 million in *FinanceApp AG (wefox)*, which is considered an InsurTech in the framework of the present study and is therefore not included in the venture capital investment volume in Figure 3.3.

cent. The development of the volume of series B capital gives an indication as to how the Swiss FinTech industry has evolved, namely towards a more mature industry. Series B capital dominated the venture capital environment in the Swiss FinTech industry in 2019, and exhibited a high volume growth rate in 2019 compared to the previous year (+115 %), indicating the increased relevance of later stage funding for the Swiss FinTech industry. From those investment rounds captured in the sample, the three largest are all series B funding rounds. Among them are, for example, the over CHF 40 million raised by *Numbrs Personal Finance AG* (Netzwoche, 2019), or the CHF 22 million raised by Loanbox operated by *Swiss FinTech AG* (startupticker.ch, 2019b). This conclusion aligns with both the figures found for the global FinTech sector as a whole, as well as with the results found for the European start-up industry. According to a recent study of European venture capital investments (across all industries), late stage funding rounds became more frequent in 2019 (Pitchbook, 2019). The Swiss Venture Capital Report 2020 also supports this conclusion, stating a strong growth in later stage investments in particular for the Swiss ICT, FinTech, and Biotech sectors in 2019 (startupticker.ch, 2020).

Figure 3.4 illustrates the investments in the Swiss FinTech industry in 2019 according to the business models of the beneficent companies. According to the results of the analysis, the majority of the investment volumes (57 %) were invested in FinTech companies which sup-

ply to both businesses and consumers (B2B & B2C business model). In the Swiss FinTech environment, these companies make up around 42 percent of the number of FinTech companies and therefore have slightly disproportionately higher investment volumes in comparison. This segment is followed by the companies which only target businesses as a customer segment (B2B), to which 32 percent of the funding volumes were attributed in 2019. With these companies representing 53 percent of the FinTech companies in Switzerland, the funding volumes attributed to this group are disproportionately lower in comparison to their number in the Swiss FinTech market. The remaining eleven percent of the funding volumes in the Swiss FinTech industry in 2019 are accounted for by companies supplying only to consumers, while in terms of the number of firms, this group represents around five percent of the FinTech companies in Switzerland. With 74 percent of Swiss FinTech companies supplying to both international and Swiss customers, as opposed to supplying exclusively to Swiss customers, these companies attract 92 percent of the investment volumes in the Swiss FinTech sector. It should be noted, however, that the investment volumes in Figure 3.4 do not include investment rounds for which no data on the volumes were available, meaning the percentages could be biased due to missing data.

One way to invest in Swiss FinTech companies is through venture capital funds targeting the industry. 2019 witnessed the creation of a new tech fund set up by a

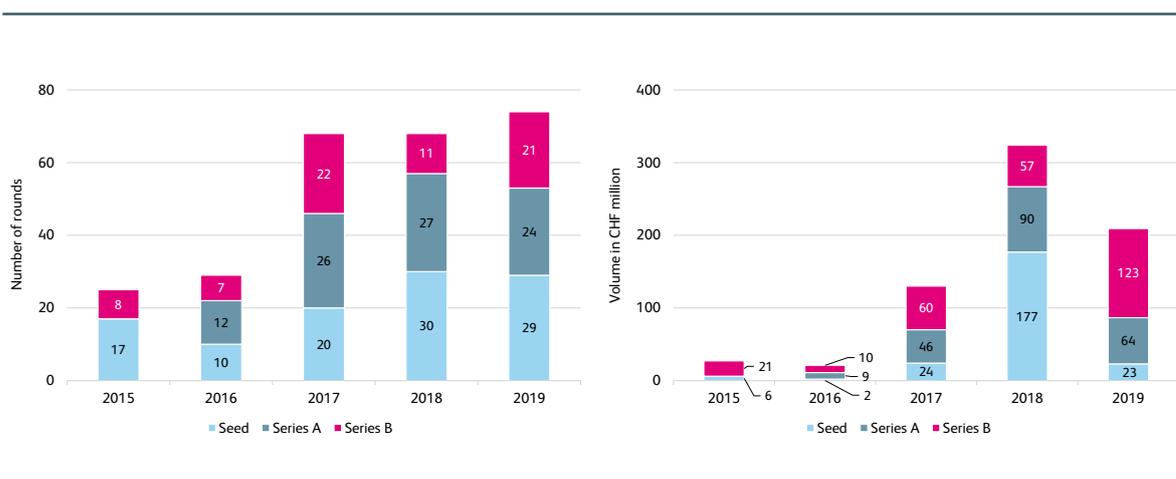


Figure 3.3: Venture capital invested in Swiss FinTech companies, as of December 31, 2019¹⁰⁸

¹⁰⁸ In this analysis, all later stage funding rounds, e.g., series B or series C, are summarised as series B funding.

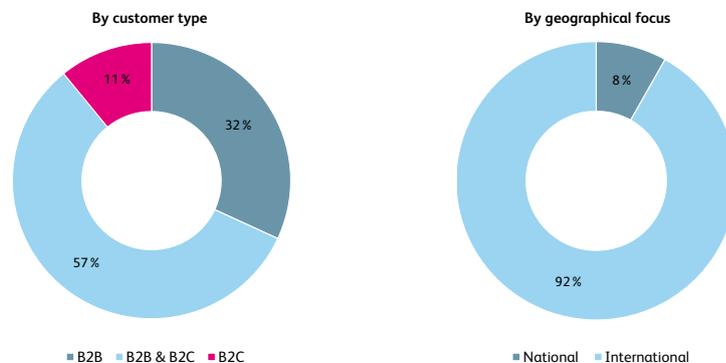


Figure 3.4: Percentage of investment volumes in the Swiss FinTech industry according to the FinTech company's customer segment, as of December 31, 2019 (n=44)

group of Swiss founders, *Wingman Ventures*. The fund seeks to invest USD 60 million exclusively in Swiss tech start-ups (Fintech Switzerland, 2019a). Also in 2019, *Spicehaus Partners* launched a venture fund targeting start-ups in the area of digitalisation. The goal is to acquire CHF 50 million in funds by the end of 2020, which can then be invested in the Swiss tech start-up industry (inside-it.ch, 2019a).

A further way capital can flow into the FinTech industry is through blockchain-based token sales¹⁰⁹ in exchange for funds, commonly referred to as initial coin offerings (ICOs). As shown in Figure 3.5, token sale activities sharply decreased in the past year, both globally (left-hand graph) and specifically in the Swiss FinTech sector (right-hand graph). While the number of token sales conducted in 2018 amounted to 991 in all sectors worldwide, the figure for 2019 lies at 120 (CoinSchedule, 2019). This corresponds to a year-over-year decrease of 88 percent. The total volume raised by token sales worldwide decreased similarly. While the total volume was around USD 22 billion in 2018, it fell to USD 3.3 billion in 2019, representing a decline of 85 percent. Of the USD 3.3 billion raised globally, roughly 62 percent were accounted for by companies active in the fields of finance, payments, and trading & investing (CoinSchedule, 2019). A further notable development in the year 2019 is the emergence of so-called initial exchange offerings (IEOs). An IEO is technically a special form of a token sale, with the tokens being issued through a crypto exchange, rather than directly to investors (Beedham, 2019). For investors, this has the advantage that the projects are subjected

to listing requirements by the exchange and thus have a certain level of credibility. As a further advantage, the tokens are listed immediately after their issuance. The advantages for the token issuer are that the entire token sale process is outsourced to the crypto exchange, although a fee is charged. Of the total token sale activity in 2019, slightly more than half of the financing rounds (51%) and the total volume of funds (52%) raised were accounted for by IEOs (CoinSchedule, 2019). The largest IEO was conducted by the crypto exchange *Bitfinex* using its own platform. *Bitfinex's* IEO raised a total of USD 1 billion in ten days (Canellis, 2019). A second IEO platform that revealed significant activity is *Binance Launchpad*, which hosted a total of eleven IEOs in the year 2019 (Binance, 2019).

For the Swiss FinTech sector, the year 2017 constituted a record year with USD 668 million raised across 16 token sales (see Figure 3.5, right-hand graph). Though the number of token sales remained relatively stable in 2018, the volumes raised dropped to USD 386 million in 2018. The decrease in volumes as well as number of token sales was even more pronounced in 2019, with a mere USD 10 million raised by Swiss FinTech companies through four token sales in 2019. The largest Swiss token sale in 2019 was conducted by *Smart Valor AG* at the beginning of 2019, raising almost USD 6 million (ICObench, 2019). Despite the significant decline in the token sale activity in 2019, Switzerland was in the global focus with regard to cryptographic assets due to the establishment of the *Libra Association* in Geneva. The association is a Facebook-led consortium

¹⁰⁹ As this section focuses on the financing of FinTech companies, only token sales with a corresponding purpose are considered. Volumes of asset-backed tokens, such as some types of stablecoins, are therefore not included in the figures.

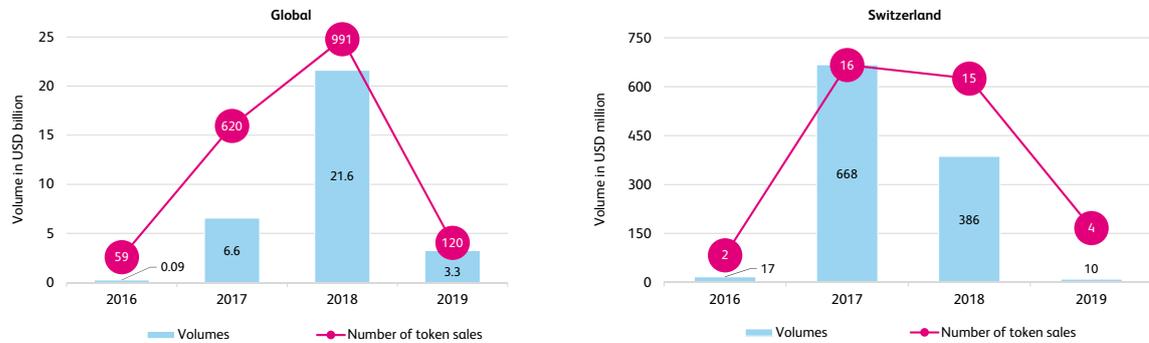


Figure 3.5: ICOs in the global (left-hand graph) and Swiss (right-hand graph) FinTech sectors respectively, as of December 31, 2019 (Source: CoinSchedule (2019))

of large companies with the aim of launching a global stablecoin, backed by a reserve of fiat assets (Libra, 2019b). Of the 28 members named in the June 2019 announcement, seven withdrew from the project by the end of the same year (Bloomberg, 2019). Besides Libra, there are further Swiss-based stablecoins which are either already being traded or are in planning. These include the Swiss Franc-backed stablecoins CryptoFranc (XCHF) managed by *Swiss Crypto Tokens AG*, CHFt by *Smart Valor*, CHF³⁶ by *element36*, and ROCKZ by *Alprockz*.

In summary, the volumes of venture capital investments and token sales in the FinTech industry appear to be decreasing both globally and for Switzerland individually. But there is another aspect: the appearance of exits in the FinTech ecosystem. An exit describes the phenomenon of the founders, or in some cases external investors in the company, selling their equity stake. This happens either through the acquisition of the company by another party or by the company going public through an initial public offering (IPO). The appearance of exits in the FinTech market constitutes an important indicator for the sector as this points to a certain level of maturity of an ecosystem. Ideally, the founders make a profit upon liquidating their position, meaning they receive their initial investment plus a profit from the sale of their stake. In the case of a dynamic industry like the Swiss FinTech sector, this can have an important effect on the dynamic of the ecosystem. Founders who are able to exit on a profit are able to reinvest in new opportunities and companies, found new companies, or act as mentors to other FinTech companies in the ecosystem (startupticker.ch,

2019c), and thus further develop the industry. According to the Swiss Startup Radar 2019/2020, which considers start-up companies across different industries, 36 percent of founders retain an executive position in the company upon selling their stake, 30 percent act as serial entrepreneurs in different start-up companies, 14 percent invest in further companies, and eight percent support other founders as mentors or consultants (startupticker.ch, 2019c).

With the average age of a FinTech company at the realisation of an exit lying at 7.7 years according to a global report (Mind the Bridge, 2019), a fair amount of exiting activity in the Swiss FinTech market could be expected (with 70 companies in the database being founded in or prior to the year 2012, see Figure 6.4). However, apart from a few exceptions which are described below, the number of companies being acquired or going public in Switzerland does not yet seem to have caught up. This, despite the fact that in general, European FinTech companies have been found to create over twice the amount of value compared to any other tech industries in Europe (Dealroom, 2019), making investments and the corresponding exit particularly attractive for venture capital investors. The Swiss Startup Radar 2019/2020 points out some possible explanations for the lack of exits in the Swiss start-up market in general. Acquirers in the Swiss start-up sector appear to be more risk averse than those in other markets such as the Israeli or US market. This risk aversion and caution leads to longer and slower processes in the acquisition of start-up companies (startupticker.ch, 2019c). As a further point, the Swiss Startup Radar 2019/2020 mentions the general start-up eco-

system in Switzerland being characterised by a high degree of industry diversity, which could have the effect of slowing down investments, as investors need to acquire specific knowledge on a different industry before each investment. These weaknesses of the Swiss start-up ecosystem could seek to be counteracted by increasing the transparency and availability of data on start-ups to make valuations easier, and thus the investment in Swiss start-up companies more attractive (startupticker.ch, 2019c).

Figure 3.6 illustrates the development of the number of FinTech acquisitions between 2000 and 2019 across continents, with the data sourced from the information platform *Crunchbase* (as of January 1, 2020).¹¹⁰ The deals are attributed to the corresponding continent based on the country of headquarters of the acquired company. The figure shows a relatively consistent upwards trend in the number of acquisitions. North America is the clear leader in terms of the number of FinTech company acquisitions across the entire period, hosting a minimum of 50 percent of the deals in the majority of the years. A very recent example of

an exit in the American FinTech industry is the acquisition of *Plaid*, a financial services API company, by *Visa* in January 2020 for USD 5.3 billion (Wilhelm & Miller, 2020). The second largest percentage of acquisition deals were met in Europe, which has hosted 30 percent of the FinTech acquisition deals on average over the last decade. Though to date only holding a small percentage of the global FinTech acquisition deals, Asian FinTech deals grew by over 200 percent between 2017 and 2018 from 6 deals to 19 deals, respectively. For the moment however, the North American and European FinTech markets see the most activity in acquisition deals. This is confirmed by a study by the European Union which further suggests that the exit of FinTech start-ups in the European Union mainly happens through acquisitions as opposed to IPOs (European Union, 2018). In addition, the study finds a strong geographical endogamy in acquisition deals with European FinTech companies generally being acquired by European companies and US FinTech companies generally being acquired by US companies (European Union, 2018).

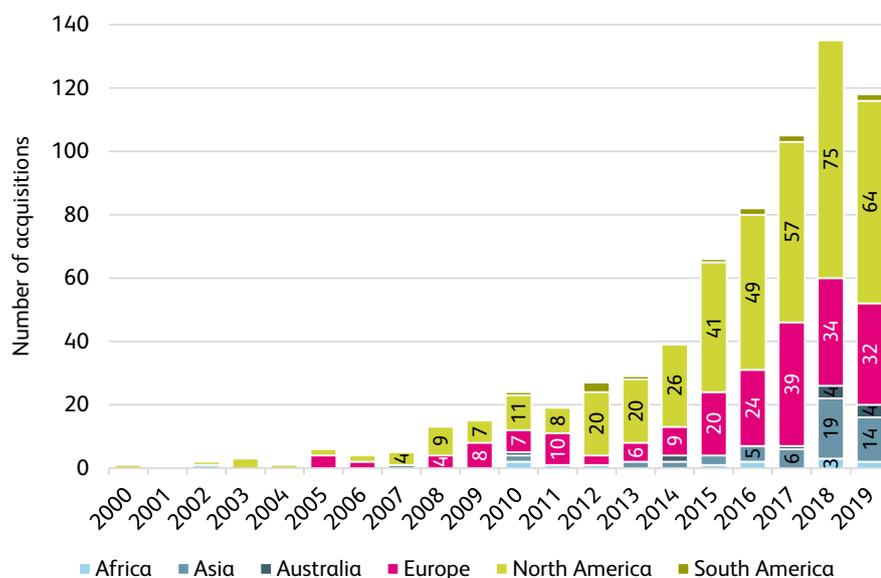


Figure 3.6: Number of FinTech acquisitions by continent, 2000-2019 (Source: Crunchbase (2020))

¹¹⁰ Please note that whenever external data sources are accessed in the present study, a bias of the data cannot be completely ruled out. This may be due, for example, to the fact that certain sources have a specific thematic or geographical focus or are potentially subject to a home bias.

Though not included in the *Crunchbase* database, four acquisitions of Swiss FinTech companies in 2019 were identified over the course of the present study. The Swiss FinTech company *Devisenwerk AG*, a company offering currency exchange and cooperating with Swiss banks such as *Zürcher Kantonalbank*, was acquired by the Irish company *Transfermate Global Payments* in April 2019, giving the acquirer clearing access to selected Swiss banks (startupticker.ch, 2019d). The second acquisition in the Swiss FinTech ecosystem was the takeover of the *PostFinance* subsidiary *Lendico Schweiz AG* by the crowdlending platform *LEND.ch* operated by *Switzerland AG* in May 2019 (PostFinance, 2019). By seeking to benefit from the existing market presence of *iKentoo SA*, the Canadian company *Light-speed POS* acquired the Swiss FinTech company in 2019 (startupticker.ch, 2019e), constituting the third Swiss FinTech acquisition in 2019. The most recent acquisition deal was completed in December 2019 when the Swiss company *Aduno* increased its stake in the Swiss FinTech *Contovista AG* from 70 to 100 percent (startupticker.ch, 2019f). Even though the number of FinTech company acquisitions in Switzerland in 2019 may not seem large, the appearance of the first market exits could constitute an indication for gradual market consolidation and increased maturity of the Swiss FinTech industry, possibly leading to increased acquisition or IPO activity in the years to come.

Though the dominant position of the North American continent in terms of FinTech company exits remains confirmed when examining the number of IPOs since 2000, Europe is overshadowed by activity in the Asian market (see Figure 3.7). This confirms the results of the above-mentioned report by the European Union which state that market exits of European FinTech start-ups mainly happen through acquisitions (European Union, 2018). The development of the number of IPOs is not as consistent and steady as the development of company acquisitions, with a marked peak in the number of IPOs in 2007, followed by a drop in 2008, which can be explained by the financial crisis and overall economic environment making IPOs less favourable at the time. A new peak was reached in 2018 with a total of 20 FinTech company IPOs globally, of which over a third were hosted in Asia. In line with the number of acquisitions, the year 2019 illustrates a significant fall in the number of IPOs though this could be attributed to the lag in updating information in the database. There are some listed companies included in the IFZ FinTech database: For example, *Crealogix AG* went public in 2000 and is listed on the SIX Swiss Exchange, while *Temenos AG* went public in 2001 and is also listed on the SIX Swiss Exchange. In addition, 2019 has seen the participation of two Swiss FinTech companies in the pre-IPO programme *Techshare*, organised by the European stock exchange *Euronext*. This

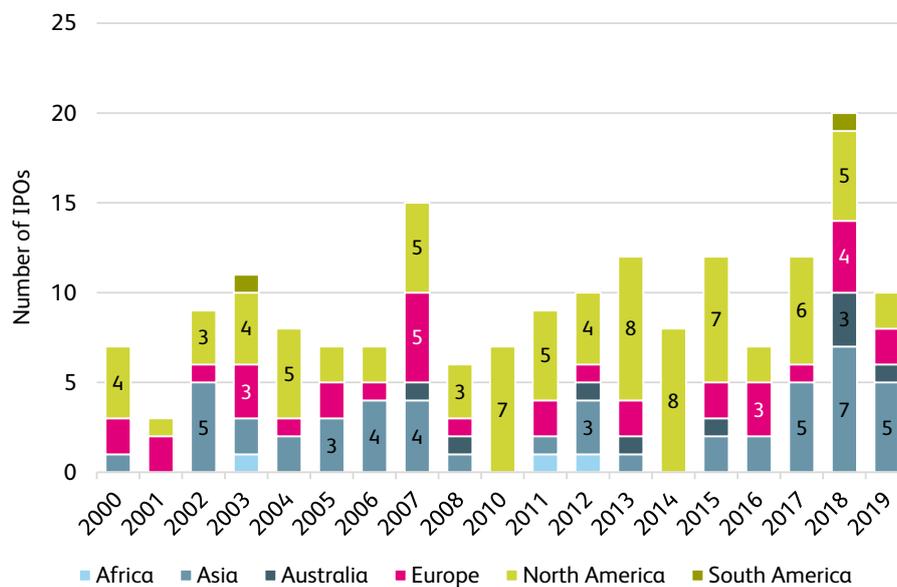


Figure 3.7: Number of FinTech IPOs by continent, 2000-2019 (Source: Crunchbase (2020))

programme seeks to train potential future IPO candidates by providing a platform, tools, and insights useful for the preparation of an initial public offering (startupticker.ch, 2019g). Among the twelve Swiss companies selected for the programme are the two Swiss FinTech companies *CreditGate24 (Schweiz) AG* and *NetGuardians SA* (startupticker.ch, 2019g). Another Swiss FinTech with IPO plans in the medium term is *Bitcoin Suisse AG*. The Zug-based financial intermediary, broker, and financial service provider for cryptographic assets made corresponding plans public at the beginning of 2020 (Finanz und Wirtschaft, 2020). Another example which could be expected to be realised in the near future is the acquisition or IPO of *Avaloq* which has been indicated by an investor's intention to sell its position. The US private equity firm *Warburg Pincus*, which currently holds a 45 percent equity stake in the Swiss FinTech company, has hinted at plans to implement its exit strategy as early as 2020 (inside-it.ch, 2019b).

3.2.3. Incubators, Accelerators, Challenges & Awards

Different incubators, accelerators, challenges, and awards based in Switzerland seek to support both Swiss-based and international FinTech companies in their development. These programmes and events are able to offer benefits ranging from funding, over specialised expertise, to a professional network. For this reason, these programmes and events form an important part of the economic environment within the Swiss FinTech ecosystem. The variety of the programmes and events organised in Switzerland is large and the landscape constantly changing, with new programmes and events appearing every year. This section provides an overview of selected programmes and events, and mentions some of the companies involved.

The aim of an incubator programme or lab is to provide a framework where innovative ideas or solutions are able to further develop and mature. An example for such a programme is the CV Labs Blockchain Incubator, which was officially opened in April 2019 and is open to both Swiss and international companies (CV VC, 2019). Though this year's group of companies benefitting from the incubator programme does not include any Swiss FinTech companies, some international FinTech companies were able to join (CV VC, 2019). A further example of a FinTech lab is the Innovation Garage initiated by *Generali Switzerland*. The Innovation Garage seeks to give ideas the space to incubate and hosts ten start-ups of which five are Swiss FinTech companies; *Ad-*

joint Switzerland AG, *Billte AG*, *Enterprise Bot GmbH*, *Imburse AG*, and *Shift Cryptosecurity AG* (Generali, 2019). Founded in 1991 and based in Geneva, the Fongit Innovation Incubator seeks to support tech ventures and currently hosts selected Swiss FinTech companies such as *InvestGlass SA*, *TokenEstate SA*, *Quantreex* operated by *Algoright System SA*, *Taurus Group SA*, and *Impaakt SA* (Fongit, 2019). Thomson Reuters Labs is an incubator which offers a six to twelve month programme to start-up companies. Though they currently do not host any Swiss FinTech companies, *OpenMineral AG*, *WealthArc GmbH*, *Ariadne Business Analytics AG*, and *Smart Valor AG* are among their previous participants (Thomson Reuters, 2019). The F10 FinTech Incubator & Accelerator sponsored by *SIX* offers three different programmes to Swiss start-ups: "Idea to Prototype" (see paragraph on challenges below), "Prototype to Product" and "Product to Market" (see paragraph on accelerators below), with each aimed at a different stage of the company life cycle (F10 Fintech Incubator & Accelerator, 2019), of which the "Prototype to Product" programme can be considered an incubation programme. Following the recent development of the launch of a pre-seed fund by *F10*, the participants in the "Prototype to Product" programme are also able to benefit from a CHF 200,000 investment upon completion of the programme (startupticker.ch, 2019h).

Accelerator programmes aim to support the growth of a business and scale it to promote its future development. The F10 Fintech Incubator & Accelerator, mentioned among the incubator programmes above, also acts as an accelerator and has recently announced its expansion to Singapore, thereby seeking to create synergies between the Swiss and Asian ecosystems (Fintech Switzerland, 2019b). Two Swiss FinTech companies received the opportunity to participate in the F10 "Product to Market" programme in 2019, namely *element36 AG* and *Yova AG* (Fuchs, 2019). A further example of an accelerator based in Switzerland is the Kickstart Accelerator which offers programmes in different industry categories ranging from cybersecurity, over healthtech to FinTech (Kickstart, 2019). The programme is run by the Impact Hub Zürich and its currently participating Swiss FinTech start-ups include *Assetyze AG* and *atpar AG* (startupticker.ch, 2019i). Venturelab offers ten start-ups the opportunity to participate in a one-week investor roadshow held annually in different parts of the world. This year's team which includes the Swiss FinTech start-ups *Billte AG*, *Crypto Finance AG*, *Loanbox* operated by *Swiss Fin-*

Tech AG, Orca AG, Pexapark AG, Raized.AI AG, TokenEstate SA, turicode AG, and vestr AG, travelled to Hong Kong in an attempt to accelerate their expansion into the Chinese market (Venturelab, 2019). The Up-Scaler Programm is offered by the Swiss Entrepreneurs Foundation and aims to support the growth strategy of selected companies, of which the Swiss FinTech company *PXL Vision AG* is the first company to be accepted (startupticker.ch, 2019j). Offering a one-week Business Acceleration Programme in the Silicon Valley is the Swisscom StartUp Challenge, which involves pitch training, mentoring and challenging by *Swisscom* experts (Swisscom, 2019a). Among the winners for the year 2019 was the Swiss FinTech company *PXL Vision AG* (Swisscom, 2019a). New initiatives constantly seek to increase the support of Swiss start-up companies. A recently established accelerator includes the Blockchain Propulsion accelerator which is focused on blockchain-based start-ups (Blockchain Propulsion, 2019).

Organised challenges are a further way to encourage and support FinTech companies in driving their ideas forward. Most of the challenges involve a prize, for instance in the form of cash or free office space. There are many challenges in Switzerland open to Swiss FinTech companies although not all of them are specifically limited to FinTech but cover start-ups or innovation in general. The Swiss Innovation Challenge involves multiple pitch rounds where companies seek to prove the potential of their innovative solutions. The group of finalists in 2019 included the Swiss FinTech companies *Parashift AG, Private Alpha Switzerland AG, and Tilbago AG* (Swiss Innovation Challenge, 2019). Participants compete for cash and in-kind prizes in the MassChallenge, a challenge offered in different categories, one of which is FinTech (MassChallenge, 2019). Two Swiss FinTech companies were announced “Gold winners” in the most recent MassChallenge, namely *Enterprise Bot GmbH* and *PXL Vision AG*. The winners of the IMD Startup Competition receive access to different educational programmes (IMD, 2019). The two Swiss FinTech companies *eBOP SA*, offering the payment solution KiWi, and *Pexapark AG* were selected to work with the fulltime MBA class and *PXL Vision AG* was selected to work with the EMBA class (startupticker.ch, 2019k). Another form of challenge to mention is the hackathon, an event aimed at creating a software product against the clock. In the case of the Swiss Blockchain Hackathon, the goal is to build blockchain solutions for various industries (Trust Square,

2019). The F10 “Idea to Prototype” programme is a further hackathon challenge held in Switzerland, with the winner receiving a golden ticket, granting access to the incubator programme “Prototype to Product” to further develop the solution (F10 Fintech Incubator & Accelerator, 2019).

FinTech awards usually involve an award ceremony and provide the opportunity to acknowledge or recognise an innovative solution in the FinTech industry. In 2019, for example, *Sonect AG* won both the “Next Global Hot Thing” award at the Digital Economy Awards ceremony (Digital Economy Award, 2019), as well as the Finance IT-Innovation Award along with its collaborators *Hypothekbank Lenzburg, neon Switzerland AG* and the German FinTech *NDGIT* (startupticker.ch, 2019l). *Open Mineral AG* was selected among the Technology Pioneers from the *World Economic Forum* (startupticker.ch, 2019m). Once a year, *Finanz und Wirtschaft* holds the Swiss FinTech Awards ceremony, with the two Swiss FinTech companies *Apiax AG* and *Crypto Finance AG* being named the two best FinTech companies in 2019 (Finanz und Wirtschaft, 2019). The Schweizer Innovationspreis from *IDEE-SUISSE* is an annual award given to innovative ideas with the potential to support the Swiss economy (IDEE-SUISSE, 2019). The Swiss FinTech company *aura AG* received the Golden Idea Award in the year 2019 (IDEE-SUISSE, 2019). Though not directed at start-up companies, the FinTech company *Tindeco Financial Services AG* won the WealthBriefing Swiss Awards 2019 in the “Wealth Management” category (WealthBriefing, 2019). The Swiss Economic Award in the category high-tech/biotech was won by the Swiss FinTech company *PXL Vision AG*, granting the company prize money amounting to CHF 75,000 (startupticker.ch, 2019n).

Besides the Swiss-based programmes and events, Swiss FinTech companies also have the opportunity to participate in programmes abroad. One example is *Worldline’s* e-payments challenge which was won by the Swiss FinTech company *OneVisage SA* in 2019, thereby granting the company access to the Worldline Booster Program (startupticker.ch, 2019o). The Swiss FinTech companies *Araneum Technologies GmbH* and *Squirro AG* both won the European Fintech Competition launched by the American multinational company *DXC Technology* for the first time in 2019 (startupticker.ch, 2019p). 17 Swiss start-ups were selected to participate in the Tech Tour contest held in Germany

in 2019, of which *Spitch AG* won bronze in the digital vertical (startupticker.ch, 2019q). At the same time, Switzerland acted as a host for FinTech companies from abroad who are interested in the Swiss FinTech environment. In January 2019, for example, UK-registered FinTech companies were matched with Swiss banks and venture capital firms within the annual UK Fintech Mission (FinTech Scotland, 2018). Later in the year, as part of a Spanish trade mission, eleven Spanish FinTech companies visited Switzerland to learn more about the environment, ecosystem, and opportunities and were matched with potential partners in an attempt to establish synergies.

3.3. Social Environment

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The social environment constitutes the third dimension of the PEST analysis. Social factors such as, for example, the public's and media's attitude towards and interest for an industry, the demand for the industry's products and services, trends, and demographics all influence the extent to which a company is able to successfully conduct its business. One important social factor is the labour force, which was examined in last year's study. This year, the public's attitude towards and demand for FinTech solutions (see Section 3.3.1), as well as the frameworks which assist in bridging the gap between the FinTech sector and the public, namely the associations (see Section 3.3.2), are examined. In a final part, Section 3.3.3 takes a closer look at the people who work in FinTech and how the teams are composed in terms of diversity.

3.3.1. Attitudes Towards and Demand for FinTech Solutions

The introduction of digital financial innovation can be expected to have positive welfare implications such as increased financial inclusion or services provided at lower costs, supporting the democratisation of financial services (BIS, 2019). Despite these benefits however, in order for the development of digital financial innovation to sustain or even grow, sufficient *demand* for the products and services is crucial. This section, therefore, seeks to assess the attitudes towards and demand for FinTech solutions in the Swiss market by looking at different customer segments and different product categories, which can be expected to exhibit different levels

of demand. A first area is the payments industry. Though digital banking has become a part of daily life for most Swiss citizens, they still lag behind other European citizens in terms of acceptance and usage of new solutions in the industry (Mastercard, 2019). While the European average for the usage of banking apps from a digital bank lies at 20 percent, only 14 percent of Swiss customers use an app from a digital bank (Mastercard, 2019). Nevertheless, a majority of the 1,004 surveyed Swiss customers see potential in digital banking products saving time and being easy to use (Mastercard, 2019). A further area of interest is that of the wealth management industry, which is also affected by changing customer demands and new entrants to the industry. On the one hand, with a high percentage of millennials prepared to switch to, or already having switched to FinTech companies for their wealth management services on a global scale (EY, 2019a), demand is present. On the other hand, millennials have lower earnings, fewer assets, and less wealth in comparison to earlier generations at the same age (Kurz et al., 2018), indicating that the effect of this demand could be limited at the moment. A report from *LGT* in 2018 examines the interest for digital banking services among private banking clients in the DACH region, including a survey among 156 Swiss private banking customers. The results of the report show differences in the levels of interest depending on the age of the customer, with the need for private banking services around the clock, for example, being more important for the younger than the older generation (LGT, 2018). From the total number of surveyed individuals, one in four indicated their interest in receiving offers from purely online financial services providers (LGT, 2018) – signalling a potential for FinTech solutions. Swiss private banking clients in particular seem open to the idea of digital financial services, with 42 percent being prepared to use purely online services as opposed to an advisor (LGT, 2018). In terms of adoption levels of FinTech solutions, Swiss citizens are in line with the European average: The Global Fintech Adoption Index 2019 aims to capture the FinTech adoption trends worldwide and states that 64 percent of the digitally active population in Switzerland adopts FinTech solutions (EY, 2019b). Nevertheless, the results of the IFZ Sentiment Questionnaire among Swiss FinTech companies show that finding customers is still considered the largest challenge by the industry (see Subchapter 6.2). This could either indicate the limits of a small domestic market, only a small range of FinTech solutions adopted by the Swiss population, or

that the difficulties in finding customers primarily lies with the companies applying a B2B business model. Albeit a small market, the Swiss government has shown its initiative to exploit the opportunities of digitalisation, such as with the “Digital Switzerland” strategy adopted by the Federal Council in 2018 (Federal Office of Communications OFCOM, 2019).

A global study by *Accenture* sought to examine what financial services customers value and demand from financial providers. The results of the survey among 47,000 banking and insurance clients in 28 countries show the wish for integrated propositions addressing core needs, personalised offering and a better integration across physical and digital channels, among other things (*Accenture*, 2019a). In a suggestion on how to meet these demands, *Accenture* puts forward the option of expanding business models through ecosystems, though primarily with non-financial vendors (*Accenture*, 2019a). Extending these ecosystems to offer further financial services or more sophisticated digital solutions through partnerships and cooperation with FinTech companies represents a further option for the established financial services industry to meet customers’ demands. In addition, such “beyond banking” ecosystems which seek to target specific needs provide simple access and ease of use for the customer (*McKinsey & Company*, 2019b). An ecosystem can be thought of being made up of consumers, financial institutions, other FinTech companies, regulatory authorities, investors, educational institutions (*EY*, 2019c), and possibly further relevant stakeholders. Mutually beneficial cooperation and a maintained network between the individual actors is crucial for keeping the ecosystem alive. One example of a platform facilitating the establishment of a network between the actors is *GitHub*. *GitHub* provides a platform for developers or organisations to share code and to contribute to open source projects, but also to interact among each other. From the FinTech companies included in our study sample, 25 percent have a *GitHub* account, though the levels of contributions to projects or the creation of own projects varies among them. In terms of the number of FinTech companies with an account, those within the IFZ FinTech database classed as *Distributed Ledger Technology* along the technological dimension have the most *GitHub* accounts (almost 40% of the DLT companies), while on average only around 17 percent of the companies in the *Process Digitisation / Automation / Robotics and Analytics / Big Data / Artificial Intelligence* categories have a *GitHub* account. This

could be explained by the fact that *Distributed Ledger Technology* companies generally have a decentralised company structure, with their developers based across the world. In addition, due to the open source nature of many of their projects, a code management platform such as *GitHub* offers the necessary infrastructure to develop the DLT solutions. When viewed across all *GitHub* users, contributor growth among users based in Switzerland was high in 2019, at 36 percent (*GitHub*, 2019), laying fertile ground for a stable ecosystem. Switzerland’s strong position with the fourth highest number of professional developers per 1,000 inhabitants in a European comparison (*Atomico*, 2019) could further encourage this development.

As a final possible indicator for the public demand for FinTech solutions, the level of media coverage of a topic provides an indication as to how current or of how much interest a topic is. According to *Swissdox*, the number of Swiss newspapers and magazines including the term “FinTech” amounted to 2,267 in the year 2019, which represents a 13 percent increase compared to the year 2018 (*Swissdox.ch*, 2019). As a further source to examine the relevance of FinTech in Switzerland, the results from a search for news articles and blog posts in Google News provide an insight. As illustrated in Figure 3.8, the search results for news articles related to FinTech in Switzerland in the years 2016 to 2019 show increasing numbers. For this, the terms “Fintech” and “Switzerland” were searched together. 6,330 news articles were found for the year 2016, yet almost five times as many were found for the year 2019 (30,200 results). This indicates a heightened interest for the topic and is possibly reinforced by developments such as the progress in the FinTech-related regulation, which has witnessed a significant increase in mentions between 2016 and 2019. Search results for the terms “Regulation”, “Fintech”, and “Switzerland” showed only 543 articles for 2016, and almost eight-fold for 2019 (4,140 results).

3.3.2. Associations

According to Swiss law, associations are defined as a group of persons who “acquire legal personality as soon as their intention to exist as a corporate body is apparent from their articles of association”, in pursuit of a non-commercial purpose (article 60, Swiss Civil Code). As they do not conduct business for profit, associations therefore pursue other goals such as the representation of a community or industry, or the promotion of a specific topic. The Swiss FinTech community

and industry is also represented and promoted by various different association based in Switzerland. While some of these associations dedicate themselves solely to the FinTech industry, some cover a more general field such as start-up companies or the financial industry. Table 3.1 provides an overview of some of the associations based in Switzerland that either represent and/or promote FinTech companies. The first column states the year of inception, while the second column shows the logo and website, and the third column provides a brief description of the respective association. Together, these associations support the FinTech community and sector by promoting the industry and seeking to create favourable conditions for it. Another important goal the different associations target is educating the public on the topic and creating a connection between the public and the FinTech industry. Further information on the associations and their goals can be found on the respective websites.

3.3.3. Diversity in the FinTech Industry

A driving force behind the innovative ideas in the financial industry are the FinTech company founders. The constellation of such a founding team could be crucial to the further development of a company. How these founding teams are composed and the extent of

their diversity and inclusion is examined in the State of European Tech Study by *Atomico*. The study takes a look at the general state of FinTech in Europe by conducting a survey among 1,200 European FinTech founders. The results show the majority of share deals being attributed to all-male European tech founder teams, with only a minority being attributed to mixed or all-female founders (*Atomico*, 2019). When compared to other European countries, Switzerland is assessed as average with 86.3 percent of deals being attributed to all-male founder teams, 12.1 percent to mixed and 1.6 percent to all-female founder teams (*Atomico*, 2019). And when looking at the FinTech industry in particular, it appears to be among the least gender diverse tech industries in Europe according to the results of the State of European Tech Study 2019. An analysis of the IFZ FinTech database shows that only seven percent of the surveyed Swiss FinTech companies' management team members and five percent of the surveyed Swiss FinTech companies' board members are female (see Subchapter 6.1 for further details). Nevertheless, many different initiatives in Switzerland seek to improve this ratio, as well as other aspects of diversity such as ethnicity or age. Five of the eight diversity and inclusion driven initiatives mentioned in the State of European Tech Study for the CEE and DACH

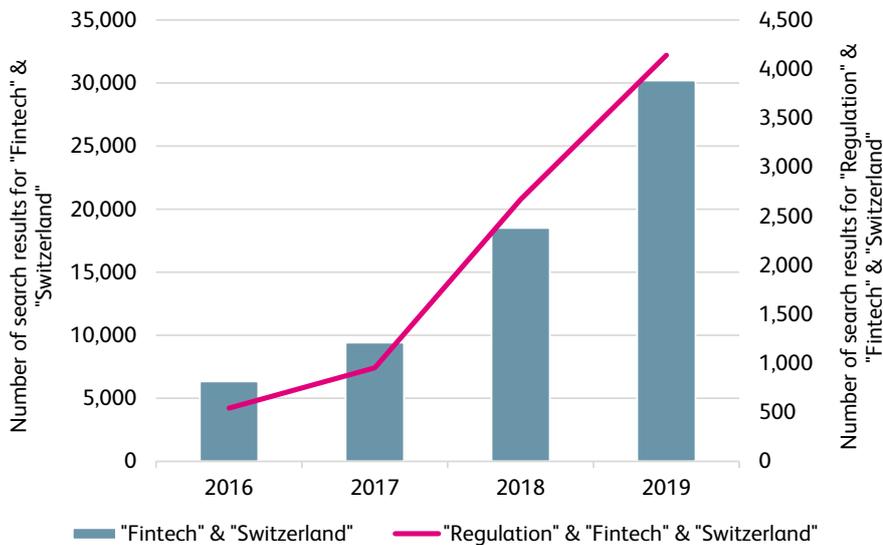


Figure 3.8: Results from Google News (2020) search for the terms “Fintech” & “Switzerland” and “Regulation” & “Fintech” & “Switzerland”

Year	Association	Description
1912	Swiss Bankers Association swissbanking.org	The <i>Swiss Bankers Association</i> was founded in 1912 in Basel and is the leading professional organisation of the Swiss financial centre. The association aims to maintain and promote the best possible framework conditions for the Swiss financial centre both at home and abroad. As it considers FinTech as one of the most disruptive factors for the business models of banks, it has intensively devoted itself to this topic for some time.
2013	Bitcoin Association Switzerland bitcoinassociation.ch	The <i>Bitcoin Association Switzerland</i> , located in Zurich, aims to promote digital currencies, especially <i>Bitcoin</i> , by organising regular events, resolving open legal questions, and educating the public on the matter. It is composed of an active community of supporters and corporate members. The association organises regular meetups in various locations in Switzerland.
2014	Swiss ICT Investor Club (SICTIC) sictic.ch	The <i>Swiss ICT Investor Club (SICTIC)</i> is a non-profit association aimed at connecting early stage tech start-ups, including those in the FinTech sector, with its network of smart money investors. The process of the deal, as well as the match-making is organised by <i>SICTIC</i> . The association, however, does not invest or hold equity in any of the pitching start-ups.
2014	Swiss Finance Startups swissfinancestartups.com	<i>Swiss Finance Startups</i> is a non-profit organisation run and organised by the ventures involved. The association wants to foster the common Swiss FinTech start-up spirit, create synergies, join forces, drive innovation, inspiration and change in Switzerland.
2015	Swiss Finance + Technology Association (SFTA) swissfinte.ch	The <i>Swiss Finance + Technology Association (SFTA)</i> is a neutral, inclusive, and non-profit association with over 250 members and subscribers. The association enhances the positioning of Switzerland as a leading international FinTech hub by organising high-quality events, connecting the various stakeholders, conducting research, creating publications, leveraging the knowledge base of their members, and advocating for improved regulations and policies.
2015	digitalswitzerland digitalswitzerland.com	<i>digitalswitzerland</i> is a cross-industry association with the purpose of making Switzerland a leading hub for innovation and technology. The multi-stakeholder initiative was created from the shared vision of its over 150 members to strengthen Switzerland's position. By engaging government, business, academia, and the public, the association seeks to create a platform to lead Switzerland forward.
2015	Swiss Crowdfunding Association swisscrowdfundingassociation.ch	The <i>Swiss Crowdfunding Association</i> consists of more than 30 platforms of the type crowddonation, crowdlending, crowdinvesting and real estate crowdfunding in Switzerland. It aims to promote crowdfunding in Switzerland, to disseminate best practices among the actors, to do research in this field, and to spread information to media and politics.
2016	Swiss FinTech Innovations swissfintechinnovations.ch	<i>Swiss FinTech Innovations</i> is an association of financial institutions in Switzerland. Its goal is to make Switzerland a leading FinTech hub worldwide. The association focuses on partnerships and cooperation with various stakeholders from the FinTech industry. In addition, it aims to create new ideas and to work on the regulatory framework, as well as bring FinTech start-ups and established companies to work in collaboration.
2016	Swiss Startup Association swissstartupassociation.com	The <i>Swiss Startup Association</i> seeks to promote a better legal, regulatory, and tax environment for founders and start-ups in Switzerland, as well as more social and political awareness of Switzerland's start-up ecosystem.
2017	Crypto Valley Association cryptovalley.swiss	The <i>Crypto Valley Association</i> is an independent, government-supported association established to take full advantage of Switzerland's strengths to build the world's leading blockchain and cryptographic technologies ecosystem. The association supports and connects start-ups and established enterprises.
2017	Multichain Asset Managers Association (MAMA) mama.global	The <i>Multichain Asset Managers Association (MAMA)</i> is a global community of organisations working to transform asset management through the blockchain technology. The association works with regulators, carries out projects, organises events, and shares insights in order to bring about an appropriate regulatory and supervisory regime for on-chain asset management.

Year	Association	Description
2017	CryptoPolis Association cryptopolis.swiss	The <i>CryptoPolis Association</i> is an ecosystem centered in and around the Swiss city of Chiasso with active connections to international centres of blockchain and FinTech innovation in the world, with the mission to develop the best ecosystem for blockchain, cryptographic technologies, and FinTech in the south of Europe.
2017	International RegTech Association (IRTA) regtechassociation.org	The <i>International RegTech Association (IRTA)</i> is an international non-profit association for regulatory technology with a chapter in Switzerland founded in 2017. The <i>IRTA</i> is destined to ease and accelerate the evolution of the RegTech industry by bringing together people, tools, and policies. In particular, the association aims to facilitate integration, collaboration, and innovation of all stakeholders in the financial industry.
2018	Capital Markets and Technology Association (CMTA) cmta.ch	The <i>Capital Markets and Technology Association (CMTA)</i> is a Geneva-based association established by <i>Lenz & Staehlin</i> , <i>Swissquote</i> and <i>Temenos</i> for creating standards around facilitating the use of <i>Distributed Ledger Technology</i> in the field of capital markets. In particular, the association aims to create standards for issuing, distributing, and trading tokenised securities.
2018	Swiss Marketplace Lending Association (SMLA) lendingassociation.ch	The <i>Swiss Marketplace Lending Association (SMLA)</i> is an association based in Rotkreuz which brings together different stakeholders of the crowdfunding industry. Its goals are to increase the transparency and to raise awareness for the asset class of marketplace lending for professional and private investors, and to foster the cooperation within the sector.
2019	Geneva Fintech Association (GFA) genevafin.tech	The <i>Geneva Fintech Association (GFA)</i> is a non-profit association based in Geneva, which aims to promote the development of new technologies, with a special focus on crowdfunding and distributed ledger technology. It advocates and supports the education on new technologies and seeks to bring together stakeholders from the FinTech ecosystem.
2019	Swiss Blockchain Federation blockchainfederation.ch	The <i>Swiss Blockchain Federation</i> is an association based in Bern which promotes the attractiveness of Switzerland as a business place for blockchain-based activities. The association also aims to encourage the development of a secure and competitive legal framework, whilst connecting the blockchain sector with the political, economic, academic and public field.

Table 3.1: Overview of selected associations representing or promoting FinTech companies in Switzerland

area are located in Switzerland (Atomico, 2019). These include Capacity, Hack'n'-Lead, Girls in Tech Switzerland, TechFace, and We Shape Tech (Lewin, 2019) and are presented in further detail in Table 3.2. A special case appears to be companies active in quantum computing, where 23 percent of the European founding teams are mixed or all-female (Atomico, 2019).

Besides gender, the diversity and degree of inclusion of a FinTech company's founder team is characterised by other factors such as, for example, the ethnicity or educational training of the team members. No figures on the ethnicity and educational training are available on the country-level. However, the results from the above-mentioned study show that within the DACH region, 84 percent of European tech company founders identify as white/caucasian and over half of them hold a Master's degree as their highest formal educational attainment (Atomico, 2019). In summary, it can be stated that there is still room for improvement both

in terms of the level of diversity in the FinTech industry and in the collection and availability of data necessary to monitor developments in this regard.

3.4. Technological Environment

By Thomas Ankenbrand, Denis Bieri & Nicola Illi, Institute of Financial Services Zug IFZ

The technological environment is the fourth and final dimension considered within the PEST analysis conducted for the present study. This subchapter covers technological developments and innovations relevant to the FinTech industry. Since these developments are rarely limited to a national market, the present subchapter should be understood in a global context and scale. Section 3.4.1 gives an overview of the relevant technological trends for the FinTech industry. In Section 3.4.2, the topic of marketplace banking is covered, with a closer look at developments in open banking.

Year	Initiative	Description
2015	Capacity capacityzurich.ch	<i>Capacity</i> is a talent and start-up incubator for people with a refugee or migrant background based in Zurich and founded in 2015. The incubator offers the three different programmes Capacity Launch, Capacity Boost, and Storytelling for Inclusion (Capacity, 2019).
2016	We Shape Tech weshape.tech	<i>We Shape Tech</i> is a network organisation striving for greater diversity and inclusion in technology and innovation through events and workshops. The organisation was founded in 2016 (We Shape Tech, 2019).
2017	Girls in Tech Switzerland switzerland.girlsintech.org	<i>Girls in Tech Switzerland</i> is a non-profit organisation which aims to attract and retain women in tech with the help of different initiatives. The organisation offers different events and workshops (Girls in Tech Switzerland, 2018).
2018	TechFace techface.ch	<i>TechFace</i> is a hiring platform which seeks to solve the tech talent gap by coaching the community to build the skills they need whilst improving diversity in tech by expanding companies' hiring network (TechFace, 2019).
2019	Hack'n'Lead womenplusplus.ch	<i>Hack'n'Lead</i> is a Swiss non-profit association which organises a hackathon aimed at women, as well as workshops for preparation leading up to the event. The aim is to connect people with diverse backgrounds and different skillsets (Women++, 2019).

Table 3.2: Overview of diversity and inclusion organisations in Switzerland

3.4.1. Relevant Trends and Technologies for FinTech in 2020

In recent years, various global technological innovations with relevance for the FinTech sector have emerged (see, for example, Ankenbrand et al., 2019). According to McWaters et al. (2018) the most relevant technological trends and developments can be divided into four main technologies, namely artificial intelligence (AI), blockchain, cloud computing, and quantum computing. These four technologies, which are interconnected and mutually reinforcing, are identified as the backbone for future innovation in the financial industry, for example in terms of new operating models or market structures. In particular, the developments in the field of quantum computing will be discussed in the following, as this is the most emerging of the four technologies mentioned.¹¹¹

The relevance of quantum computing lies in the fact that traditional microprocessors have reached their physical performance limits. Currently, this issue is counteracted by the process of parallelisation and cloud architectures in the case of daily use and there-

fore does not pose an acute problem. But in attempting to solve the next generation of challenges with exponentially growing degrees of complexity, traditional computer architectures will reach their limits. For optimisation or machine learning problems, quantum computers could exceed the capabilities of the traditional computers. Possible use cases for quantum computers in the financial industry include the following (Orus, Mugel, & Lizaso, 2019):

- **Optimisation:** Optimisation poses a broad range of computation intensive challenges. Concrete possible applications of quantum computing are, for example, dynamic portfolio optimisation, which seeks to find the optimal trading trajectory, or a quantum annealer which can help to find optimal arbitrage opportunities. A further example is the feature selection and classification for the application of credit scoring.
- **Scenario analysis:** Scenario analysis with Monte Carlo sampling is another possible use case for quantum speed-up. There is a direct link to many current financial methods, including pricing of derivatives and risk analysis.

¹¹¹ For an in-depth discussion of the remaining three main technologies, i.e., artificial intelligence, blockchain, and cloud computing, see, for example, McWaters (2018) or Ankenbrand et al. (2019).

- **Machine learning:** Machine learning is not applied exclusively in the field of finance, but also offers promising applications in other areas thanks to its applicability in the areas of pattern recognition, data classification, regression and principal component analysis, and neural networks.

Quantum computers are available in different architectures and configurations. *Microsoft*, for example, offers quantum computing on its Azure cloud platform. On the one hand, Azure Quantum provides tools developed by *Microsoft* itself, such as the programming language Q# or the Quantum Development Kit (QDK), which are available under an open source licence. On the other hand, Azure Quantum makes quantum hardware accessible. These are classic Azure servers that simulate the behaviour of quantum computers. In addition, *Microsoft* also offers quantum computing services from their partners *1Qbit*, *Honeywell*, *IonQ*, and *QCI* (*Microsoft*, 2019).

Amazon Braket is part of the Amazon Web Services cloud solution and offers a fully managed service. It provides a development environment to study and design quantum algorithms, test them on simulated quantum computers, and run them on various quantum hardware technologies like *Rigetti's*, *D-Wave's*, and *IonQ's* quantum computing solutions. To facilitate the development of hybrid algorithms that combine traditional and quantum tasks, Amazon Braket helps manage traditional computing resources and establish low-latency connections to quantum hardware (*Amazon*, 2019).

Besides the four main technologies identified by *McWaters* (2018), *Gartner* (2019) defines specific strategic technological trends that are expected to have a significant impact in the year 2020. Through their rapid growth, these trends are expected to enhance a broader impact and use of certain technologies. The top ten trends for 2020 according to *Gartner* are listed and explained in the following:

- **Hyperautomation:** Hyperautomation is key in enabling the combination of robotic process automation (RPA) and machine learning. With the evolution of RPA through hyperautomation, all the process steps of RPA, such as discovering, analysing, designing, automating, measuring, monitoring, or reassessing data, are able to be implemented automatically.
- **Multiexperience:** Multiexperience stems from the

evolution of user experience (UX), similar to the development of robotic process automation towards hyperautomation. Conversational platforms, for example, are changing the way people interact with the digital world, while technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR) are changing the way people perceive the digital world.

- **Democratisation of expertise:** Access to technical expertise or business domain expertise is becoming easy and affordable. The distribution, access, and application of the methods and tools of data analytics, artificial intelligence, and machine learning, for example, is becoming more wide spread thanks to the ease of access to the relevant expertise.
- **Human augmentation:** In human augmentation, technology delivers cognitive and/or physical improvements as an integral part of the human experience. Physical augmentation includes, for example, wearables or implants. Cognitive augmentation can occur through accessing information and exploiting applications on traditional computer systems.
- **Transparency and traceability:** Consumers are increasingly aware that their personal information is valuable and are demanding control. Transparency and traceability refer to a range of attitudes, actions, and supporting technologies and practices designed to address the regulatory requirements for achieving control, to preserve an ethical approach to the use of data, and to rebuild the trust in companies, the government, and other organisations. Companies recognise this development and have started treating their customers in a participative way and developing new business models.
- **The empowered edge:** Edge computing is a computing architecture in which information processing, collection, and delivery are placed closer to the sources, repositories, and consumers of this information. It tries to keep the traffic and processing local in order to reduce latency, exploit the capabilities of the edge devices, and enable greater autonomy. The drive behind the development stems from the Internet-of-Things (IoT) systems seeking to deliver disconnected or distributed systems. Complex edge devices like robots, drones, and autonomous vehicles accelerate this development.
- **Distributed cloud:** A distributed cloud is the distribution of public cloud services to different locations, while the original public cloud provider takes responsibility for the operation, management, updates, and further development of the services. This also

allows for compliance with regulatory requirements regarding the national storage of data in the financial industry.

- **Autonomous things:** Autonomous things are devices that use AI to automate functions. Examples are robots, drones, autonomous vehicles, and ships. They go beyond the automation provided by programming models and they use AI to deliver self-learning behaviour, allowing the devices to interact more naturally with their surroundings and with people. With technology capabilities improving, regulation becoming more accommodating, and social acceptance growing, autonomous things will increasingly be deployed in uncontrolled public spaces. There will also be a shift from stand-alone intelligent things to a swarm of collaborative intelligent things where multiple devices will work together, either independently of people or in collaboration with humans.
- **Practical blockchain:** Distributed ledger technology (DLT) is a database technology with the potential to reshape industries with its cryptographic and decentralised architecture. Although not specifically mentioned by Gartner (2019), DLT is still in search for suitable use cases in the financial industry. This is underlined by the clear dominance of Bitcoin in terms of market capitalisation. The emergence of token sales, decentralised finance applications, and futures trading for cryptographic tokens, however, indicate further developments within the industry. Besides the market perspective, there were other relevant developments in the DLT area in 2019. The tech giants *Microsoft* and *Amazon*, for example, both expanded their blockchain offerings to include fully managed enterprise services. Already in February 2019, *Google* introduced its blockchain analytical tools on Google Cloud, its suite for cloud computing services (Dalton, 2020). From a technological perspective, the developments of certain blockchain protocols regarding the implementation of proof-of-stake consensus mechanisms are noteworthy. The Ethereum blockchain, for example, was subject to significant progress in its transition to Ethereum 2.0, a new blockchain that, among other innovations, is based on a proof-of-stake consensus mechanism. The first step of the transition is expected to take place in the first quarter of 2020 (CCN, 2020).
- **AI security:** AI will continue to be used to improve human decision making in a wide range of use cases. AI plays a role in the area of security on three levels. First, AI enables more systems to be attacked. Second, attackers also use AI. Thirdly, the defenders

also have the appropriate methods and tools at their disposal.

It remains to be seen to what extent these trends will materialise in 2020, especially with regard to FinTech solutions.

3.4.2. Marketplace Banking

A topic which covers all four dimensions of the PEST analysis is open banking with the relevant application programming interfaces (APIs). By making (open) APIs publicly available to external service providers, traditional banks can offer their customers more innovative or integrated services. These third-party providers (TPPs) can be payment service providers, retailers, FinTech companies, and others. The advantages of open banking for external service providers are that they are able to gain access to the financial market, as well as customers. Traditional banks can offer more competitive services and avoid losing their market share (Accenture, 2019b).

Open banking is more than just a buzzword. This is confirmed by the ever-increasing number of financial APIs which are available (see Figure 3.9). For banks, the implementation of open banking does not simply involve the application of a new technology but also requires adjustments in areas of company culture and operation (Accenture, 2019b). A functioning open banking ecosystem requires the following elements (The Odie & Fingleton, 2019):

- **Standards:** The standards concern three levels. First, technical standards ensure that data can be shared and used effectively. Second, user experience standards seek to ensure a seamless experience for the user. Third, operational guidelines set minimum service requirements.
- **Open banking directory:** The directory secures that only authorised entities can participate.
- **User dispute mechanism:** The mechanism seeks to solve problems between consumers.
- **Implementation support:** The support aims to help banks and TPPs implement and test products.
- **Monitoring function:** In some cases, a monitoring body is necessary for regulatory or other requirements.

There are various regulations, standards, or initiatives on open banking worldwide. Examples are (Accenture, 2019b; The Odie & Fingleton, 2019):

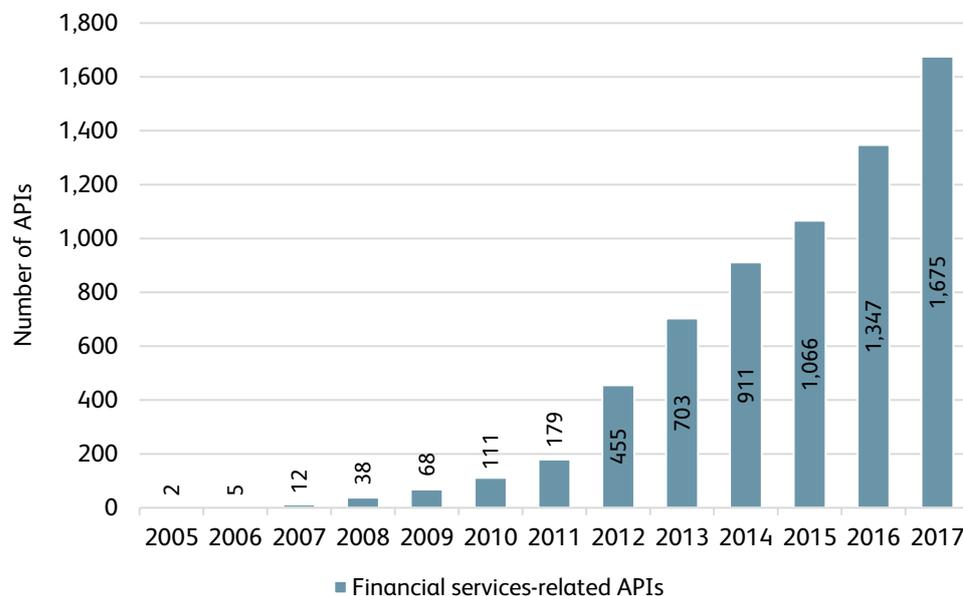


Figure 3.9: Number of financial services-related APIs (Source: Accenture (2019b))

- PSD2 regulation passed by the EU
- UK’s Open Banking Implementation Entity
- Australia’s Consumer Data Right
- Hong Kong Monetary Authority (HKMA) Open API Framework
- API rulebook published by the Monetary Authority of Singapore (MAS) and the Association of Banks in Singapore
- NACHA’s API standardization program in the USA

Mexico, Nigeria, India, Japan, New Zealand, and others have launched similar initiatives (The Odie & Fingleton, 2019). Switzerland has struggled with the lack of appropriate regulation and established technological standards. However, a number of initiatives have been formed that aim to establish open banking in Switzerland.

The OpenBankingProject.ch promotes the development of open banking in Switzerland. The founders are the core banking manufacturers and operators *Avaloq*, *Finnova*, *Hypothekbank Lenzburg* (Finstar), and *DXC Technology*, the software manufacturer *Ergon*, the consulting and research company *Business Engineering Institute St. Gallen*, and the *University of Bern*. The project aims to launch the “Swiss NextGen API” for re-

trieving account information and initiating payment orders in accordance with the specifications valid in Switzerland. The open industry standard NextGenPSD2 from the European standardisation initiative Berlin Group will serve as the basis, according to the announcement. Based on the Swiss NextGen API, Swiss companies and especially banks can create new offers for their customers efficiently and in a future oriented manner (OpenBankingProject, 2019).

Already 2018, *Swiss FinTech Innovations* (SFTI) published the “Common API” specifications (Swiss Fintech Innovations, 2018). Another approach was chosen by SIX with “Swiss Corporate API”, an attempt to create a central hub for programming interfaces between banks and third-party providers. *Swisscom* offers the Open Banking Hub, while Swiss core banking providers themselves, such as, for example, *Avaloq* and *Finnova*, also have their own API platforms.

But do clients even want open banking? In connection to this topic, would clients potentially be willing to share their banking data with external service providers? According to a recent report, 31 percent of consumers in Hong Kong, 66 percent in Australia, and 69 percent in the UK would not agree to share their data (Accenture,

2019b). The concerns are about security, trust towards third party providers, and the lack of benefits the users see in sharing their data (Accenture, 2019b).

Security and trust concerns, however, can be countered by the following principles (The Odie & Fingleton, 2019):

- User names and passwords are only shared with the bank.
- Open banking is only opt in, never opt out. The client is always asked to give his or her explicit consent to share data and the decision can easily be changed.
- Only authorised/certified service providers can participate.
- Dispute mechanisms are established.

On the one hand, open banking offers a view from the customer interface. On the other hand, FinTech solutions are driven by BigTech companies from the technological side. Seven of the ten largest companies worldwide, as measured by market capitalisation, are BigTech companies (PwC, 2019). But the BigTechs are also attacking financial services in an end-to-end approach. *Amazon*, for example, is building the next-generation-bank without striving to be a conventional bank. The strategic goal is an increased participation in the *Amazon* ecosystem. Concretely, this means an increase in the number of merchants on *Amazon*, in turn enabling them to increase sales. Generally, the reduction of any buying and selling friction is the main goal. To reach these goals, *Amazon* builds or invests in different payment, cash, lending, and insurance solutions (CBInsights, 2019b).

Global digital platforms for primary services pose a challenge to the traditional, vertically integrated business models of the banking and financial industry. GAFA platforms (*Google*, *Apple*, *Facebook*, and *Amazon*) in the West and the BAT trio (*Baidu*, *Alibaba*, and *Tencent*) in the East seamlessly incorporate banking services into their own core business by adopting the

Banking-as-a-Platform business model. In the business models of these digital platforms, financial services are generally free of charge or low-priced, which brings the margins in the traditional business under pressure. Digital platforms are also redefining the service experiences with their seamless integration of various services (Mattila et al., 2018).

Sharing (exchanging) data offers advantages for financial institutions, regulators, and customers alike. Basically, there are three ways in which data can be shared: inbound (acquiring data), outbound (selling data), and collaborative data sharing (a combination of inbound and outbound data sharing). Data sharing enables institutions to improve decision-making systems with the help of additional information. Other advantages could be drawing on third-party capabilities or achieving a greater level of scaling. Examples of situations in which data sharing may prove advantageous are the loss of a database or the possibility to share know-your-customer (KYC) utilities. In the case of data sharing scenarios, the regulator becomes a more effective systemic supervisor, while the customer becomes more efficient in accessing higher quality products and services. However, there are also potential drawbacks to sharing data. For institutions, these include the exposure of competitive knowledge, the violation of data protection laws, and reputational risks. The risk of the misuse and leakage of personal and sensitive data is a drawback customers or users may be confronted with. For regulators, data sharing offers the possibility to return the ownership and control of personal and financial data back to the customers and users (World Economic Forum, 2019). This is in line with one of the top trends mentioned by Gartner (2019): transparency and traceability. Consumers are increasingly aware that their personal information is valuable and are demanding control. There is a need for efficient marketplaces which enable integrated and seamless data sharing. Perhaps the distributed ledger technology can help to overcome these challenges.

4. Analysis of FinTech Hubs

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In this chapter, the general factors of selected FinTech hubs are evaluated in the same way as in previous editions of the IFZ FinTech Study. In addition, however, this year's study includes an analysis of the connection between the factors shaping a FinTech environment and the corresponding FinTech activity in a certain country, with the level of activity being measured by the number of FinTech companies, the size of the FinTech labour force, and the total funding in the sector. The aim of the analysis is to identify the connection between the individual input factors and the relative size of the local FinTech sector. This chapter starts with a literature review of the topic (Subchapter 4.1), followed by a description of the methodology and the results of this year's FinTech hub ranking (Subchapter 4.2). The last part of this chapter includes an analysis of FinTech activities in different countries (Subchapter 4.3).

4.1. Literature Review

The evaluation of factors driving the success of a FinTech hub has increasingly been subject to academic research. Two recent publications on the matter are those from Haddad and Hornuf (2019) and Laidroo and Avarmaa (2019). Both papers aim to identify the relevant determinants of a FinTech hub formation. Haddad and Hornuf (2019) focus on economic and technological determinants. Using a random effects negative binomial regression model, they find that countries with a well-developed economy, sufficient venture capital availability, difficult accessibility to loans, and high quality of business regulation and strength of legal rights reveal more FinTech start-up formations. From the technological perspective, the number of secure Internet servers, mobile phone subscriptions, and the availability of labour force impacts the development of a FinTech sector positively (Haddad & Hornuf, 2019). Laidroo and Avarmaa (2019) follow a different approach in determining location-specific drivers of FinTech formation intensity. Their empirical analysis is based on a set of indicators, each assigned to one of the four dimensions of the Porter diamond, which is typically used to measure the competitiveness of an industry.

The four dimensions include:

- Related and supporting industries, i.e., the home-based competitiveness of related industries
- Demand conditions, i.e., the size, sophistication, and specialisation of local demand
- Factor conditions, i.e., the competitiveness of different types of resources and infrastructures such as human capital or R&D infrastructure
- Firm strategy and rivalry, i.e., the intensity of the local competition and other factors influencing the creation, organisation, and management of firms

The empirical results show that strong supporting industries, in particular a strong ICT services sector, and good factor conditions such as a high rate of tertiary education enrolment, intense university-industry collaboration, fixed-line availability, and strong ICT readiness have a positive effect on the FinTech formation intensity in a given region. Demand conditions, on the other hand, do not seem to influence the emergence of FinTech companies. For the firm strategy and rivalry dimension, the authors find evidence for an increased FinTech intensity for countries that have witnessed a crisis during the last decade. In addition, the empirical findings indicate that larger financial freedom and development in a country tend to be positively related with the emergence of FinTech companies (Laidroo & Avarmaa, 2019).

The two publications mentioned above show that there is increasing clarity about the drivers of FinTech ecosystems. With our FinTech hub ranking and the subsequent regression analysis including the sector's output, we would like to further contribute to a better understanding of the connection between the general conditions relevant to FinTech companies in certain regions and the development of the corresponding sector.

4.2. FinTech Hub Ranking

In line with our previous studies, the hub ranking is based on the PEST framework described in Subchapter 2.2. In this year's edition, Madrid (Spain) as an additional in-scope city, as well as three performance indicators on the country level, namely the digital competitiveness, the intensity of mobile app creation, and the number of scientific and technical publications, are newly included in the analysis. Overall, our ranking is based on 69 publicly available indicators¹,

¹ The considered indicators, their sources, as well as their affiliation to one of the four PEST dimensions are listed in Appendix A.

captured on either the city- or country-level, and includes 34 different cities. No updated figures could be found for five of the 69 indicators.² These indicators therefore remain unchanged compared to the analysis conducted in last year's study. The final ranking is derived by performing the following four methodological steps:

1. Each of the 69 performance indicators are categorised into one of the four PEST dimensions according to their affiliation.
2. For each indicator, an individual ranking of all the 34 in-scope cities is derived, resulting in 34 individual scores ranging from 1, the city with the worst performance, and 34, the city with the best performance.

3. For each of the four PEST dimensions, a sub-ranking score is calculated by averaging the affiliated indicator rankings.
4. The overall hub ranking score is derived by aggregating the PEST dimension sub-ranking scores from step 3 for every in-scope city.

The results of this year's ranking are shown in Figure 4.1. As in last year's ranking, Singapore takes the leading position with a considerable distance to its first followers, Zurich and Geneva. Besides the unchanged top three, this year's ranking shows some significant shifts in the top ten hubs compared to last year. Stockholm, on the one hand, has seen the biggest rise in the ranking, climbing six ranks to the fourth position. London, climbing six ranks to the fourth position. London,

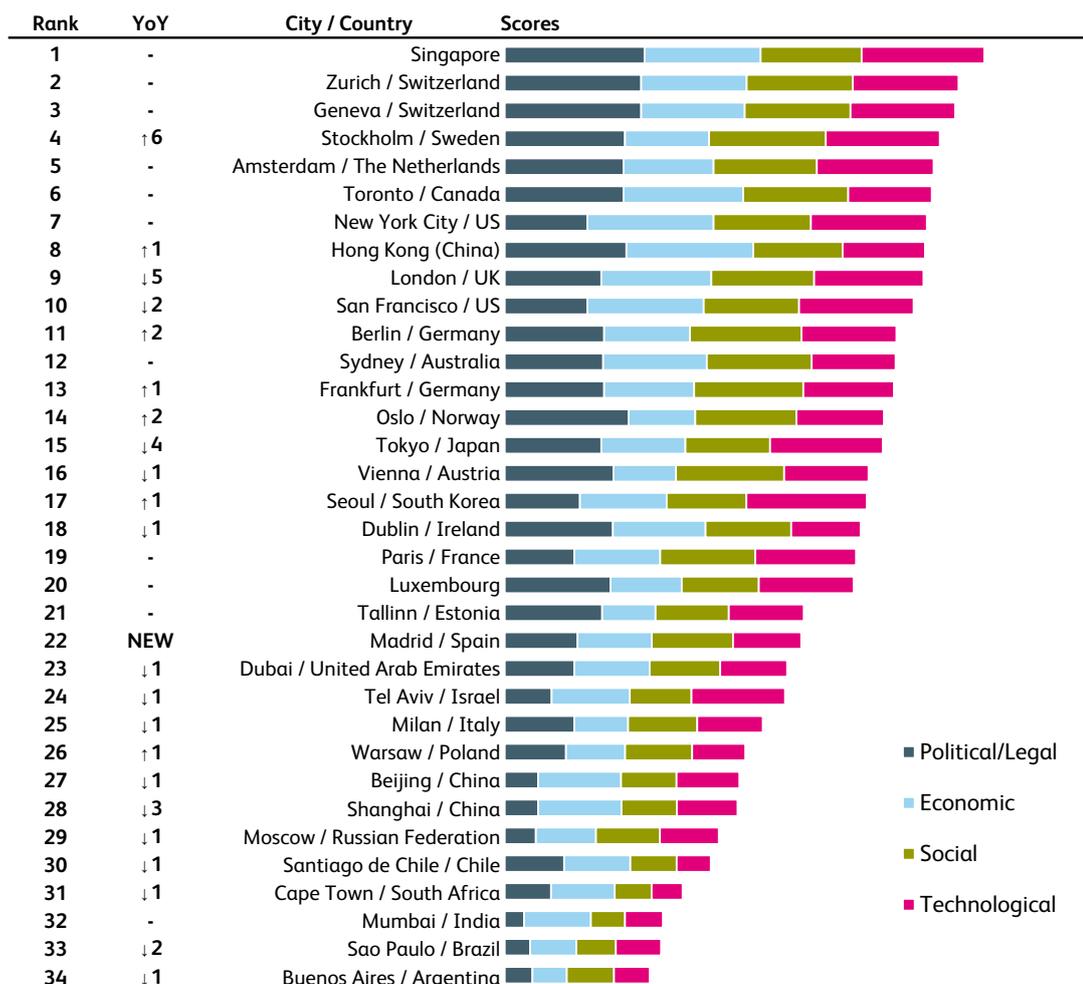


Figure 4.1: FinTech hub ranking

² The year to which each indicator refers is also listed in Appendix A.

which assumed the fourth position in last year's ranking, on the other hand, falls the most, losing five ranks and thus dropping to position nine. Rank five and six are occupied by Amsterdam and Toronto, remaining the same as last year. The two US cities, New York and San Francisco, reveal a diverging development. Whereas New York retains its seventh place, San Francisco, now on rank ten, loses two positions. Rank eight is occupied by Hong Kong, implying a year-on-year increase of one rank.

The ranking in Figure 4.1 reveals that the differences in the performance scores of the cities between ranks four and ten are only marginal. Year-over-year changes in the positions thus need to be interpreted with caution. A further cluster of relatively similarly performing cities lies between the ranks eleven and 20 including, in ranking order, the cities Berlin, Sydney, Frankfurt, Oslo, Tokyo, Vienna, Seoul, Dublin, Paris, and Luxembourg.

The PEST dimension ranks for each of the ten leading cities are shown in Figure 4.2, which reveals that Lon-

don's significant decline is mainly due to the deteriorating political and legal situation. It appears that indicators in the corresponding PEST dimension have now incorporated the uncertainty following the Brexit referendum from June 2016. This is underlined by the sharp deterioration of the United Kingdom's political stability indicator. The time lag between the occurrence of an event and its impact on the indicators may also be the reason for Hong Kong's climb in the ranking from position nine last year to position eight in this year's ranking. The increase of one position in the political and legal dimension indicates that the 2019 Hong Kong protests might not be reflected in the respective indicators. In any case, there has been no deterioration in Hong Kong's political stability indicator over the past year. The most significant shift in ranks is witnessed by the social environment of Singapore. In last year's study, Singapore took the leading position in the respective dimension and falls down to position twelve in this year's ranking. The main reason for this is that Singapore was newly included in certain indicators this year in which it performs comparatively worse (e.g., government expenditure on education per secondary student)

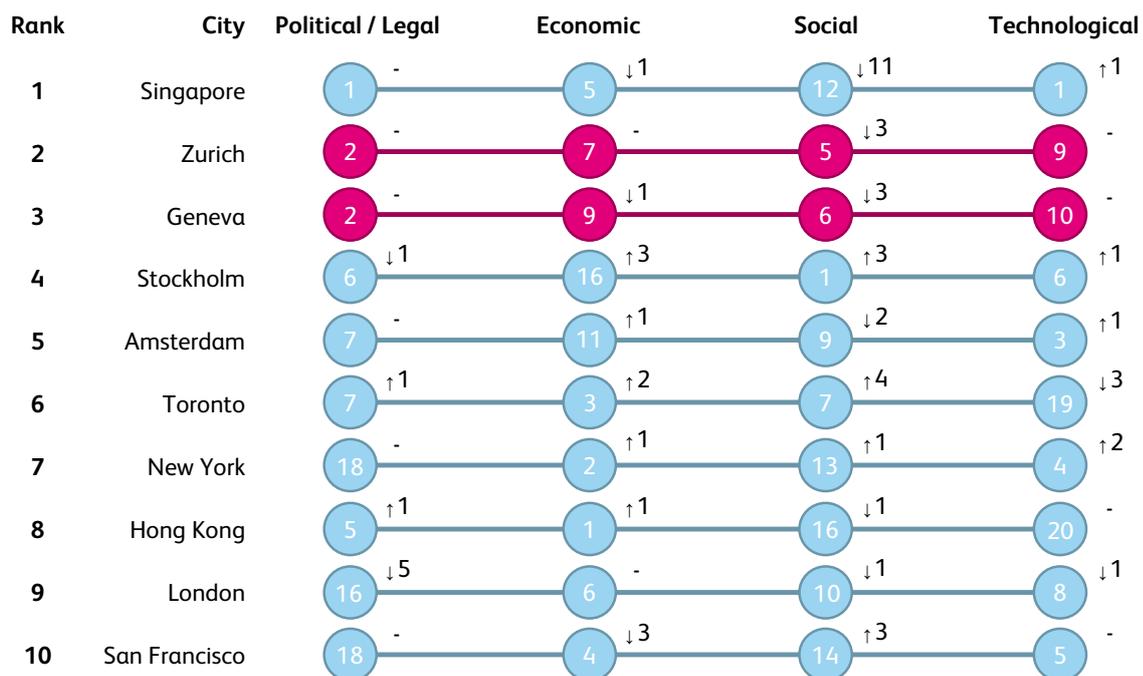


Figure 4.2: PEST dimension rankings and year-on-year changes

or because of deteriorating performance in individual indicators (e.g., share of females employed with advanced degrees out of the total number of employees). Besides Singapore, the two Swiss cities have also become slightly less competitive in the social regard, with each city dropping three ranks. In addition, Geneva loses one rank in the economic dimension. Stockholm, the biggest winner in the overall ranking, improves its performance based on rank increases in three out of the four dimensions, i.e., the economic (+3), social (+3), and the technological (+1) dimension, though the city lost one rank in the political/legal dimension.

An evaluation of the Swiss cities at the indicator level shows that, among all the cities considered, they perform best in terms of corruption perception, market capitalisation, financial secrecy, quality of labour force, talent competitiveness, attractiveness for expats, ICT usage, ICT services exports, and relative number of scientific and technical publications. On the other hand, the protection of minority investors, costs of living, e-participation of residents, and high-tech imports are the indicators that reveal the most potential for improvement for the Swiss cities.

4.3. Analysis of FinTech Activity

In this subchapter, we aim to evaluate whether there is a linear relationship between the quality of the general factors of the in-scope countries, and the output performance of the corresponding FinTech sectors. Our null hypothesis is that, on average, a better general environment should be linked to a relatively larger FinTech sector.

Whereas the input performance is based on our FinTech hub ranking shown in Figure 4.1, the output performance is measured by the (ranked) variables “Number of FinTech companies per capita”, “Number of employees in the FinTech sector per capita”, and “Total funding of FinTech companies per capita”. The data for measuring the output performance was sourced from *Crunchbase* (2019). Due to the availability of the necessary data, the output performance was calculated on a country level rather than on a city level. With regard to the input performance, the indicators at the city level were therefore used as a proxy for the

respective country performance. For countries in our FinTech hub ranking with more than one city, i.e., China, Germany, Switzerland, and the United States, we used the average of the respective cities as a proxy for the country score. Since most indicators (61 out of 69) are reported on a country level, the possible bias created by averaging should be rather small. The calculation of the output score was done in two steps:

1. Ranking of each of the three output variables among all countries, resulting in a ranking for each of the three output variables with a ranking score between 1 and 30 for each country (1 for the in-scope country with the worst performance and 30 for the country with the best performance).
2. Deriving the final output score by adding up the ranks of the three output variables per country. From this, we derived a final output score between 3 and 90 points for each country.

Note that we also calculated the output score with alternative scaling variables other than the population of a country, i.e., the GDP of the respective country and a mixture of the population and the GDP. Using these different measures as an alternative scaling measure for the size of a population does not significantly change the overall output score for the vast majority of countries.³ Finally, we estimated a linear regression model in order to assess the average relationship between the input and output scores of the in-scope countries.

Figure 4.3 illustrates the relationship between the input scores, on the x-axis, and the output scores, on the y-axis, for each of the in-scope countries. It shows that, in accordance with our null hypothesis, countries with qualitatively better input factors, i.e., a higher input score, tend to have a relatively larger and more economically relevant FinTech sector, i.e., a higher output score. The leading position in both dimensions is taken by Singapore, revealing a larger input and output score in comparison to their closest competitors. In line with the FinTech hub ranking, Singapore is followed by Switzerland and Sweden in the input dimension. Regarding the output score, Luxembourg and the United Kingdom occupy the ranks two and three, respectively.

³ One exemption hereof is India, which significantly improves its output score when using GDP as a scaling measure.

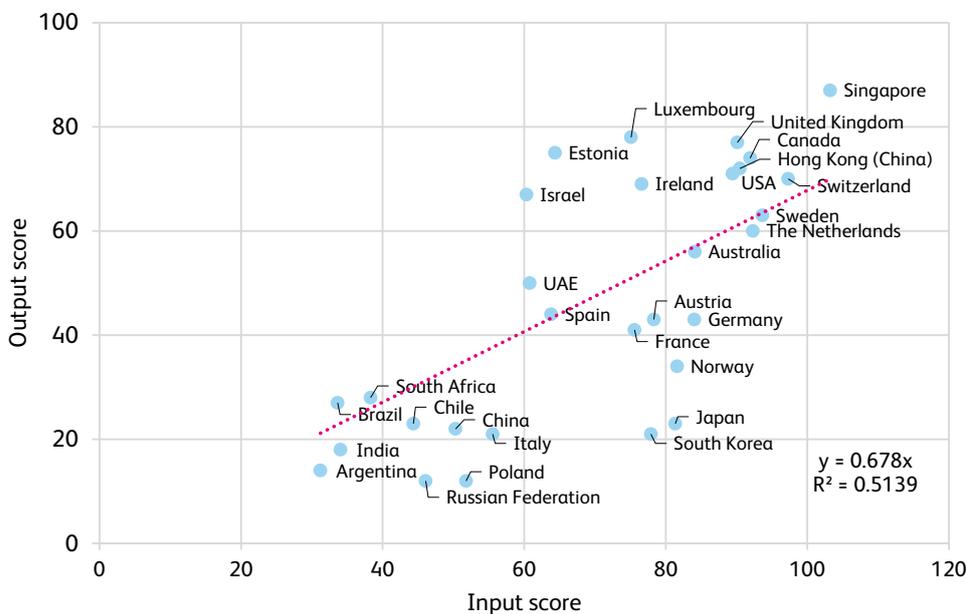


Figure 4.3: Comparison of input and output scores

Figure 4.3 also includes a regression line that approximates the average linear relationship between the input and output scores of the in-scope countries. The highly significant regression slope coefficient of about 0.68 indicates that an increase in the input score by one unit corresponds to an increase of the output score by 0.68 units on average.⁴ Countries lying above (below) the regression line reveal higher (lower) output scores than would have been predicted by the regression model. In other words, given the input factors, these countries seem to have FinTech sectors generating above (below) average output. The largest positive deviations are associated to Estonia, Israel, and Luxembourg. These countries are thus home to an above-average FinTech sector, in relative terms, given the general factors of their FinTech ecosystems. The opposite holds true for Japan, South Korea, and Norway. Switzerland, among other countries, is close to the regression line, implying that the relative output of the Swiss FinTech sector is in proportion to the quality of the local general factors.

In addition to assessing the relationship between the total input and output scores of FinTech ecosystems for

selected countries, an analysis at the indicator level is particularly relevant, especially for policy makers. The identification of particularly relevant indicators for the emergence or growth of a FinTech sector can serve as a basis for future location policy. We do so by calculating the rank correlation⁵ between the ranked output scores of our in-scope countries and the corresponding country ranks for each of the 69 indicators used to derive the input score. Correlation is a measure of association between two variables and is bound between -1 and 1 . A correlation of -1 (1) indicates a perfect negative (positive) correlation, meaning that the two variables always move in the opposite (same) direction. Zero correlation exists when there is no linear relationship between the two variables considered. Note that for every indicator, we only include countries without missing values for calculating the correlation with the output ranks. It should also be stressed that statistical correlation should not be equated with causality, since it simply measures the linear relationship between two variables.

Table 4.1 lists the ten indicators yielding the largest correlation with the ranked output scores, along with the country/countries taking the leading positions in the

⁴ Due to lack of significance and an only marginal effect on the R-squared, a statistical measure of how close the data are to the fitted regression line, we refrain from including an intercept in the regression equation.

⁵ In this chapter, when the term correlation is used, it always refers to the Pearson correlation.

Indicator	Correlation	Leading country/countries	PEST dimension
Joint Venture Deals	0.843	Singapore	Economic
Venture Capital Deals	0.798	Canada, United States	Economic
Regulatory Quality	0.775	Hong Kong	Political/Legal
Quality of Labour Force	0.770	Switzerland	Social
Ease of Paying Taxes	0.756	Hong Kong	Political/Legal
Corruption Perception	0.733	Singapore, Sweden, Switzerland	Political/Legal
Tertiary Level Inbound Mobility	0.729	Luxembourg, Singapore, United Arab Emirates	Social
Purchasing Power	0.728	Switzerland	Economic
Talent Competitiveness	0.705	Switzerland	Social
Government Effectiveness	0.704	Singapore	Political/Legal

Table 4.1: Correlations between the output scores and individual indicators

corresponding indicators and their associated PEST dimension. Joint venture and venture capital activity, both from the economic dimension, reveal the highest correlation coefficient with the ranked output scores. Countries with the top ranks in the two mentioned indicators, e.g., Singapore, Canada, and the United States, and thus exhibiting high joint venture or venture capital activity, tend to host FinTech sectors with a relatively high output. A further strongly positively correlated indicator from the economic dimension includes the purchasing power, with Switzerland in the leading position among all in-scope countries. Indicators from the political/legal dimension include the regulatory quality and the ease of paying taxes, for which Hong Kong holds the leading position in both cases, the corruption perception, with Singapore, Sweden, and Switzerland sharing the top position, and the government effectiveness, with Singapore performing best among the in-scope countries. The remaining three indicators in the top ten highest correlating indicators are linked to the social dimension. While Switzerland ranks first in terms of the quality of the labour force and talent competitiveness, Luxembourg, Singapore, and the United Arab Emirates have the highest inbound mobility at the tertiary level. The technologi-

cal dimension is not represented in Table 4.1. It should, however, be noted that said dimension also includes indicators with significantly positively correlated indicators such as the degrees of mobile app creation (0.638), digital competitiveness (0.637), and ICT access (0.632).

In summary, Singapore is the leader in terms of both the quality of the environment for FinTech companies, as well as the relative output of the corresponding sector. In general, there is a positive relationship between the quality of the general factors and the relative size of a country's FinTech sector, although this relationship does not imply causality. In other words, the better the environment for FinTech companies, the larger the local FinTech sector. For Switzerland, the relative size of the sector is roughly in proportion to the quality of the FinTech environment. According to our analysis, venture capital and joint venture activity correlate the strongest with the output performance of FinTech hubs. However, please note that the results of the analysis should be treated with caution, as the sample is comparatively small and the methodology chosen does not take lead-lag effects into account. The results also do not imply any causal relationships.

5. Global FinTech Companies

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This chapter aims to provide an overview of globally leading FinTech companies by applying the frameworks described in Chapter 2. For this, a sample of leading global FinTech companies was identified with the help of four different FinTech rankings. Following the collection of publicly available data on these companies, the sample was then analysed. While Subchapter 5.1 offers a descriptive analysis of the identified FinTech companies, Subchapter 5.2 aims to provide an initial valuation approach for deriving industry benchmarks in the FinTech sector.

5.1. Overview of Globally Leading FinTech Companies

The subsequent analysis is based on four different FinTech rankings published by *Crunchbase*, *Forbes*, *IDC*, and *KPMG & H2*. In comparison to last year's edition of the IFZ FinTech Study, the ranking from *CB Insights* was replaced by the 100 top ranked FinTech companies according to the data provider *Crunchbase* (2019), as *CB Insights* did not publicly publish an updated ranking for the year 2019. The leading 50 FinTech companies were included from *KPMG & H2*'s ranking (*KPMG & H2*, 2019). Unlike last year's evaluation, the 50 emerging companies were omitted. While they are considered young companies with a lot of potential for future success, they cannot (yet) be considered leading in the global FinTech sector. *Forbes'* (2019) and *IDC's* (2019) rankings, including their identified top 50 and top 100 FinTech companies, respectively, complete the data basis. From these rankings, companies in the field of insurance (14 companies) and real estate (4 companies) as well as all duplicates, were omitted, which leaves a final data sample of 250 companies. The fact that only a few duplicates were found in the four rankings indicates a lack of a universally accepted definition of the term "FinTech". Note that this data sample consists of companies which would not necessarily be classed as FinTech according to the definition of the present study (see Subchapter 2.1).

The 250 companies included in the final sample were evaluated with the help of publicly available data. In a first step, each company was categorised into the FinTech Grid described in Subchapter 2.1, i.e., into one of the four product areas *Payment*, *Deposit & Lending*,

Investment Management, and *Banking Infrastructure*, as well as into one of the four technological dimensions *Process Digitisation/Automatisation/Robotics*, *Analytics / Big Data /Artificial Intelligence*, *Distributed Ledger Technology*, and *Quantum Computing*. In a second step, the year of inception, country of headquarters and the market orientation of the companies were assessed. To describe the market orientation, the present study distinguishes between a Business-to-Business (B2B) or Business-to-Customer (B2C) focus (or a combination of both) on the one hand, and between a national and international focus on the other. By definition, an international focus also covers the national market. In the following paragraphs, the data sample is analysed from both the product area and the technology perspective.

Figure 5.1 shows the 250 FinTech companies classified according to their product area and technological dimension. With 145 companies, over half of the considered companies offer *Banking Infrastructure* (58%) products and services within the product areas. 53 companies offer *Payment* services (21%), followed by *Deposit & Lending* with 34 (14%) and *Investment Management* with 18 (7%). The strong position of the product area *Banking Infrastructure* is mainly driven by the *IDC* ranking. 84 percent of the companies included in the ranking are active in said product area and thus influence the present analysis accordingly.

158 FinTech companies apply the technologies of *Process Digitisation/Automatisation/Robotics*, followed by *Analytics/Big Data /Artificial Intelligence* with 74 companies, *Distributed Ledger Technology* with 17 companies, and *Quantum Computing* with one company. Hence, 63 percent of the FinTech companies use the technologies of *Process Digitisation/Automatisation/Robotics* for their products. Among the remaining FinTech companies, 30 percent use *Analytics/Big Data/Artificial Intelligence*, seven percent *Distributed Ledger Technology* and 0.4 percent *Quantum Computing*. Since the mentioned technological categories follow the degree of technological innovation, it does not come as a surprise that most companies use more established technological concepts from the field of *Process Digitisation/Automatisation/Robotics*. Considering that the development and testing of innovative technologies takes time, a larger number of companies basing their business models on more innovative technological concepts could be expected to be identified in the future.

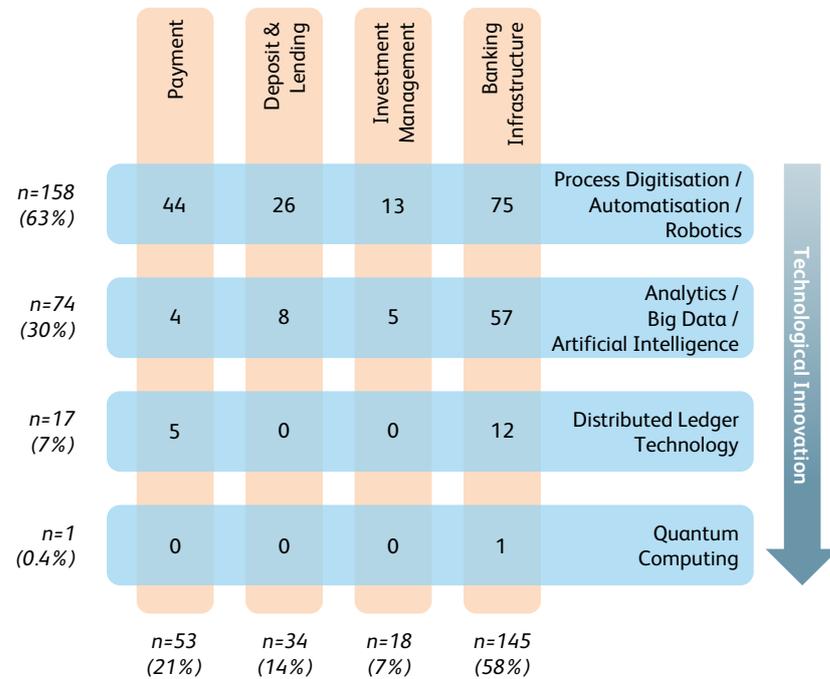


Figure 5.1: Distribution of FinTech companies in the rankings according to the FinTech Grid (n=250)

In 2018, five companies were founded and included in at least one of the four rankings this analysis is based on. Three of these are associated with the *Banking Infrastructure* product area and two offer services and/or products in the field of *Payment* (left-hand graph in Figure 5.2). From the technological perspective (right-hand graph in Figure 5.2), four apply the technologies of *Pro-*

cess Digitisation / Automatisation / Robotics, while one is based on the distributed ledger technology.

Figure 5.2 reveals that the number of inceptions peaked in the years 2011 through to 2015, besides the large number of companies founded prior to the year 2000. Between 17 and 22 companies, which are included in at

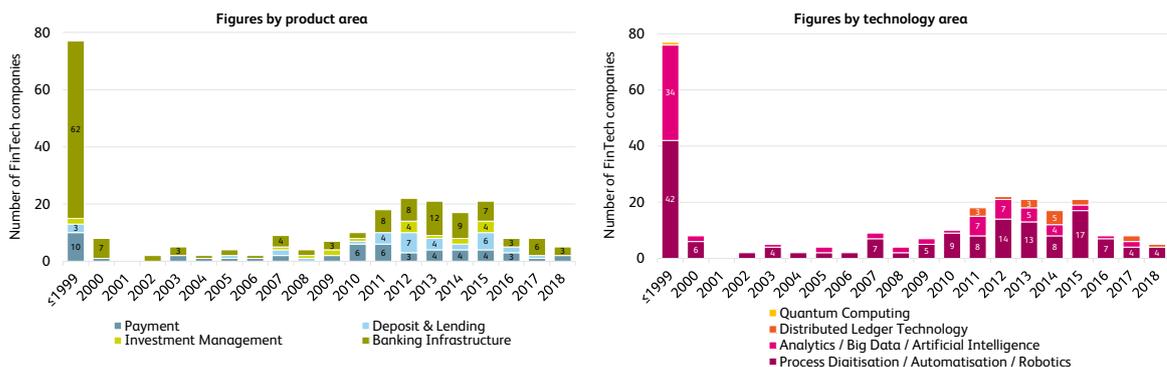


Figure 5.2: Number of FinTech company incorporations per year (n=250)

least one of the four rankings, were founded between 2011 and 2015. From 2015 to 2016, there was a significant decrease from 21 to eight new companies. In the two most recent years, there have been eight and five inceptions, respectively. One possible reason for the decline in inceptions after the year 2015 could be the maturity of the companies included in the rankings of globally leading FinTech companies. Most companies need to grow to a critical size in order to receive enough attention to be included in those top rankings. This is also in line with the significant amount of companies founded prior to the year 2000.

With regard to the product areas and technologies applied, two observations stand out. Companies which use the distributed ledger technology first appear in the year 2011. This may be due to the fact that DLT is a comparatively new technology. It often takes some time for new technological solutions to be used in operational business, which typically is one of the conditions for being included in the rankings of leading FinTech companies. The second observation addresses the most recently founded companies. Although these companies could be expected to apply technologies more advanced than *Process Digitisation/Automatisation/Robotics*, they appear to work as enablers as opposed to disruptors.

Figure 5.3 shows the location of the headquarters of FinTech companies by country. A total of nine countries reveal five or more companies in the sample. With 133 companies, the United States hosts by far the most companies included in the data sample. The

second largest number of companies are based in the United Kingdom (22), followed by India (16), China (10), Brazil (8), Canada (8), Switzerland (8), France (7), and Japan (6). All the remaining countries are summarised in the category “Others”, which consists of 32 companies. Note that the relatively small number of Indian and Chinese companies in comparison to the United States could be related to the origins of the rankings, which might be subject to a certain home bias.

Finally, the target markets of the globally leading FinTech companies are analysed, thereby differentiating between a national and international focus, and between businesses or private individuals as customers. Note that an international focus also covers the domestic market. Furthermore, a company can either serve businesses (B2B), private individuals (B2C) or a combination of both (B2B & B2C).

Firstly, the overall distribution of the data sample is analysed. Most companies choose to serve more than just their domestic market and therefore have an international focus. This is the case for 169 companies or 68 percent in relative terms. From the 81 (32%) companies which are exclusively active in their home markets, 40 (49.4%) target private individuals (B2C), 35 (43.2%) serve businesses (B2B), and six (7.4%) focus on both customer types (B2B & B2C). Most internationally oriented companies focus on businesses as target customers (123; 72.8%), followed by those targeting private individuals (23; 13.6%), and companies which serve both (23; 13.6%).

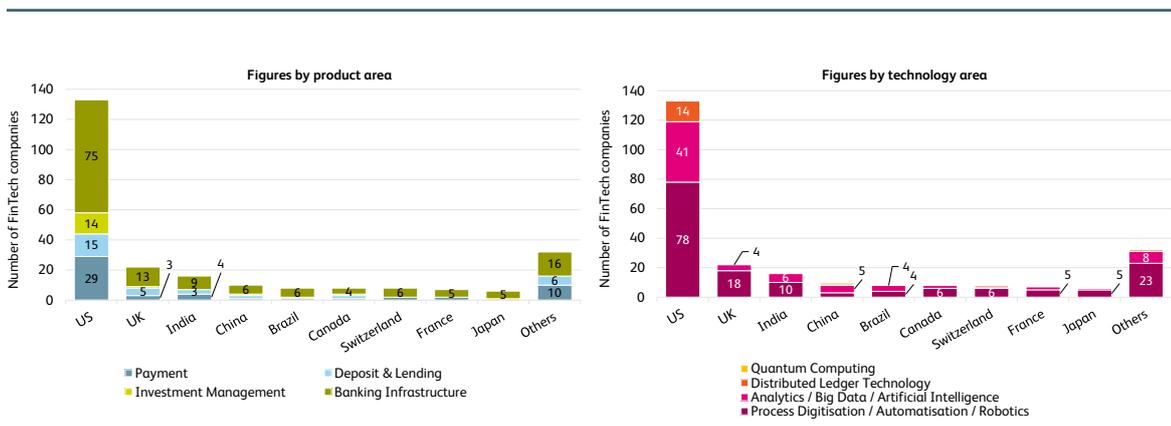


Figure 5.3: Number of FinTech companies by country of headquarters (n=250)

Secondly, the data sample regarding the product areas is analysed (left-hand graph in Figure 5.4). At 74 percent, companies active in the field of *Banking Infrastructure* are the most frequently focused on international markets. On the other side are companies providing solutions for the deposit and lending business, of which half focus their business on the domestic market and the other half assume an international orientation. For the remaining two categories, 36 percent of companies in the product area *Payment* and 39 percent of those active in *Investment Management* focus on their domestic markets. Regarding the served customers, the analysed companies mainly target business clients or business and individual clients. Companies in the fields of *Banking Infrastructure* and *Payments* predominantly target businesses with 77 percent and 58 percent, respectively. 50 percent of FinTech companies active in the investment management business, and 47 percent in the deposit and lending business mainly serve individuals as clients.

Thirdly, the characteristics in the technological dimension are assessed (right-hand graph in Figure 5.4). As the sample size for companies applying quantum computing concepts covers just one company, this technological dimension is barely visible. It does, however, serve companies in its domestic market. All of the three remaining technological dimensions are mainly active internationally. The graph illustrates that more advanced technologies exhibit a higher degree of international orientation. More precisely, 59 percent of all the companies using technological concepts from the field of *Process Digitisation/Automatisation/Ro-*

botics, 81 percent of those applying analytics, big data or artificial intelligence techniques, and 88 percent of those using the distributed ledger technology serve clients internationally (which includes the domestic market). Companies applying technologies from the field of *Process Digitisation/Automatisation/Robotics* show almost the same allocation to B2B and B2C as the overall sample. This does not apply for the other two technological dimensions. The majority of companies in the *Analytics/Big Data/Artificial Intelligence* dimension serve B2B clients (79.7%), followed by companies serving both businesses and private individuals (10.8%) and only B2C clients (9.5%). For companies with the distributed ledger technology as their technological backbone, roughly 40 percent only target B2B clients (41%), followed by B2C and B2B business models (35%) and pure B2C models (24%).

In summary, most of the identified FinTech companies operate in the product area *Banking Infrastructure* and apply more established technologies from the field of *Process Digitisation/Automatisation/Robotics*. While 40 percent of the companies were founded between 2011 to 2015, almost a third was founded prior to the year 2000. Concerning the location of the companies, the US hosts significantly more companies in the rankings than all the other countries, followed by the UK, India, and China, which, however, might be subject to a certain home bias of the rankings this analysis is based on. Finally, a review of the target markets reveals almost 70 percent of all companies having an international focus, while 63 percent choose to serve businesses rather than private individuals.

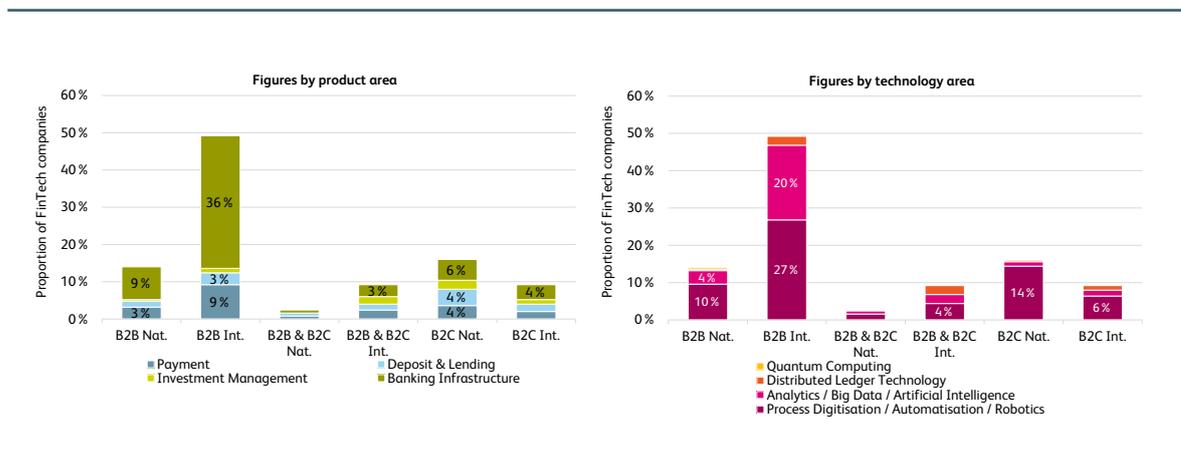


Figure 5.4: Proportion of FinTech companies by customer segment (n=250)

5.2. Valuation of FinTech Companies

The valuation of FinTech companies is challenging for various reasons. First, the markets they serve and the business models employed according to the FinTech Grid described in Subchapter 2.1 are different. For the valuation of a payment transaction company applying the distributed ledger technology and targeting businesses as customers, for example, different factors should be considered than in the case of a robo-advisor which is based on artificial intelligence and serving private individuals. Secondly, the valuation of a start-up company is considered a challenge per se, as there is typically no track record and no available data on financial metrics such as profit, on which a valuation could be based. Thirdly, valuations change over time (and are often subject to hypes) and are therefore volatile.

In this subchapter, a first attempt is made to assess the values of FinTech companies. It should be understood as a first step based on the (incomplete) existing data and seeks to motivate further research. This subchapter starts with an overview of the existing literature concerning valuations and in particular, valuations of FinTech companies. In the second section, the methodology and data used to derive valuations in the FinTech sector are discussed. The last section covers the results of the empirical analysis regarding the valuations of the globally leading FinTech companies identified in Subchapter 5.1.

5.2.1. Literature Review

Three common approaches to valuating a company are proposed by Langerveld (2016) and are described briefly in the following:

- **Fair market value:** The value of a company is determined by supply and demand. It is derived as a result of a settled transaction between a buyer and a seller.
- **Strategic value:** The value of the company is assessed based on its potential for a specific investor. The level of potential is mainly determined by possible synergies and opportunity costs and is specific to the buyer.
- **Intrinsic value:** There are several ways to determine the standalone value of a company. Common approaches are multiples, industry valuation benchmarks, discounted cash flow models (DCF) and net assets (IPEV, 2018). The disadvantage of these methods, however, is that they usually necessitate a

large amount of data in order to conclude the value of a company. Since most FinTech companies are privately owned, publicly available data is often scarce or inexistent. Furthermore, many FinTech companies are in a start-up or growth phase. This implies that the EBIT generated by the company is often negative, making a valuation based on this metric insignificant to the present case (Damodaran, 2009).

Based on a systematic review of the empirical literature, Köhn (2018) develops a framework for the factors determining start-up valuations. In line with Langerveld (2016), the framework contains three factors: start-up characteristics (comparable to the intrinsic value), determinants related to the future potential value to the investor (comparable to the strategic value), and the external environment (comparable to the fair market value).

The above-mentioned multiples, defined as the ratio between two different financial metrics, are a useful and simple methodology to determine a value of a company (Corporate Finance Institute, 2020). Different multiples or industry valuation benchmarks are considered reasonable, depending on the different business models. Among other financial metrics, the number of payment transactions for companies in the payment business, the balance sheet volume for companies in the deposit and lending business or the assets under management for investment management companies can be considered to derive valuations. Another metric used for valuing companies constitutes the number of customers (see e.g., de Bel, 2019).

A further approach to value FinTech companies is proposed by Mind the Bridge (2019), namely an employee multiple (price or valuation vs. number of employees). This could be particularly relevant for early stage companies, which tend to have little or no revenue, while revenue multiples (price or valuation vs. revenue) could be more significant for later stage companies. Mind the Bridge (2019) observes that FinTech companies are paid an average price of USD 0.8 million per employee, while companies with fewer than 50 employees are paid a price of USD 1.1 million per employee. For later stage companies, a trailing revenue multiple (based on the median) of 3.4 is reported for FinTech companies and an average revenue multiple of 3.0 for each million in capital raised (Mind the Bridge, 2019).

An alternative approach, which is considered more of a scoring, rather than a valuation approach, is the Mosaic framework by Sanwal (2019). It scores companies across three dimensions: market, money, and momentum. A further dimension, management, which is often considered a key element by practitioners for companies in the scope of venture capital companies, is missing in this approach. However, there are some difficulties involved in quantitatively measuring the quality of a company's management. Besides traditional indicators such as education and former employers, new quantitative signals like Twitter followers, developed patents at previous employers, published research, and network centrality have emerged.

A dynamic change of the multiples can be observed without necessarily changing the underlying fundamentals described in the approaches above. Gompers and Lerner (2000) found that inflows into venture capital funds have a substantial impact on the pricing of venture capital investments. Concerning the dynamic change, the impact of the financial crisis in 2008 serves as an example. The financial crisis led to a low interest rate environment in the last decade. In search for returns, institutional investors sought to allocate

their assets to alternative asset classes such as venture capital and private equity. However, the shift of these assets could not be fully absorbed by these small asset classes, especially in terms of risk capital invested in early stage start-ups. The amount of assets seeking to be allocated by institutional investors exceeded the need for capital from venture companies. Due to this, owners holding multiple vehicles traded companies among these to create an increased price (Sokolin, 2019). In some cases, valuations are unrelated to profits. Companies may even show negative profits, yet are strongly oriented towards growth (de Bel, 2019). Figure 5.5 illustrates the growth in the number of US-based unicorns and their valuations from 2006 to August 2018, with large growth post 2013.

Various cycles have already been observed in the FinTech industry, for example among those companies applying the distributed ledger technology with numerous initial coin offerings in 2017, which were subject to a market correction in 2018. Le and Beck (2019) find similar patterns for four alternative lenders and show how their revenue multiples decreased after going public¹ (see Figure 5.6). Le and Beck conclude that "what goes up privately, comes down publicly".

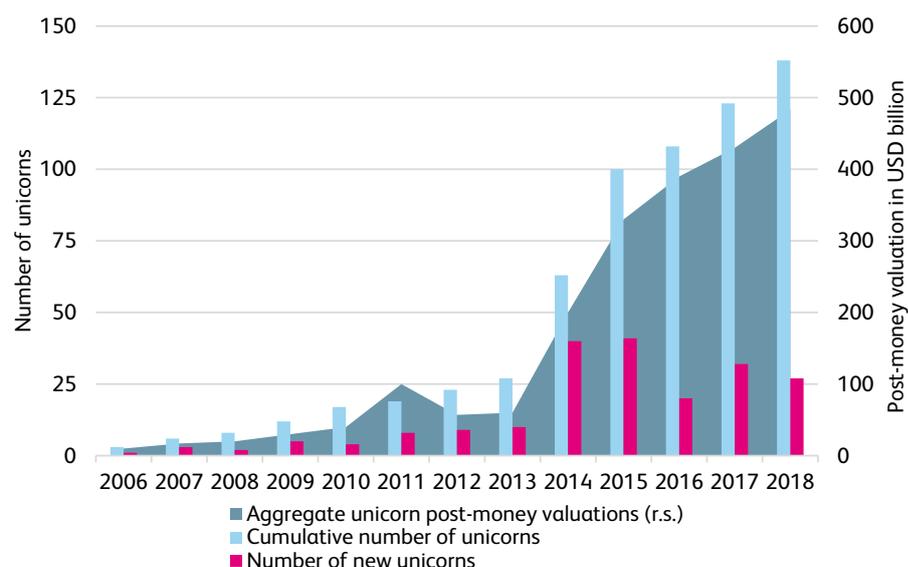


Figure 5.5: Number of US unicorns and aggregated post-money valuations (Source: Sokolin (2019))

¹ The IPO of *Funding Circle* took place in September 2018, that of *Green Sky* in May 2018, and those of *Lending Club* and *On Deck* in December 2014.

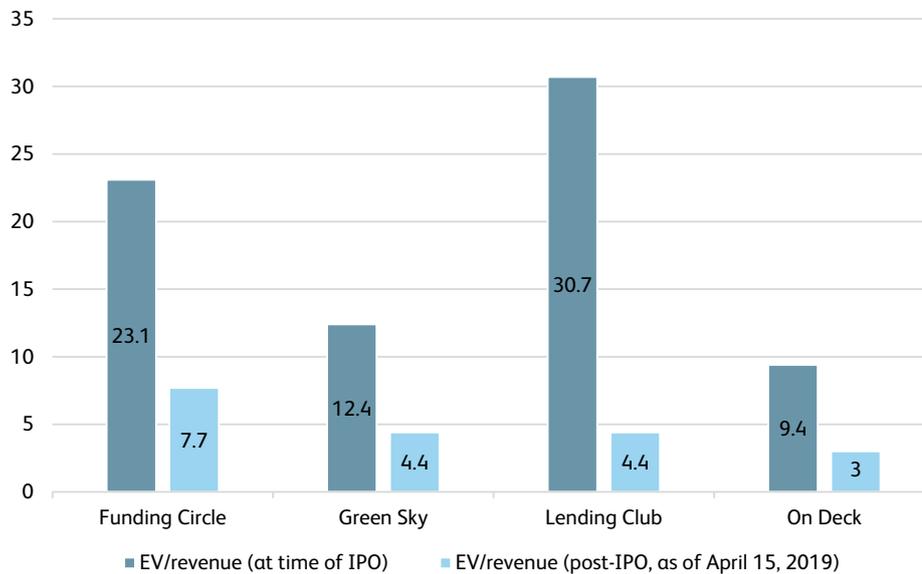


Figure 5.6: Enterprise value (EV) to revenue multiples at the time of IPO and post-IPO (as of April 15, 2019) for selected alternative lenders (Source: Le & Beck (2019))

5.2.2. Methodology & Data

In line with the definition of customer segments mentioned in Subchapter 2.3 and the empirical analysis of the global FinTech companies in Subchapter 5.1, the present analysis distinguishes between companies with a B2B and a B2C business focus. Companies serving both markets are included in the analysis of the B2B, as well as the B2C segment. For the derivation of industry benchmarks of companies active in the B2B market, revenue (in USD) is applied as a metric, while for companies active in the B2C market, the number of customers is used as an explanatory variable. Note that all the metrics used were published in either 2018 or 2019. Therefore, the analysis does not correct for possible dynamic changes over time discussed in Section 5.2.1.

The sample used for the present analysis corresponds to the sample derived in Subchapter 5.1. Therefore, the total sample contains 250 globally leading FinTech companies from all over the world. Note that some of the companies in the sample are listed on a stock exchange, resulting in consistent data to analyse. However, the majority of the companies in the

sample are held privately. For these companies, valuation data was predominantly obtained from *Dealroom* (2020). In addition, where available, public reports were used to verify and complete valuations. The companies' websites and their annual reports, if published, were consulted to receive data on the two explanatory variables, i.e., the companies' revenues and the number of employees. Because data on private companies is rather scarce, not all metrics were available for all the companies included in the sample. Subsequently, in the B2B subsample, data was available for 137 companies, after being adjusted for missing valuations and revenue data. Concerning the B2C subsample, data for 49 companies was applied in the analysis, adjusted for missing valuations and number of customers.

After preparing the data in a first step, the statistical distributions of the metrics used were assessed. This assessment showed right-skewed distributions for all three metrics, i.e., for the valuation, revenue, and the number of employees. The cause for this lies in the relatively large number of small FinTech companies (in

terms of valuation, revenue, and number of customers) in the sample on the one hand, and in the minor proportion of relatively large companies (e.g., Ant Financial) on the other hand. To correct for the right-skewness in the data, all metrics were logarithmised.

In a second step, for those companies serving the B2B market, the (log) valuations were regressed on the corresponding (log) revenues in order to statistically assess the linear relationship between the two variables. The industry benchmarks were then approximated using the regression estimates. Note that when taking logarithms for both the dependent and independent variables in a regression model, the coefficients cannot be interpreted as multiples. Rather, the slope coefficient shows the average percentage growth of the dependent variable (valuation), for a one percent increase in the independent variable (revenue). Concerning companies serving the B2C market the same methodology was applied. As mentioned above, revenue as the independent variable was replaced by the number of customers.

5.2.3. Valuation of International FinTech Companies: Regression Analysis

The results for companies pursuing a B2B business model are illustrated in Figure 5.7, with the companies

(log) revenue on the horizontal axis and the corresponding (log) valuations on the vertical axis. The regression line indicates a positive linear relationship between the two variables, resulting in an R-squared of around 0.60, meaning that 60 percent of the variation of the (log) valuation is explained by the fitted model. Both coefficients in the model (the slope coefficient and the intercept) are statistically significant at the one percent level. The regression's slope coefficient implies that an increase of one percent in the revenue of a FinTech company active in the B2B segment translates, on average, to an increase of almost 0.57 percent in its valuation.

The results for FinTech companies active in the B2C segment are illustrated in Figure 5.8. Note that in contrast to the B2B analysis, and as explained in Section 5.2.2, the (log) number of customers is shown on the x-axis. A positive relationship between the number of (log) customers of a FinTech company and its (log) valuation is indicated in the case of the companies active in the B2C segment. With a value of around 0.29, the R-squared of the regression model, however, is lower than in the regression results for the B2B companies, implying that the model does not fit the data as well as in the B2B analysis. However, the coefficients of both the intercept and the slope are statistically sig-

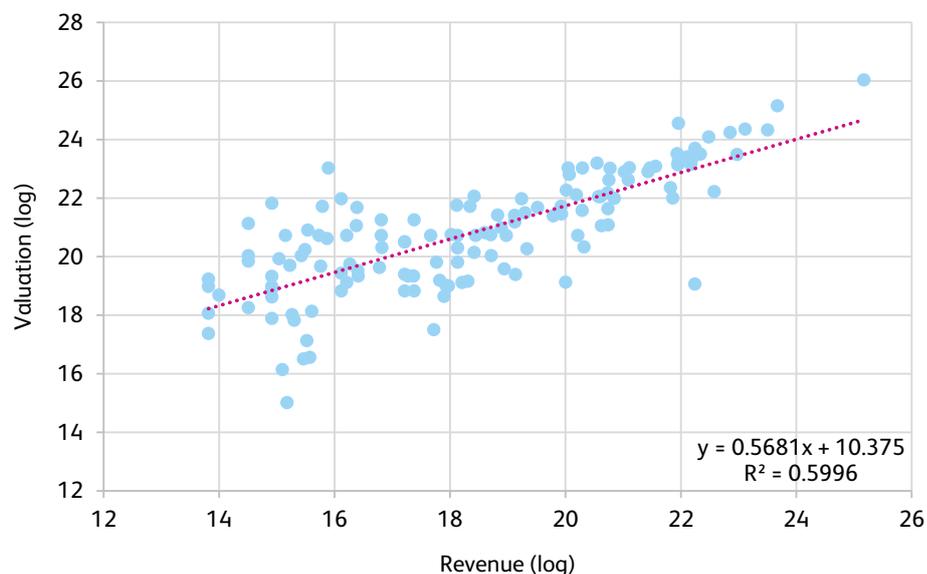


Figure 5.7: Regression model for B2B companies (n=137)

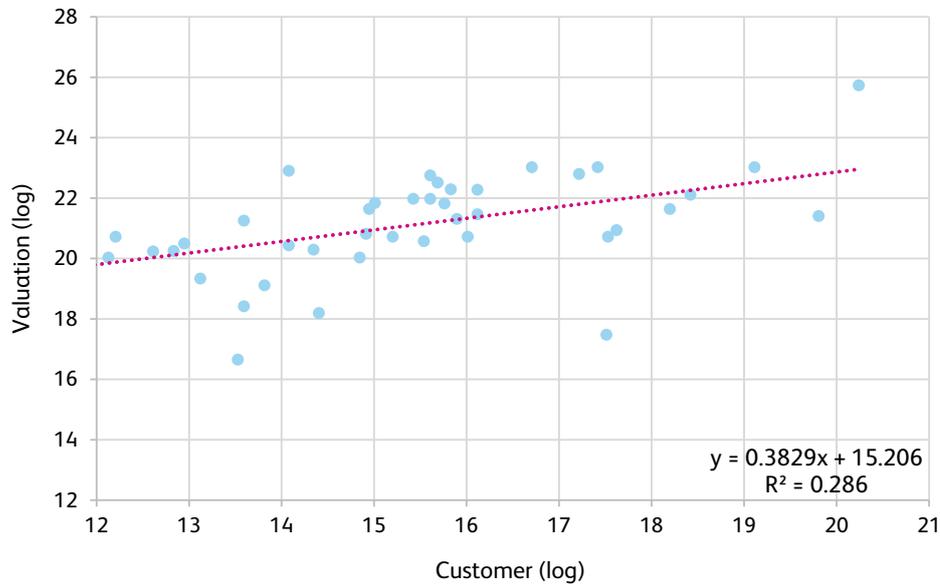


Figure 5.8: Regression model for B2C companies (n=49)

nificant at the one percent level. The slope coefficient of 0.38 implies that a one percentage point change in the number of customers of a FinTech company targeting private individuals corresponds, on average, to an increase of 0.38 percent in its valuation.

5.2.4. Conclusion

This subchapter constitutes a first attempt to assess the values of globally leading FinTech companies, which is subject to a number of different challenges. One example indicated by the reviewed literature is the presence of dynamic changes in the market. A further ex-

ample is the issue of missing, unreliable, or skewed data. Based on a final sample of 137 companies active in the B2B and 49 companies in the B2C segment, two regression analyses were performed, one for each customer segment. The results indicate a positive linear relationship between the revenue and the valuation for companies active in the B2B segment, and the number of customers and the valuation for companies in the B2C segment. These results could serve as a basis for further research in the field of valuing FinTech companies, though they should be considered with caution as the sample is rather small.

6. Swiss FinTech Companies

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In this chapter, the aggregated results of the survey among companies active in the Swiss FinTech sector are presented. While Subchapter 6.1 covers the empirical analysis of the sector and the business models of Swiss FinTech companies, Subchapter 6.2 sheds light on their current challenges. The chapter is based on the methodologies and frameworks introduced in Chapter 2, and thus illustrates the results from the perspectives of both the product dimension and the technology dimension.

6.1. Overview of Swiss FinTech Companies

2019 was another record year for the Swiss FinTech sector. As of the end of the year, a total of 382 FinTech companies were legally incorporated in Switzerland. A breakdown of these companies into the four FinTech product

areas and main technologies applied is shown in Figure 6.1.¹ The so-called FinTech Grid² reveals that from a product area perspective, 147 (38%) of the Swiss FinTech companies are active in the field of *Investment Management*, providing solutions in the fields of robo-advisory, social trading, risk management services, or advisory services related to digital investment management, among others. Covering 115 companies (30%), *Banking Infrastructure* is the second largest product area. Solutions in this field include, for example, challenger banks, personal finance management tools, regulatory technology (RegTech) for banks, or trading infrastructures. The product areas *Payment* and *Deposit & Lending* account for 71 (19%) and 49 (13%) of the Swiss FinTech companies, respectively, and thus appear to be less targeted by the Swiss FinTech industry. Companies in the field of *Payment* typically provide mobile or online payment solutions, or offerings concerning money transfer. *Deposit & Lending*, on the other hand, comprises solutions in the area of crowdlending, crowdinvesting, and invoice trading, among others.

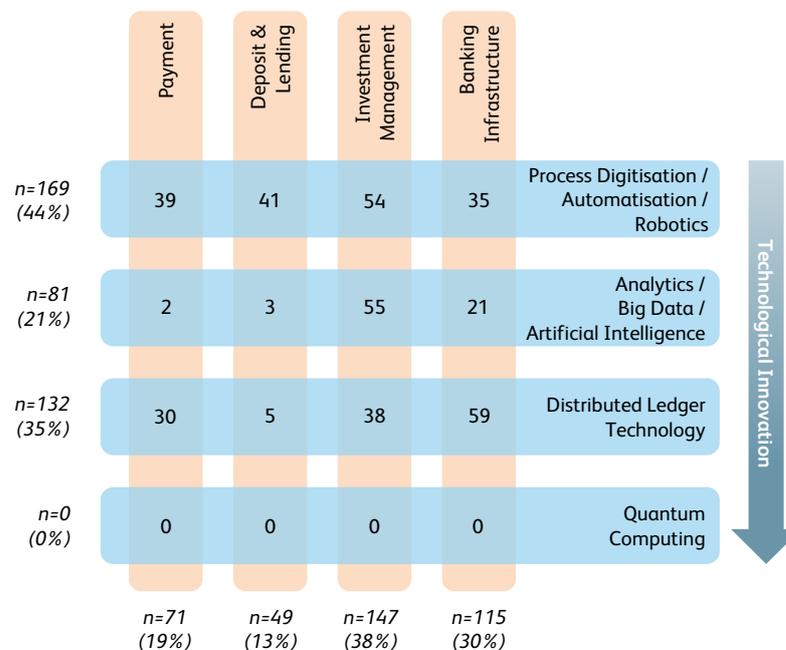


Figure 6.1: FinTech Grid (n=382)

¹ In order to ensure the comparability of the results of the analysis across all five editions of the IFZ FinTech Study, any FinTech companies that were previously included but are now excluded from the database were retrospectively classified according to the new classification framework.

² For a monthly updated digital version of the companies active in the Swiss FinTech sector, see www.fintechmap.ch.

The vertical dimension of the FinTech Grid in Figure 6.1 reveals that most Swiss FinTech companies (44 %) base their business model on the more established technological concepts of *Process Digitisation/Automatisation/Robotics*. The *Distributed Ledger Technology* category accounts for 35 percent of the Swiss FinTech companies. Technological concepts from the field of *Analytics/Big Data/Artificial Intelligence* are applied by 21 percent of the companies. Quantum computing, on the other hand, is not applied in the Swiss FinTech sector.

Looking at the combination of the respective product area and applied technology, it turns out that most FinTech companies offer DLT-based solutions in the field of *Banking Infrastructure*. Examples of such solutions include wallets and trading platforms for cryptographic assets, as well as crypto banks. The second most common business models in the Swiss FinTech sector focuses on investment management solutions using technological tools related to analytics, big data, or artificial intelligence. Examples hereof are algorithmic trading and performance optimisation solutions, as well as tools for data-driven portfolio optimisation or risk management. Business models in the field of *Investment Management* using the comparatively more established technologies in the area of *Process Digitisation/Automatisation/Robotics* are the third most frequently pursued by Swiss FinTech companies. Robo-advisors are examples of such business models. In addition, the FinTech Grid in Figure 6.1 shows some combinations of product areas and technologies that are hardly covered by Swiss FinTech companies. Business models focusing on the payment and deposit and lending industry using analytical tools are among those that are rarely pursued. DLT-solutions in the deposit and lending industry are also not common in the Swiss FinTech sector. This, however, could change in the future as decentralised finance (“DeFi”) becomes increasingly relevant, as indicated by the high growth rates in the total value locked in such solutions (NASDAQ, 2019).

Comparing the classification of Swiss FinTech companies in Figure 6.1 to the evaluation of globally leading FinTech companies in Figure 5.1 highlights some differences between the two samples. While Swiss FinTech companies in the area of *Banking Infrastructure* applying technological concepts in the fields of *Process*

Digitisation/Automatisation/Robotics or *Analytics/Big Data/Artificial Intelligence* are underrepresented, companies providing investment management solutions using technological concepts in the fields of *Analytics/Big Data/Artificial Intelligence* and *Distributed Ledger Technology* account for a comparatively larger proportion. Business models in the area of *Investment Management* basing themselves on the distributed ledger technology are also more common in the Swiss FinTech sector, in relative terms.

Despite the record high in the absolute number of FinTech companies legally incorporated in Switzerland, the year-to-year growth rate has slowed down significantly in comparison to the year 2018. While 2018 saw an increase in the number of Swiss FinTech companies of over 60 percent, the growth rate was around 7 percent in 2019. Growth in 2019 is also lower compared to 2016 and 2017, which show growth rates of 18 and around 16 percent, respectively. However, when examining the absolute number of newly included FinTech companies, the year 2019, with an increase of 26 companies, is comparable to 2016 (+29 companies) and 2017 (+30 companies). The significant increase of 136 Swiss FinTech companies in the year 2018 is explained by the emergence of the so-called Crypto Valley. This is underlined by the right-hand graph in Figure 6.2. While the number of FinTech companies applying the distributed ledger technology amounted to 41 by the end of 2017, this number rose to 127 within one year, implying an increase of roughly 210 percent. By the end of 2019, the number of FinTech companies applying DLT was 132, and thus remained relatively stable (+5 companies) in a year-to-year comparison. Compared to the other technology categories in our FinTech Grid, i.e., *Process Digitisation/Automatisation/Robotics* (+14 companies) and *Analytics/Big Data/Artificial Intelligence* (+7 companies), this represents the smallest absolute (and relative) growth in the year 2019, with the exception of *Quantum Computing*, an early-stage technology which is not (yet) used by any Swiss FinTech company.³

The left-hand graph in Figure 6.2 reveals that three of the four product areas increased their number of associated FinTech companies in the year 2019. The largest absolute growth is accounted for by solutions in the field of *Investment Management* (+11 companies), followed by *Payment* (+10 companies), and *Banking*

³ From this point on, we exclude the technological category *Quantum Computing* from our analysis due to lack of activity.

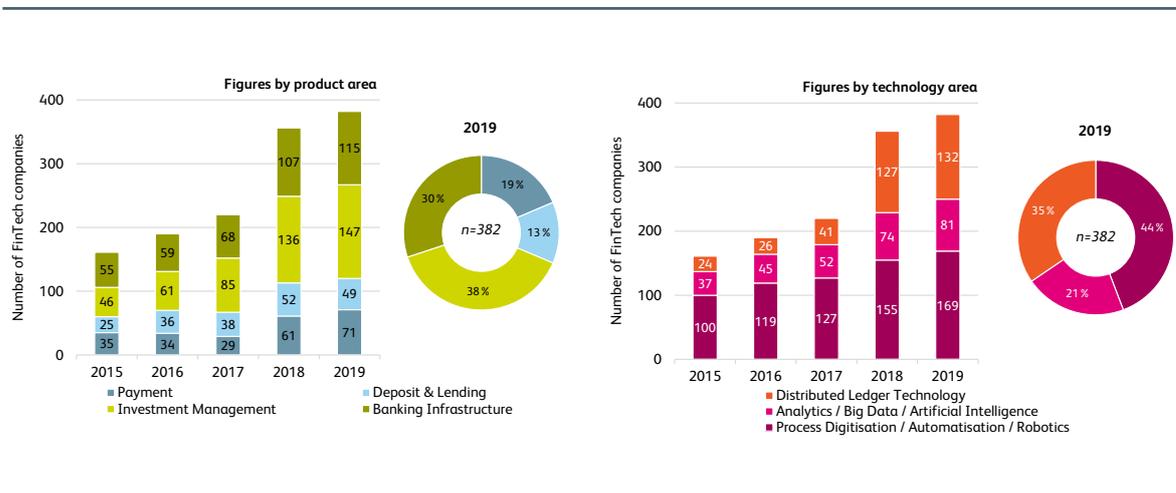


Figure 6.2: Number of FinTech companies in Switzerland by product (left-hand graph and chart) and technology area (right-hand graph and chart) (n=382)

Infrastructure (+8 companies). *Deposit & Lending* constitutes the only product area with a negative growth rate. In the year 2019, the number of FinTech companies active in this field declined by three companies from 52 to 49. One reason for this decline lies in the “selective consolidation” in the crowdfunding industry, as stated by Dietrich and Amrein (2019).

Comparing the distribution of Swiss FinTech companies by product area to the evaluation of the globally leading FinTech companies in Figure 5.1 reveals a significantly larger share of companies in the field of *Investment Management* for the Swiss FinTech sector, while fewer companies are active in the area of *Banking Infrastructure*. From a technological point of view, companies that use DLT as a backbone technology are more common in relative terms. This again can be attributed to the emergence of the Crypto Valley. Technological concepts from the fields of *Process Digitisation/Automatisation/Robotics* and *Analytics/Big Data/Artificial Intelligence*, on the other hand, are applied relatively less frequently by Swiss FinTech companies.

The growth of the Swiss FinTech sector by 26 companies in 2019 results from three different factors, as shown in Figure 6.3. First, 49 companies were excluded from our database due to no longer being active, having relocated to a foreign country, merged, being acquired, or changed their business models away from FinTech. Second, 54 FinTech companies legally incorporated in Switzerland but founded prior to the year 2019 were newly included in our analysis. The reasons for this lie in companies that worked in “stealth mode”

before 2019 and were therefore not publicly active, or switched their business model to FinTech after having a non-FinTech focus before. Third, in 2019, 21 new FinTech companies were founded and accordingly entered the commercial register.

The number of FinTech company foundations per year is shown in Figure 6.4, including a classification of the newly founded companies into product (left-hand graph) and technology areas (right-hand graph). It reveals that the total number of foundations is significantly lower in the year 2019 than in the two previous years. There are two main reasons for this decline. First, the number of foundations for the latest year, i.e., the year 2019, is typically underestimated, as not all of the companies founded are publicly active from the first day after their foundation and thus are not

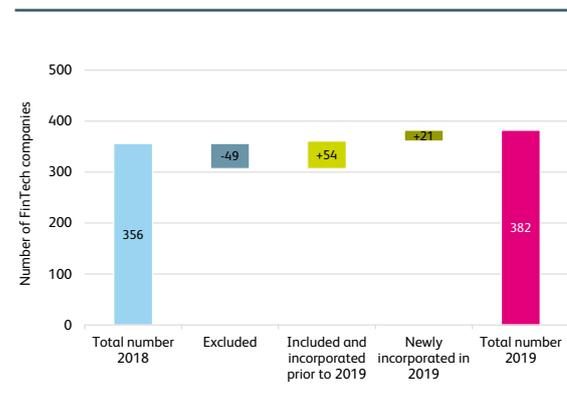


Figure 6.3: Year-to-year change in total number of Swiss FinTech companies

(yet) included in our database. The number of FinTech companies founded in 2019 is therefore likely to increase in the coming months, as more and more of them enter the public domain. Second, the flattening of the hype around DLT, which is also reflected in the declining market capitalisations for cryptographic assets, has led to a significantly lower number of foundations in said field from 50 and 49 in the years 2017 and 2018, respectively, to ten in the year 2019. Compared to the other technology categories, however, *Distributed Ledger Technology* still accounts for the highest number of FinTech company foundations in 2019, followed by *Process Digitisation/Automatisation/Robotics* (+6 companies) and *Analytics/Big Data/Artificial Intelligence* (+5 companies). From a product area perspective, the largest number of companies were founded in the area of *Payment* (+7 companies), followed by *Investment Management* and *Banking Infrastructure* (both +5 companies), and *Deposit & Lending* (+4 companies). This stands in contrast to previous years, in which foundations in the areas of *Investment Management* and *Banking Infrastructure* were significantly higher than in the other two areas. The relatively high proportion of newly founded FinTech companies offering payment products in 2019 is related to the technology category *Distributed Ledger Technology*, as five of the seven foundations in the product area *Payment* use this technology, including the Geneva-based *Libra Association*.

The geographical distribution of FinTech companies based in Switzerland is shown in Figure 6.5. The analysis is again divided into the two dimensions: by prod-

uct (left-hand graph) and technology area (right-hand graph). Overall, the canton of Zug takes the leading position, hosting a total of 126 FinTech companies as of the end of 2019, a year-to-year increase of 15 companies. With 118 companies, Zurich is the second largest Swiss canton as measured by the number of FinTech companies. Due to the lower absolute increase in the number of resident FinTech companies compared to Zug, Zurich (+4 companies) loses the leading position it held in 2018. The pronounced cluster formation of Swiss-based FinTech companies in the cantons of Zug and Zurich can be explained by their important roles as hubs for crypto and traditional finance, respectively. Hence, it does not come as a surprise that while the distributed ledger technology is the technological backbone of most Zug-based companies, the majority of Zurich-based companies apply the more established technological concepts of *Process Digitisation/Automatisation/Robotics*. From a product area perspective, both cantons show a similar distribution with the majority of FinTech companies pursuing a business model offering solutions in the fields of *Investment Management* and *Banking Infrastructure*. Following the two clear leaders in terms of the number of headquartered FinTech companies are the cantons of Geneva, Vaud, and Schwyz with 37, 28, and 17 companies, respectively. While the cantons of Geneva (+6 companies) and Vaud (+5 companies) reveal larger absolute growth than Zurich, Schwyz counts two more FinTech companies in comparison to the end of 2018. The largest decline in the number of resident FinTech companies in 2019 was recorded in Ticino (-5 companies), followed by Basel-Land (-3 companies).

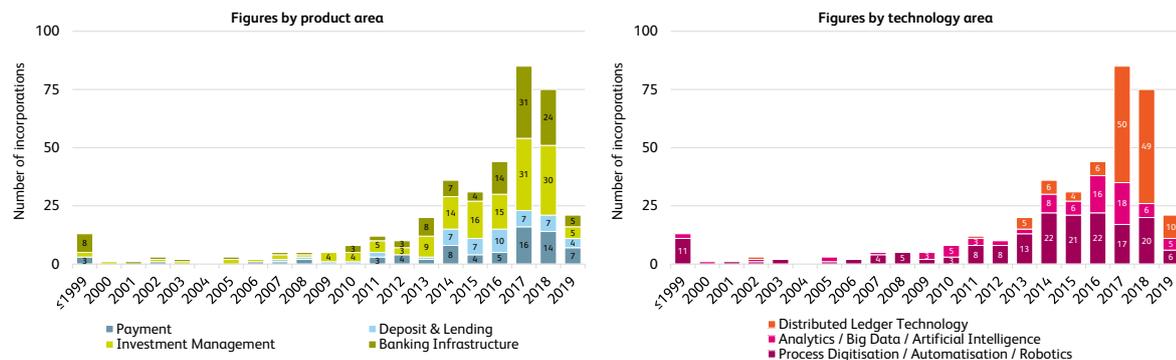


Figure 6.4: Number of FinTech company incorporations per year by product (left-hand graph) and technology area (right-hand graph) (n=382)

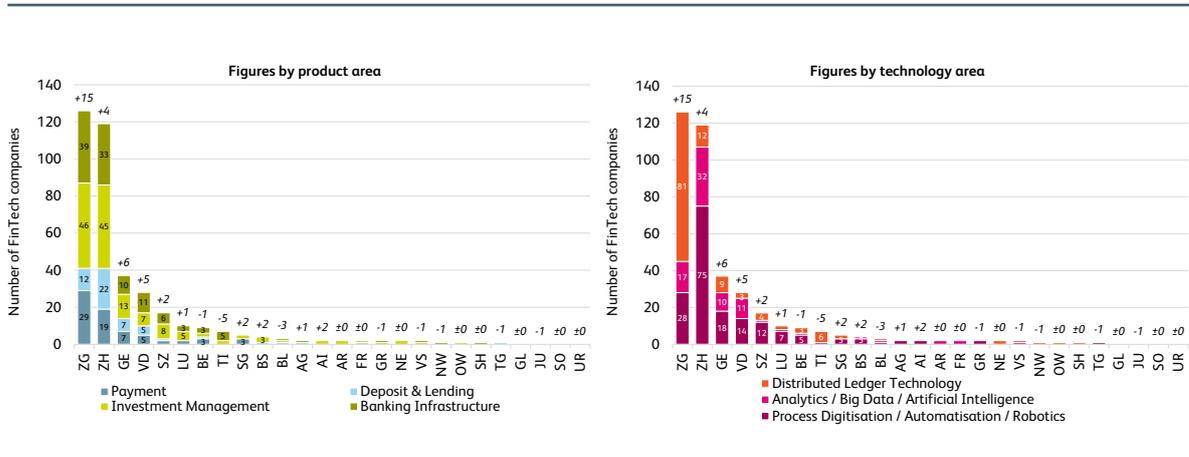


Figure 6.5: Number of FinTech companies by region, and by product (left-hand graph) and technology area (right-hand graph) (n=382)

After the evaluation of trends in the overall Swiss FinTech sector, the following paragraphs are focused on the analysis of business models pursued by Swiss FinTech companies. The analysis is based on the Business Model Canvas described in Subchapter 2.3 and, for the year 2019, includes all companies that took part in our survey.⁴ Of the total 382 Swiss FinTech companies, 152 took part in the survey, which corresponds to a response rate of 40 percent. Starting with the analysis of their key resources, key activities, and key partners, i.e., the factors on the production side needed to provide the value propositions, the following paragraphs end with the analysis of the distribution side of Swiss

FinTech companies, analysing their customer segments, interaction channels, and revenue models.

A key finding of last year’s FinTech study was that the Swiss FinTech sector has matured over the past years. This was underlined by both the growth in the average capitalisation of Swiss FinTech companies and the increasing average size of the workforce employed. These trends have continued in 2019, as shown in Figure 6.6.⁵ The left-hand graph in Figure 6.6 reveals the proportion of Swiss FinTech companies by total funding, illustrating that Swiss FinTech companies have become more capitalised over time. A comparison with

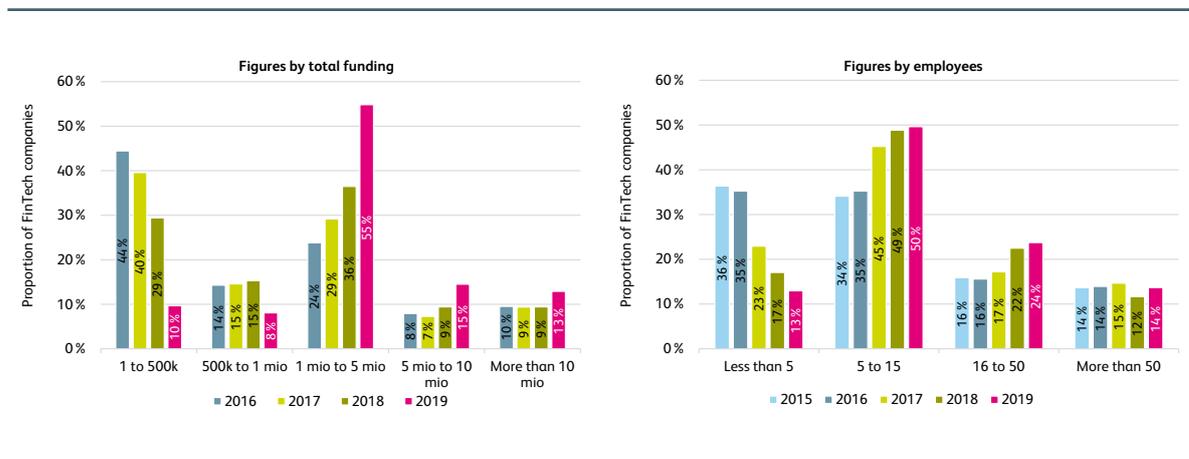


Figure 6.6: Proportion of FinTech companies by total funding (left-hand graph; n₂₀₁₉=62) and employees (right-hand graph; n₂₀₁₉=139)

⁴ Note that the sample is representative in terms of product areas. From a technological perspective, however, FinTech companies in the field of *Process Digitisation / Automatisisation / Robotics* are slightly overrepresented.

⁵ Note that we do not have any figures on the total funding of FinTech companies for 2015, as this metric was not evaluated that year.

the total funding volumes at the end of 2018 shows that the proportion of companies in the lower intervals, i.e., with funding between CHF 1 and CHF 500,000, and CHF 500,000 and CHF 1 million, has declined while total funding between CHF 1 and 5 million in particular has increased to 55 percent of all companies that provided information in this regard. This increase may partly be explained by a change in methodology, as we only consider information confirmed by the companies for the year 2019. In addition to the medium capitalisation interval, the number of Swiss FinTech companies with total funding between CHF 5 to 10 million and above CHF 10 million has also increased.

In addition to capitalisations, the average number of employees in Swiss FinTech companies also indicates the sector continuing to mature. The right-hand graph in Figure 6.6 reveals that the average workforce size of Swiss FinTech companies has increased continuously in the past years. As of the end of 2019, 13 percent of the total 139 Swiss FinTech companies that provided information on this key figure employed less than five full-time equivalents, a decline of four percentage points compared to the previous year. By contrast, medium-sized FinTech companies with 5 to 15 and 16 to 50 employees increased their share by one and two percentage points, respectively. In total, around three quarters of the companies in the Swiss FinTech sector employ a workforce in these segments. Companies with more than 50 full-time equivalents account for 14 percent of all Swiss FinTech companies, which repre-

sents an increase of two percentage points compared to the end of 2018. The distribution of the workforce employed in the Swiss FinTech sector by product area and technology applied is given in Figure 6.7. From the total number of employees (from those FinTech companies that revealed the size of their workforce), the majority work in companies in the area of *Banking Infrastructure* (73%) and apply technologies from the field of *Process Digitisation / Automatisations / Robotics* (72%). This large share can be explained by the fact that established and comparably large software providers, for example in the area of core banking systems, fall into said categories. While from a product area perspective the second largest proportion of employees is allocated to the *Investment Management* area (19%), technological concepts in the fields of *Analytics / Big Data / Artificial Intelligence* (20%) account for the second largest workforce from a technology perspective. A comparably small number of employees work in the areas of *Payment* (5%) and *Deposit & Lending* (3%), or use DLT (8%) as their main technology.

Of the 139 Swiss FinTech companies that provided information on their workforce, 125 provided information on the geographical distribution of their employees, i.e., whether they are based in Switzerland or abroad. While 67 percent of the full-time equivalents of the Swiss FinTech companies were located in Switzerland as of the end of 2018, this proportion had fallen to 66 percent by 2019, implying a relatively stable international composition of the workforce in the sector.

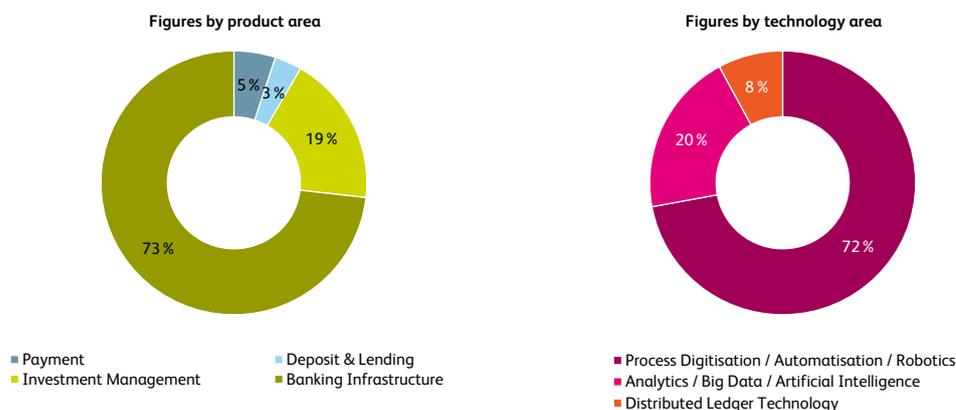


Figure 6.7: Distribution of total employees by product (left-hand chart) and technology area (right-hand chart) (n=139)

Having touched on the topic of diversity in the FinTech industry in Section 3.3.3, the results of the analysis in this present subchapter offer the possibility to examine the aspect of gender diversity in the Swiss FinTech sector specifically, with the help of data provided by the participating Swiss FinTech companies on the members of their management team and board of directors. The data allowed for the identification of 461 management team members and 463 members of the board of directors in Swiss FinTech companies. Of the 461 management team members, 427 are male and thus represent 93 percent of all Swiss FinTech management team members. Meanwhile, female management team members represent only seven percent of the total sample (34 female management team members). Female representation is even lower in the case of the board members in Swiss FinTech companies with 24 out of 463 board members identified as female (5%), while the remaining 439 members are men (95%). In an attempt to illustrate possible differences in terms of gender diversity among the FinTech product and technological categories, Figure 6.8 shows the average representation of both genders within a management team of the respective product (left-hand graph) and technology area (right-hand graph). According to these figures, among all the participating FinTech companies, those classed as *Payment* companies exhibit the highest percentage of average female member representation (13%), and are the only group of companies to fall below the 90 percent mark in terms of average male member representation. Those considered *Deposit & Lending* companies show the highest percentage of average male member

representation (98%). The right-hand graph in Figure 6.8 illustrates the average representation of each gender in a FinTech management team, separated according to the technology applied by Swiss FinTech companies. Here, the highest percentage of female member representation is found in companies classed as *Process Digitisation/Automatisation/Robotics* companies. Despite these slight differences in terms of gender diversity among the FinTech categories, overall, the level of gender diversity is considered low, though this may change in the future thanks to different initiatives which are active and striving for increased diversity, including gender diversity, in the Swiss Tech sector (see Section 3.3.3).

According to the Business Model Canvas the second factor on the production side of a business model is the key activities pursued by a company. Figure 6.9 shows the breakdown of the key activities of Swiss FinTech companies as of the end of 2019, illustrated from both the product and technology area perspectives. As key activities are not mutually exclusive, i.e., a company can pursue multiple activities, the percentages per product and technology area need not add up to 100 percent.

The left-hand graph in Figure 6.9 reveals that 90 percent of all the companies in the *Payment* segment which provided information on their key activities, are actively programming and engineering their products or services. This can be explained, at least partially, by the relatively large amount of newly founded companies in this product area in 2019 (see Figure 6.4), as start-up companies are in an early stage of the business life cycle

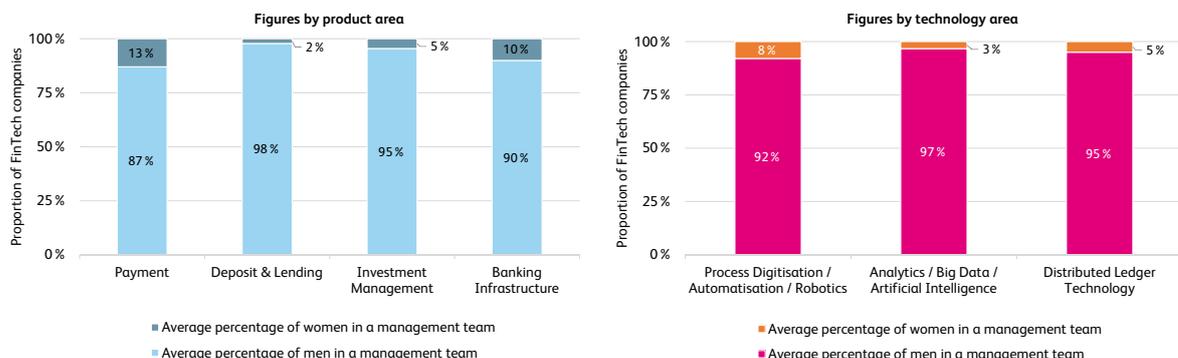


Figure 6.8: Average representation of female and male management team members across the different FinTech categories (n=461)

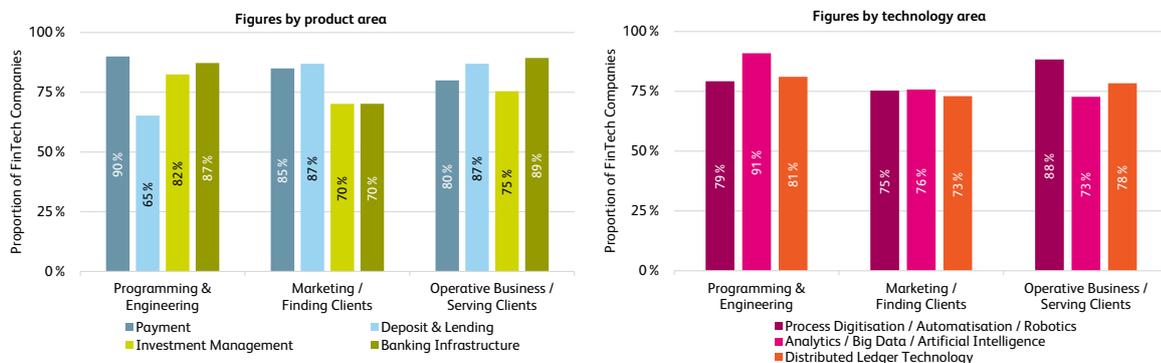


Figure 6.9: Proportion of FinTech companies by key activities, and by product (left-hand graph) and technology area (right-hand graph) (n=147, multiple answers possible)

and therefore have yet to develop their solution. Later stage activities such as marketing, customer acquisition, and business operation are pursued less frequently by Swiss FinTech companies in the *Payment* segment. The opposite holds true for companies in the *Deposit & Lending* product area, where later stage activities yield a higher proportion than the development of new solutions. This can be explained by the fact that solutions in this area, such as crowdfunding platforms, have been on the market for some time now and therefore require comparatively little development work. The remaining two product areas, i.e., *Investment Management* and *Banking Infrastructure*, show higher proportions of companies that are conducting programming and engineering activities and running business operations, in comparison to the share of companies focusing on marketing activities. This could indicate that companies in these two areas have an established customer base which is already being actively served and for which new optimised solutions are being developed.

From a technological perspective (right-hand graph of Figure 6.9), FinTech companies which apply the relatively established technological concepts in the fields of *Process Digitisation/Automatisation/Robotics*, are comparatively more operational, while companies using analytics, big data, and artificial intelligence technologies are more engaged in development activities. Among the Swiss FinTech companies with DLT as their base technology, development work also accounts for the largest share of all key activities, followed by operational, and marketing and customer acquisition activities.

Key partners constitute the third factor of the production side of the Business Model Canvas, as they provide know-how and resources that FinTech companies lack. Of the Swiss FinTech companies that provided information about their key partners, *SIX* (12 mentions) was named the most, followed by *Swisscom* (11 mentions) and *PwC* (8 mentions).

The distribution side of the Business Model Canvas focuses on the markets targeted by a company, the interaction channels through which the value proposition is delivered to the customers, and the way revenue is generated. With regard to the geographical focus of the Swiss FinTech companies, it can be observed that most of them are internationally oriented. Overall, 74 percent of Swiss FinTech companies target international markets, which represents a decrease of six percentage points in comparison to the year 2018. This share is larger than the proportion of internationally oriented globally leading FinTech companies, analysed in Subchapter 5.1. Possible reasons for the higher degree of international orientation of Swiss FinTech companies are the relatively small domestic market and Switzerland's strong international economic ties. Besides the international orientation, Swiss FinTech companies tend to primarily focus on businesses (B2B) or a combination of businesses and private individuals (B2B & B2C) as target customers, with a proportion of 53 and 42 percent targeting said client types, respectively. Business models targeting private individuals only (B2C) are pursued less frequently (5%).

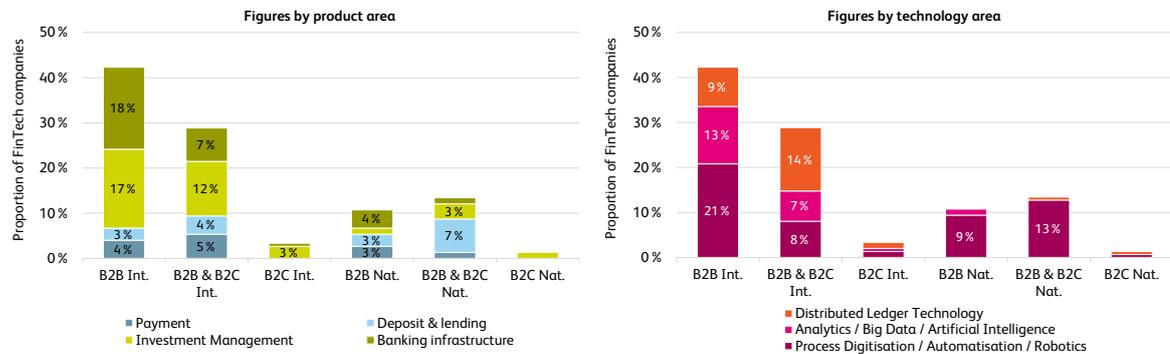


Figure 6.10: Proportion of FinTech companies by customer segments, and by product (left-hand graph) and technology area (right-hand graph) (n=149)

The evaluation of the markets served by product area and technology applied is given in Figure 6.10. As illustrated in the left-hand graph, the product areas *Investment Management* and *Banking Infrastructure* reveal the highest degree of international orientation, followed by the *Payment* segment. *Deposit & Lending* constitutes the only product area with a predominantly national focus. This is mainly driven by crowdfunding platforms that tend to focus on Swiss clients rather than expanding internationally. From a technological perspective (right-hand graph in Figure 6.10), the international orientation increases with the degree of technological innovation. Even though a majority of Swiss FinTech companies which apply the comparatively more established technological concepts of *Process Digitisation / Automatisisation / Robotics* serve international markets, the share of internationally oriented companies is significantly higher in the fields of *Analytics / Big Data / Artificial Intelligence* and *Distributed Ledger Technology*.

The left-hand graph reveals that while companies in the *Deposit & Lending* product area predominantly target both businesses (B2B) and businesses and private individuals (B2B & B2C), the *Payment* area shows an equal distribution across these two customer segments. FinTech companies in the areas of *Investment Management* and *Banking Infrastructure* show a higher degree of specialisation. 70 percent of the companies in the latter field pursue a B2B model, while from the former field, 49 percent of the companies target businesses and eleven percent target private individuals. This significantly larger share of B2C busi-

ness models compared to other product areas is driven by robo-advisory solutions, which in many cases focus on private individuals only. From a technological perspective (right-hand graph of Figure 6.10), the majority of Swiss FinTech companies using concepts from the fields of *Process Digitisation / Automatisisation / Robotics* and *Analytics / Big Data / Artificial Intelligence* predominantly follow a B2B strategy. Companies applying the distributed ledger technology, on the other hand, tend to target both businesses and private individuals.

The channels through which FinTech companies interact with their clients, as the second factor of the distribution side of the Business Model Canvas, are illustrated in Figure 6.11. While the left-hand graph shows the temporal development of the proportion of FinTech companies across different channels, the right-hand graph shows interaction channels by customer segment as of the end of 2019.

The left-hand graph reveals that a hybrid interaction strategy including both personal and digital channels was increasingly pursued by the Swiss FinTech sector over the past years. As of the end of 2019, 81 percent of Swiss companies were pursuing a hybrid strategy, while 16 and 3 percent offered purely digital or purely personal interaction, respectively. The increased proportion of companies offering both types of channels could indicate a growing awareness towards individualised products and services, which is typically difficult to achieve by only using digital interaction channels. In line with the higher tendency of demand for tai-

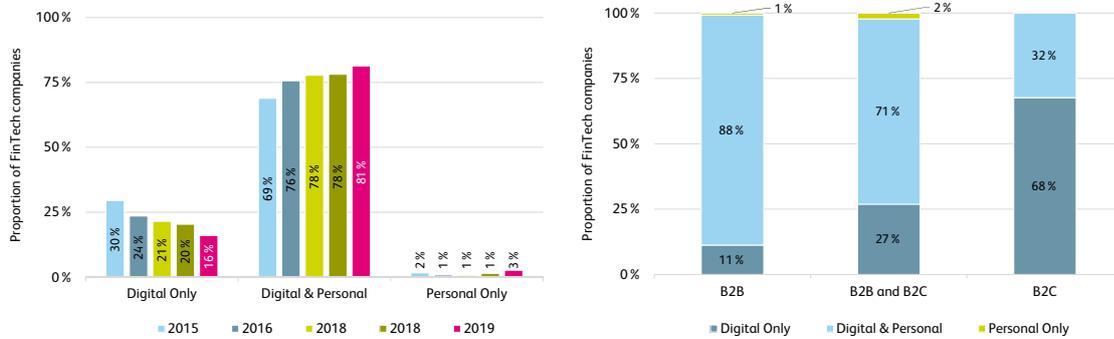


Figure 6.11: Proportion of FinTech companies by channels (left-hand graph), and channels by customer segment as of the end of 2019 (right-hand graph) (n₂₀₁₉=149)

lor-made products when supplying to businesses, a large proportion of FinTech companies pursue a hybrid interaction strategy in the B2B and B2B & B2C segments (right-hand graph in Figure 6.11). FinTech companies targeting private individuals only (B2C), on the other hand, predominantly pursue a purely digital interaction strategy, as such business models need to be scalable in order to achieve a critical mass of customers.

Figure 6.12 shows Swiss FinTech companies' revenue generation models, as the third factor on the distribution side of the Business Model Canvas. Since the year

2015, certain trends have become apparent. Revenue generation via Software-as-a-Service (which includes subscription models) has become increasingly important in the Swiss FinTech sector over the years. With around 29 percent of all revenue models⁶, the SaaS model is now pursued about as frequently as the commission business, a model typically sought by traditional financial institutions, which lies at 30 percent. Licence fees as the second IT-driven revenue model account for 22 percent of all models used in the Swiss FinTech sector. In contrast to SaaS, however, licence fees have not gained in relevance in the past years.

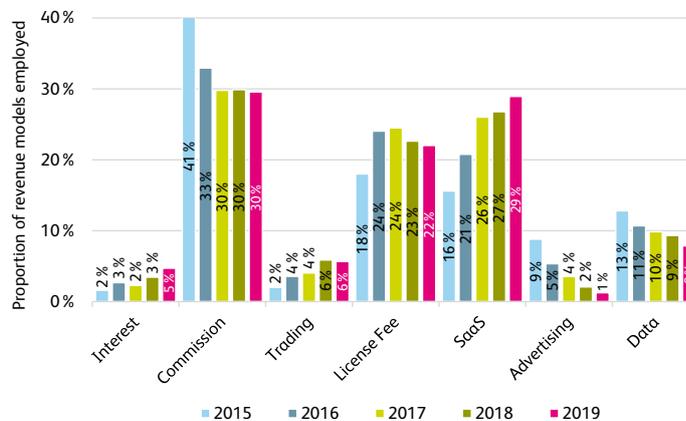


Figure 6.12: Proportion of revenue models used in the Swiss FinTech sector (n₂₀₁₉=152, multiple answers possible)

⁶ Note that this is not directly transferable to the proportion of Swiss FinTech companies, as a single company can employ several revenue models.

Nevertheless, together, the two IT-driven revenue models represented over 50 percent of all models as of the end of 2019. Revenue generation based on data sales account for eight percent, but shows a decreasing level of relevance. This may be due to the fact that this revenue model is sometimes difficult to separate from the other two IT-based models. More precisely, some FinTech business models in the areas of SaaS and licence fees indirectly imply a provision of (analysed) data. However, some of these models might not be assigned to the corresponding “Data” revenue model in Figure 6.12. Revenue generation through interest or trading, which are the other business models typically pursued by financial institutions besides the commission business, are of little relevance in the Swiss FinTech sector, although their proportions have increased over the last years. Overall, the average Swiss FinTech company follows about two different revenue models.

Figure 6.13 illustrates the revenue models employed in the Swiss FinTech sector by product (left-hand graph) and technology area (right-hand graph). As a single company can employ multiple revenue models, proportions do not necessarily add up to 100 percent. The product area perspective shows that companies targeting the payment market predominantly generate revenue by commissions and/or by providing software as a service. More precisely, 76 and 62 percent of all companies in the respective product area that have disclosed relevant information apply these two revenue models, respectively. Commission business stands

out in the *Deposit & Lending* segment. All companies in this product area pursue, among other sources of income, commission business. By contrast, Swiss FinTech companies providing solutions in the field of *Banking Infrastructure* are more IT-driven, with SaaS and licence fees accounting for the largest proportions of all revenue models. Companies in the field of *Investment Management* are most balanced in terms of revenue models applied, with SaaS, commission, and the licence fee models being employed by 64, 54, and 47 percent of the companies in said product area, respectively.

When taking a closer look at the technological view (right-hand graph in Figure 6.13), on the one hand, Swiss FinTech companies applying concepts in the field of *Process Digitisation/Automatisation/Robotics* and *Distributed Ledger Technology* largely generate revenue by taking commissions, providing software as a service or selling licence fees. FinTech companies using tools related to *Analytics/Big Data/Artificial Intelligence*, on the other hand, increasingly earn money by selling (analysed) data, in addition to the two IT-driven revenue models.

In summary, the Swiss FinTech sector continued to grow in 2019, albeit not as strongly as in the previous year. Zug has overtaken Zurich as the canton with the largest number of resident FinTech companies due to greater growth. In regard to the product areas, companies offering solutions in the field of *Investment Management* are most strongly represented, followed

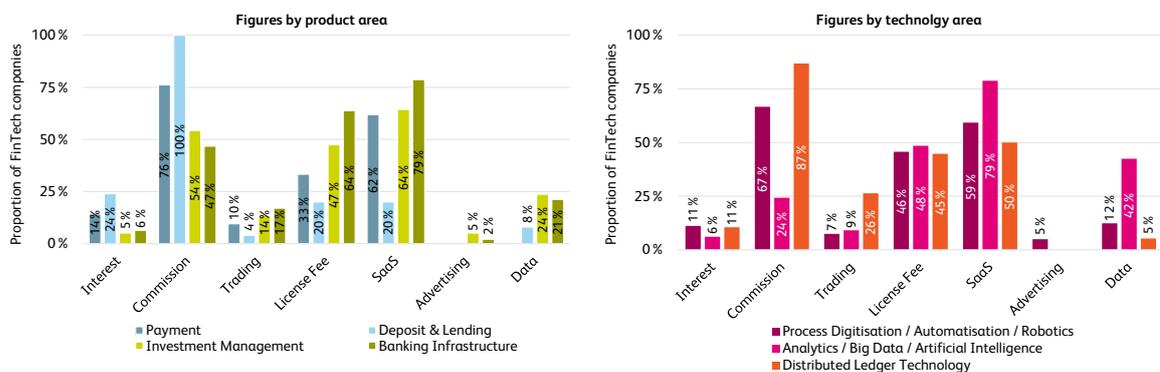


Figure 6.13: Proportion of FinTech companies by revenue model, and by product (left-hand graph) and technology area (right-hand graph) (n₂₀₁₉=152, multiple answers possible)

by companies in the field of *Banking Infrastructure*. In terms of applied technologies, Swiss FinTech companies most often rely on the more established concepts from the field of *Process Digitisation/Automatisation/Robotics*. Distributed ledger technology, in contrast, is used as the main technology by about one third of the companies in the Swiss FinTech sector. Regarding the key resources in the Swiss FinTech companies, most of the trends observed in previous years, i.e., the growing average number of employees in the companies, with roughly two thirds being located in Switzerland, and their increasing total funding, have continued. The analysis of the target markets of Swiss FinTech companies shows that they are mainly internationally oriented, and this more strongly than the globally leading FinTech companies, and focus on businesses (B2B) or businesses and private customers (B2B & B2C) as customers. The interaction with customers is usually carried out via a hybrid strategy that includes personal and digital channels. An exception are B2C models with a predominantly digital interaction channel, which allows a certain scalability of the business model. On the one hand, the evaluation of the revenue models in the Swiss FinTech sector reveals that the commission business is still the most relevant, especially in the product areas of *Deposit & Lending* and *Payment*, and for companies applying technologies from the fields of *Process Digitisation/Automatisation/Robotics* and *Distributed Ledger Technology*. IT-driven revenue models, on the other hand, are more frequently employed in the areas of *Banking Infrastructure* and *Investment Management*. These revenue models, as well as the sale of (analysed)

data, are also popular with FinTech companies that use technological concepts from the field of *Analytics/Big Data/Artificial Intelligence*.

6.2. Sentiment Analysis of Swiss FinTech Companies

In order to capture the intensity of selected challenges posed to Swiss FinTech companies, the sentiment analysis, described in Subchapter 2.4, was conducted for the third time in a row for this years' study. The participants in the survey were each asked to assess the relevance of a challenge on a ten point scale from not pressing (1) to highly pressing (10). Their answers are presented in the following.

For the third consecutive year, finding customers is considered the most pressing challenge among Swiss FinTech companies (average score of 6.8), and is followed by the challenges of the availability of skilled staff or experienced managers (6.1), the expansion into international markets (5.6) and regulation (5.6). Those challenges considered the least relevant are the costs of production or labour (5.3), competition (5.2), and access to financing (5.0). The largest year-on-year difference in average scores is found for the challenge of the costs of production or labour, which shows a decrease in the average score compared to 2018 (-0.30). The second largest year-on-year difference is accounted for by challenge of finding customers which, on the contrary, gained in importance among the

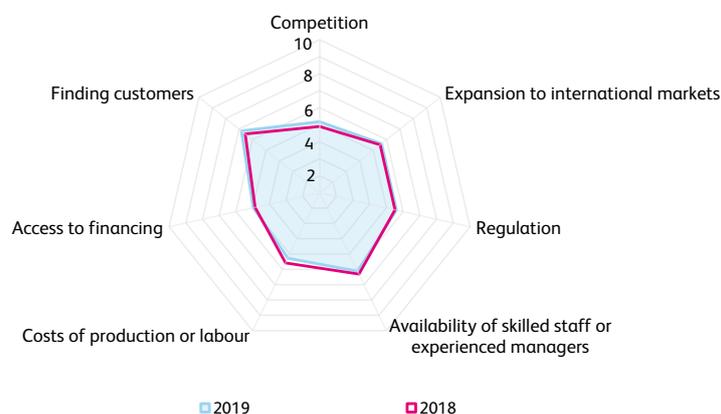


Figure 6.14: Average scores of selected challenges in the Swiss FinTech industry (n=151)

Swiss FinTech companies on average (+0.29). This finding ties in with the results of the CIO Barometer, presented in Chapter 7, which show Swiss banks not yet attributing a high priority to the implementation of FinTech solutions in their IT strategies. The average scores from the years 2019 and 2018 are illustrated in Figure 6.14, and are considered relatively stable in a year-on-year comparison.

Figure 6.15 illustrates the average scores attributed to the FinTech industry challenges according to the FinTech product areas (see left-hand graph) and technology areas (see right-hand graph). The widest dispersion of the average scores is identified among the technological categories for the challenge posed by regulation, where *Distributed Ledger Technology* companies attribute an average score of 7.36, while the *Process Digitisation / Automatisisation / Robotics* and *Analytics / Big Data / Artificial Intelligence* companies' scores average at 5.30 and 4.42, respectively. This gap could be explained by the developments in DLT-related regulation (see Section 3.1.3) such as the DLT Draft Law, demanding increased attention from these companies, though increased security and clarity on the issue could improve DLT companies' situation in the future. Two further challenges which exhibit a wide dispersion of average scores, though among the FinTech product areas, are those of the availability of skilled staff or experienced managers

and the expansion to international markets. While, on average, the challenge of attracting the right employees is considered fairly pressing for *Banking Infrastructure* companies, *Payment* companies appear to be less affected by this issue. The challenge of the expansion to international markets is, on average, judged as the most pressing by *Investment Management* companies, while *Deposit & Lending* companies, which are generally more focused on the domestic market, are the least pressed by this challenge on average.

Overall, the challenges faced by Swiss FinTech companies remain at a level comparable to the results from the 2018 survey, though the newly implemented classification framework applied across all levels of the present analysis has allowed for further insights. On the one hand, the challenge of regulation is identified as particularly pressing for Swiss FinTech companies active in the technology area of *Distributed Ledger Technology*. On the other hand, when analysed across the different product areas, the results show differing attitudes among the Swiss FinTech companies towards the challenges of the costs of production or labour, the availability of skilled staff or experienced managers, or the expansion to international markets. From an overall perspective, however, FinTech companies still agree that finding customers is the most pressing challenge posed to the Swiss FinTech sector.

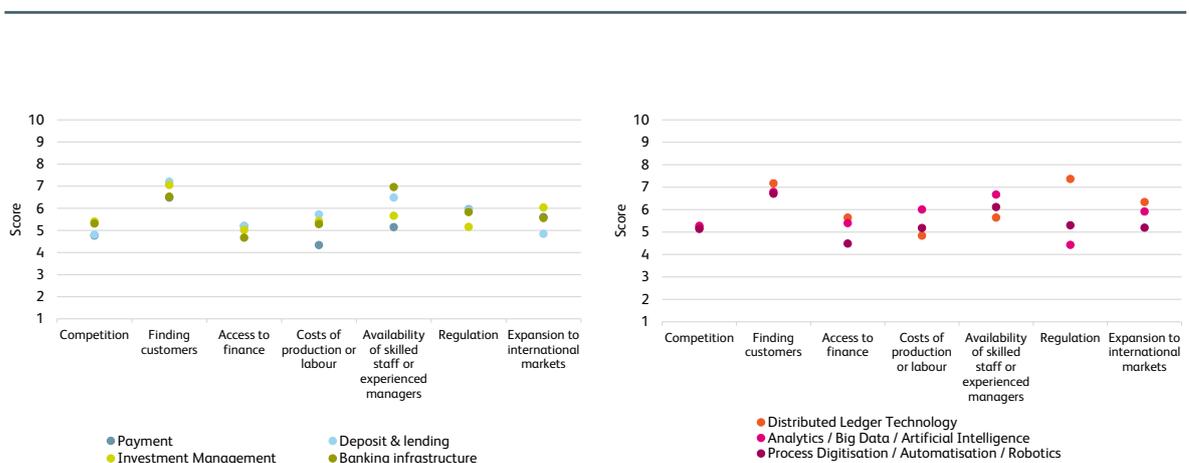


Figure 6.15: Average scores of selected challenges for each FinTech category (n=151)

7. CIO Barometer

By Thomas Ankenbrand, Denis Bieri & Nicola Illi, Institute of Financial Services Zug IFZ

The CIO Barometer is a survey conducted among individuals in charge of IT operations in Swiss banks, in an attempt to capture the current strategic technological trends and developments in the Swiss banking market. The fourth edition of the survey was carried out in 2019 and was structured similarly to the previous surveys. The methodology is presented in Subchapter 7.1, followed by the results of the CIO Barometer 2019 in Subchapter 7.2, and the conclusion in Subchapter 7.3.

7.1. Methodology

With technological advances and digitalisation bringing a new dynamic into the banking industry, the IT departments in particular are faced with new challenges. These are sought to be identified with the help of an anonymous survey among representatives of bank IT departments in Switzerland. In an attempt to efficiently structure the different dimensions of a bank's IT department, the IT Balanced Scorecard concept by Van Grembergen and Saull (2001), which is based on the original balanced scorecard approach from Kaplan and Norton (1996), was applied. The advantage of using this framework is the holistic approach it offers. Examples are the regard for customers, processes, or the degree of innovation. Also, the framework is deemed suitable to determine and describe the strategic course of a bank's IT department. Bearing these advantages in mind, the approach was applied for the 2019 edition of the survey.¹

In the IT Balanced Scorecard analysis presented here, the dimensions user orientation, business contribution, operational excellence, and future orientation are considered. While the dimension user orientation assesses how the IT department orients itself towards the user, the business contribution dimension seeks to measure how the IT department adds value to the daily business. Operational excellence refers to the efficiency and effectiveness of IT processes, and the future orientation dimension covers the processes and resources required to secure innovation capabilities. Each individual dimension covers three indicators which are thought to be relevant to assess an IT department in the respective dimension.

7.2. Results of the CIO Barometer

This subchapter seeks to present the results of the CIO Barometer conducted in 2019 and begins with a description of the sample. In a next step, the strategies and priorities of the surveyed banks are identified through the results of the IT Balanced Scorecard, followed by an overview of the IT costs in the Swiss banking industry.

7.2.1. Description of the Sample

A total of 248 representatives of Swiss banks' IT departments were contacted in November 2019, and asked to complete the survey for the fourth CIO Barometer. The final sample of respondents consists of 46 individuals, creating a response rate of 19 percent.

Figure 7.1 illustrates the main characteristics of the banks surveyed. The left-hand chart shows the distribution according to the different bank groups, of which the regional banks, savings banks, and Raiffeisen bank constitute the largest percentage of the participants (39%), while cantonal banks represent 20 percent, and private banks 17 percent of the sample. The category "Other banks", which also includes big banks and branches of foreign banks, comprises the remaining 24 percent of the participants in the survey. The middle and right-hand chart in Figure 7.1 show the balance sheet volumes and assets under management (AuM) of the surveyed banks. In both cases, the largest percentage are banks with balance sheet volumes and assets under management under CHF 1 billion. The second largest group are those with assets under management between CHF 3 billion and CHF 10 billion. Overall, both in the case of the balance sheet volumes and assets under management, over two thirds (72%) of the participating banks are below CHF 10 billion.

With a relatively small sample of 46 participants and a distribution of bank groups, balance sheet volumes, and assets under management which differ from the distribution of the base population, the results of the survey cannot be considered representative. Compared to the size of different bank groups in Switzerland, cantonal banks, regional banks, and saving banks are overrepresented, while foreign banks are underrepresented in the survey sample (SwissBanking, 2019).

¹ The previous editions of the survey, conducted in 2015, 2016, and 2018 applied the same approach.

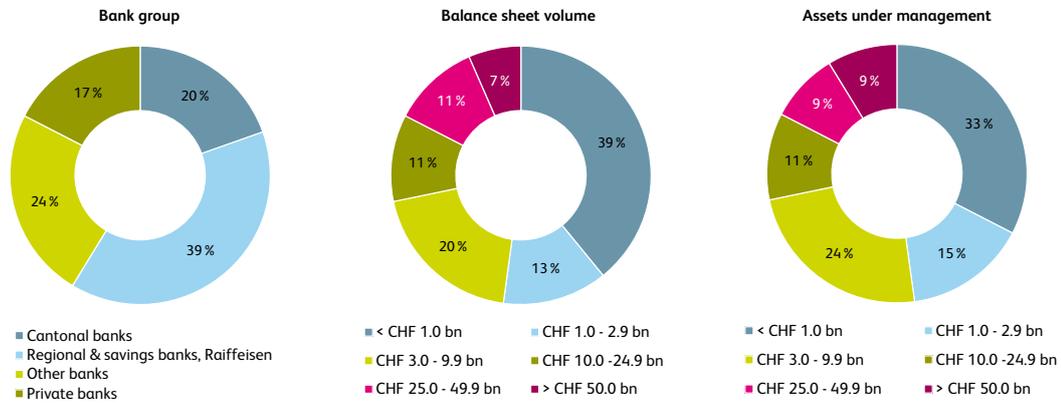


Figure 7.1: Survey participants according to bank group, balance sheet, and assets under management, numbers rounded (n=46)

Nevertheless, the results of the survey provide helpful insights and indications as to how some banks are setting their priorities and strategies in regards to information technology.

7.2.2. IT Balanced Scorecard

As mentioned above, the IT Balanced Scorecard covers four different dimensions of a bank's IT department: user orientation, business contribution, operational excellence, and future orientation. These dimensions, in turn, are each measured by three relevant indicators, which the participants were asked to rate on a four point scale as being a very low (1), low (2), high (3) or very high (4) priority for the bank at the moment, as well as the expected importance of the

individual indicator in five years' time. The results of the IT Balanced Scorecard are presented in Figure 7.2. As in the survey from 2018, on average the business contribution dimension is allocated the highest priority, with an average score of 3.16. This dimension is closely followed by the operational excellence dimension (3.05) and user orientation (2.94), while the future orientation average score remains the lowest at 2.48. Overall, with the exception of the business contribution score, all the average scores have risen in comparison to last year's results. IT security is still leading among the individual indicators and is considered a very high priority for 74 percent of the survey participants, compared to only just half in the 2018 survey (51%). This could be explained by the growing aware-

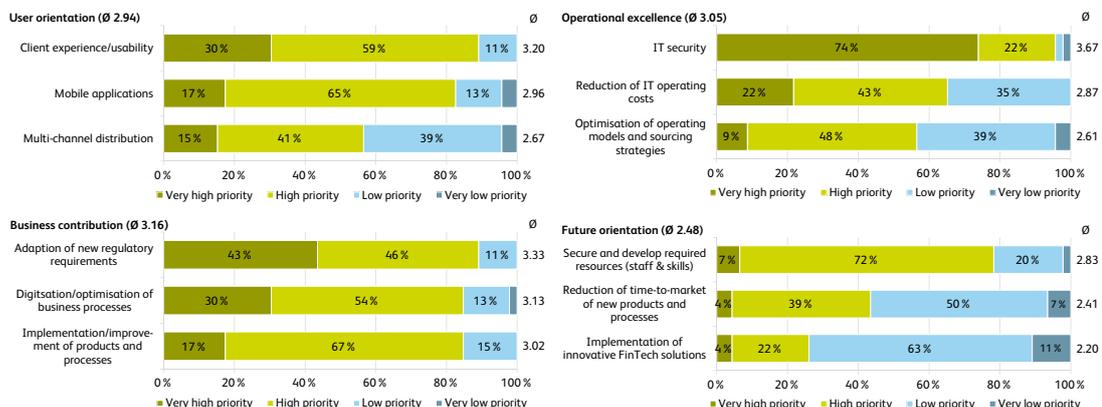


Figure 7.2: Results of IT Balanced Scorecard 2019, numbers rounded (n=46)

ness and concern for issues such as cybersecurity as a crucial risk to banking operations. A further indicator which stands out is the adaption of new regulatory requirements, which has an average score of 3.33 (3.14 in 2018) and has thus replaced the digitisation/optimisation of business processes as the highest priority within the business contribution dimension. In line with the results from 2018, the lowest relevance is attributed to the reduction of the time-to-market of new products and processes (2.41) and the implementation of innovative FinTech solutions (2.20), which both belong to the future orientation dimension. The low priority attributed by banks to the implementation of FinTech solutions partially explains the challenge identified by the surveyed Swiss FinTech companies to finding customers (see Subchapter 6.2). The third indicator included in the future orientation dimension is to secure and develop required resources (staff and skills) which, though not drastically, has decreased in terms of its average score compared to the 2018 survey. The majority of the participants, however, still allocate a high priority to this indicator (72%).

Figure 7.3 illustrates the development of the average scores of the four dimensions from 2016 to 2019, as well as the future outlook from the 2019 survey (expectation for 2024). The average scores on the importance of the topics in the future are all higher than their current values. Though for the current period the dimensions operational excellence and business contribution carry more weight, when asked for a future outlook, many of the participants attribute a much higher future importance to the dimensions user orientation and

future orientation in relative terms. This is shown by the higher growth rates in the average user orientation (15% growth) and future orientation (18% growth) scores compared to the operational excellence (10% growth) and business contribution (5% growth) dimensions between 2019 and in five years time. Indicators that ranked low in the assessment of the current relevance are expected to be of greater importance to Swiss banks' IT departments in the future. Taking a closer look at the increase in the score of the individual indicators between 2019 and the next five years, the implementation of innovative FinTech solutions stands out with a 31 percent growth rate. This development can be observed across all the different bank groups and sizes. Clearly, the participants expect FinTech solutions to become a lot more relevant to their IT operations in the future. Another indicator within the future orientation is the ability to secure and develop the required resources, with an average score for the next five years lying 13 percent higher than the average score for the current period. With competition rising for the acquisition of qualified labour, in particular IT specialists, due to the appearance of BigTechs and FinTech companies on the market, Swiss banks may expect to have to prioritise this issue in order to keep up.

7.2.3. Costs

By asking the participants in the survey to allocate their IT expenses into "run-the-bank" and "change-the-bank" costs, the survey seeks to capture the degree of IT-based innovation present in Swiss banks. The participants were asked to choose from a scale ranging from 100 percent "run-the-bank" and 0 per-

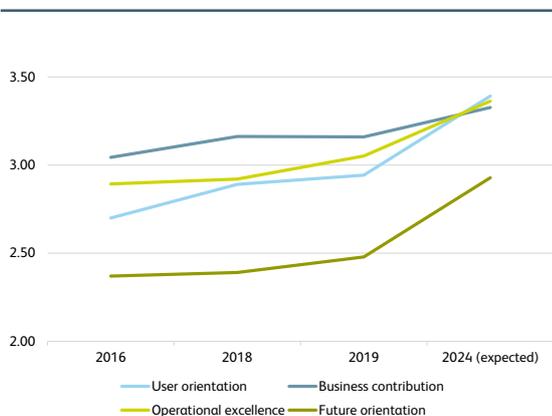


Figure 7.3: Priority averages of the four dimensions over time (n₂₀₁₆=30, n₂₀₁₈=35, n₂₀₁₉=46)

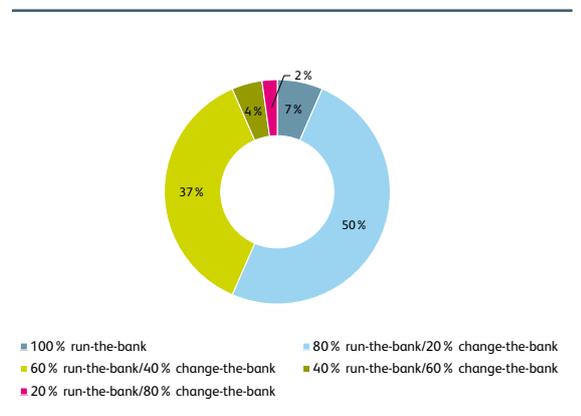


Figure 7.4: Percentage of IT costs which are associated with running the bank or changing the bank (n=46)

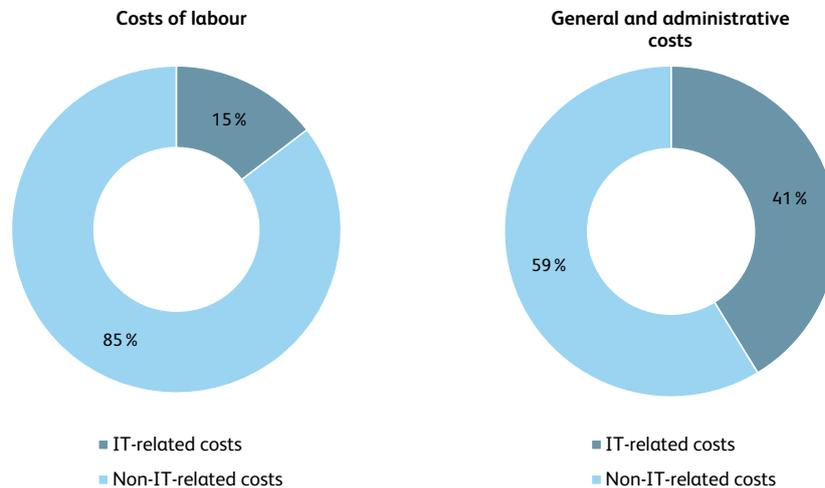


Figure 7.5: Average percentage of IT- and non-IT-related costs (n=46)

cent “change-the-bank” costs (IT used purely for ongoing operations) to 0 percent “run-the-bank” and 100 percent “change-the-bank” costs (IT used purely for innovation). Figure 7.4 illustrates the results from this question. Over half of the respondents allocate 20 percent or less of their IT expenses to change-the-bank costs, indicating a relatively low degree of use of IT resources for innovation purposes. While 37 percent of respondents use 40 percent of their IT expenses to change the bank, six percent contribute 60 percent or more to innovation-related costs. Though the results from the present survey indicate a broader range of answers with some, though only few, banks stating very low or very high percentages allocated to changing the bank, 87 percent still remain in the mid-range. Figure 7.5 illustrates the results of the allocation of IT-related labour and general and administration costs. On the one hand, only an average of 15 percent of the costs of labour are associated with information

technology. On the other hand, on average, over 40 percent of the general and administrative costs are considered IT-related. This indicates a relatively high degree of outsourcing from an overall perspective.

7.3. Conclusion

In line with the results from the 2018 edition of the CIO Barometer, in general, Swiss banks’ IT departments still appear to be focused on running the bank, rather than on a disruptive transformation, according to the results of the IT Balanced Scorecard. Possibly, however, with a few individual banks stating high expenditures on changing the bank, it remains to be seen whether this could be an indication of an emergence of a group of banking pioneers in the Swiss market. For the time being, IT security and the adaption to regulatory requirements have gained in importance.

8. (Crypto) Asset Taxonomy

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Since the inception of the Bitcoin network in the year 2009, the space for cryptographic assets has developed rapidly. The continuing technological innovation in the underlying distributed ledger technology could consequently lead to an increasing transformation of traditional financial markets into crypto-based markets. Although different asset classification frameworks exist for both worlds, a holistic approach merging both traditional finance and the crypto economy is still lacking. This poses a challenge to the various stakeholders such as investors or regulators in retaining an overview of existing assets of different types and, in particular, of their design and individual characteristics. In August 2019, as part of a collaboration between the *Lucerne University of Applied Sciences and Arts* and *Swisscom*, a taxonomy for the systematic classification of all types of assets, be it of physical, digital or tokenised nature, was proposed. Based on feedback from the industry and academia, we now propose a revised version of our first draft. The chapter starts with an analysis of selected existing classification frameworks for traditional and cryptographic assets (Subchapter 8.1), followed by a general description of the taxonomy we propose (Subchapter 8.2). The last two subchapters contain an evaluation of selected classification examples (Subchapter 8.3) and a conclusion (Subchapter 8.4).

8.1. Literature Review

The characteristics and properties of the most common types of financial instruments such as stocks, bonds, and derivatives have been the subject of research for some time, not only in the academia, but also in the industry. Therefore, a wide range of publications exist that deal with the functioning of these different instruments in a structured way. Most classification frameworks, however, focus on a specific class of instruments or purpose, like the classification framework for traditional structured products by the *Swiss Structured Products Association* (2019). Brammertz and Mendelowitz (2018), on the other hand, propose a holistic frame-

work. Their so-called ACTUS taxonomy is based on the specific nature of financial contracts and in particular on their cash flow profiles and seeks to create a global standard for the consistent representation of financial instruments. It distinguishes between financial contracts, which in turn are split into the subcategories of basic contracts and combined/derivatives contracts on the one hand, and credit enhancement on the other. Basic contracts consist of fixed income and index-based products, whereas combined/derivative contracts comprise symmetric financial products, options, and securitisation products. The second main category of the ACTUS taxonomy, i.e., credit enhancement, includes guarantee contracts, collateral contracts, margining contracts, and repurchase agreements.¹ The standard is implemented on the SolitX platform with a technical API layer and DLT adapter for transaction systems and accounting, and in the AnalytX architecture for risk management analysis, simulations, asset and liability management, and business planning (Swisscom, 2019b).

For cryptographic assets, on the other hand, the characteristics of many tokens in various respects, for example in terms of regulation, utility or valuation, were and are still largely ambiguous and hard to measure. Several initiatives from governments, the academia, and the industry have sought to reduce these uncertainties by systematically structuring the hundreds of existing tokens based on predefined criteria. The *Swiss Financial Market Supervisory Authority* (FINMA), for example, issued guidelines for enquiries regarding the regulatory framework for initial coin offerings in early 2018, in which it distinguishes between three types of tokens, i.e., payment tokens, utility tokens, and asset tokens, based on the underlying economic purpose (FINMA, 2018c)². An academic reappraisal of the topic was carried out by Oliveira et al. (2018). By applying a design science research approach, including 16 interviews with representatives of projects with blockchain-based token systems, the paper aims to derive a token classification framework for cryptographic assets that can be used as a tool for better informed decision making when using tokens in blockchain applications. Their final classification framework, a morphological box, consists of the 13 attributes class, function, role, representation, supply, incentive system, transactions, ownership, burnability, expirability, fungibility, layer, and chain, each of which include a set of defined char-

¹ For more details, see www.actusfrf.org.

² For further details on the three token categories defined by FINMA, see Section 3.1.3.1.

acteristics. A similar framework was developed by Ballandies et al. (2018). The authors established a classification framework for distributed ledger systems consisting of a total of 19 descriptive and quantitative attributes with four dimensions (distributed ledger, token, action, and type). The attributes comprise the distributed ledger type, origin, address traceability, Turing completeness, and storage in the distributed ledger dimension, underlying, unconditional creation, conditional creation, transferability, burn, and supply in the token dimension, action fee, read permission, and actor permission in the action dimension, and fee, validate permission, write permission, proof, and type in the consensus dimension. The framework was derived from feedback from the blockchain community.³

Three further classification frameworks for cryptographic assets that were strongly driven by the industry are those proposed by MME, the *International Token Standardization Association* (ITSA), and the *Ethereum Enterprise Alliance* (EEA). The framework by MME was published in May 2018 and focuses on the legal properties and risk assessment of cryptographic assets. The paper's resulting classification is based on a token's function or main use, alongside other criteria such as the existence of a counterparty, as well as its type and/or the underlying asset or value. The final archetypes of cryptographic assets are native utility tokens, counterparty tokens, and ownership tokens, which are each subject to additional subcategories of token types (Müller et al., 2018). The International Token Classification (ITC) framework by the ITSA comprises an economic, technological, legal, and regulatory vertical each containing a set of subdimensions with different attributes. The economic and technological verticals include three subdimensions each, which refer to a token's economic purpose, its target industry, and the way of distribution, and the technological setup, consensus mechanism, and technological functionality, respectively. The legal vertical includes the two subdimensions legal claim and issuer type, whereas the regulatory vertical focuses on assessing a token's regulatory status in the US, China, Germany, and Switzerland. Over all verticals, a total of twelve subdimensions are defined, though ITSA plans to define further subdimensions in the future. Concerning the evaluation of these individual subdimensions, as of September 2019, the ITC framework already provided detailed information on four of the twelve subdimensions, namely

for the economic purpose, industry, technological setup, and legal claim. The classification into these four subdimensions was compiled in a database covering more than 800 cryptographic tokens. Besides the classification framework and the corresponding database, the ITSA also introduced a nine digit unambiguous identifier for each token, the so-called International Token Identification Number, short ITIN (ITSA, 2019). The third industry-driven framework for classifying cryptographic tokens was published by the EEA in November 2019. Their proposed Token Taxonomy Initiative (TTI) distinguishes between five characteristics a token can possess. The first characteristic is the token type and refers to whether a token is fungible or non-fungible. The second characteristic, the token unit, distinguishes between the attribute of being either fractional, whole or singleton and indicates whether a token is subdivisible or not. The value type, as the third characteristic, can assume the attribute of being either of an intrinsic value, i.e., the token itself is of value (e.g., Bitcoin), or a reference value, i.e., the token value is referenced elsewhere (e.g., tokenised real estate). Characteristic four, the representation type, comprises the attribute of being common or unique. Common tokens, on the one hand, share a single set of properties, are not distinct from one another and are recorded in a central place. Unique tokens, on the other hand, have unique properties and their own identity, and can be traced individually. The fifth and last characteristic is the template type and classifies tokens as either single or hybrid and refers to any parent/child relationship or dependencies between tokens. Unlike single tokens, hybrid tokens combine parent and child tokens in order to model different use cases. In addition, the TTI provides measures in order to promote interoperability standards between different blockchain implementations (Ethereum Enterprise Alliance EEA, 2019).

Another publication, which is, however, considered more of an implementation or mapping guide of the traditional and crypto finance world rather than a classification framework, is the paper published by the *Crypto Valley Association* (2019).

8.2. The (Crypto) Asset Taxonomy

Based on the findings from the existing literature and the feedback received from various stakeholders for the first draft of the proposed taxonomy, a revised version

³ For further details on the attributes included in the two last frameworks mentioned, please refer to Oliveira et al. (2018) and Ballandies et al. (2018), respectively.

of the framework is presented in the present subchapter. Unlike existing classification frameworks, our asset taxonomy aims to classify all existing types of assets, i.e., assets from both traditional finance, as well as the crypto economy. A morphological box is chosen as the methodological approach in order to be able to take the multi-dimensionality of the matter into account. The revised version of the taxonomy is shown in Figure 8.1. In total, 14 different attributes based on which all types of assets can be classified, are identified. Note that due to the extension of the taxonomy to traditional assets, some DLT-specific attributes in the papers discussed above are summarised or generalised, while new attributes were added in order to take the characteristics of traditional asset types into account. The final attributes include claim structure, technology, underlying, consensus/validation-mechanism, legal status, governance, information complexity, legal structure, oracle interface, total supply, issuance, burn condition, transferability, and fungibility, with each comprising a set of at least two characteristics.

Since not all attributes and characteristics are intuitively clear, they are explained in more detail in the following:

Claim structure: Does the asset represent a claim?

- No claim(s): The asset does not represent any kind of claim.
- Flexible claim(s): The asset represents certain claims, the possession or exercise of which can depend on certain conditions.
- Fixed claim(s): The asset represents claims which can neither be restricted nor restrained under any condition.

Technology: Which technology is the asset based on?

- Physical: The asset exists in a physical form.
- Digital: The asset exists in a digital form, but is not based on the distributed ledger technology.
- Distributed ledger technology: The asset is based on the distributed ledger technology, structured either as a native token, i.e., a token that is native to a specific blockchain, or as a protocol token, i.e., a token issued on an existing blockchain protocol such as,

Claim Structure	No claim(s)		Flexible claim(s)		Fixed claim(s)	
Technology	Physical		Digital		Distributed ledger technology	
					Native token	Protocol token
Underlying	No underlying	Company	Bankable asset	Cryptographic asset	Real asset	Contract
Consensus/Validation Mechanism	Deterministic			Probabilistic		
Legal Status	Regulated			Unregulated		
Governance	Centralised			Decentralised		
Information Complexity	Value	Transaction	Contract	Turing completeness		
Legal Structure	No legal structure	Foundation	Note/bond	Share	Other	
Oracle Interface	No interface		Qualitative		Quantitative	
Total Supply	Fixed		Conditional		Flexible	
Issuance	Once		Conditional		Flexible	
Burn Condition	No burning	Fixed	Conditional	Flexible		
Transferability	Transferable			Non-transferable		
Fungibility	Fungible			Non-fungible		

Figure 8.1: Asset taxonomy

for example, ERC-20 or ERC-721 tokens⁴ for the Ethereum blockchain.

Underlying: Which underlying or collateral is the asset's value based on?

- No underlying: The asset's value is not a derivative of an underlying asset.
- Company: The asset's value represents a stake in a company (e.g., equity).
- Bankable asset: The asset's value represents a bankable asset (e.g., asset-backed stablecoin).
- Cryptographic asset: The asset's value represents a cryptographic asset.
- Real asset: The asset's value represents a real asset.
- Contract: The asset's value represents a contract.

Consensus-/validation-mechanism: How is the agreement on the state (e.g., property rights or ownership transfer) of the asset reached?

- Deterministic: Consensus is final. Mechanisms that typically, but not necessarily, belong to the deterministic type are, for example, notary services or qualified written form.
- Probabilistic: Consensus is not final, but reached with a certain level of confidence. Mechanisms that typically, but not necessarily, belong to the probabilistic type are, for example, proof-of-work or proof-of-stake.

Legal status: What is the regulatory framework governing the asset?

- Regulated: The asset is regulated under existing laws.
- Unregulated: There is no regulatory framework applicable to the asset.

Governance: How is the asset managed?

- Centralised: The asset is governed by an authoritative party or consortium.
- Decentralised: The asset is governed without centralised control.

Information complexity: What type of information complexity is associated with the asset?

- Value: The asset represents a specific value.
- Transaction: The asset encompasses information flows of a transactional nature in addition to its value.
- Contract: The asset encompasses conditional infor-

mation flows in addition to the deterministic information flow of a transaction (e.g., smart contract).

- Turing completeness: The asset is based on a Turing complete («universally programmable») computational model.

Legal Structure: What is the legal form of the asset?

- No legal structure: There is no legal structure governing the asset.
- Foundation: The asset is governed by a foundation/trust structure.
- Note/bond: The asset is structured as a note or bond.
- Share: The asset is structured as a share.
- Other: Other legal structure.

Oracle interface: How is relevant information on the asset managed?

- No interface: The asset is not dependent on any kind of oracle interface.
- Qualitative: The asset manages relevant information indirectly through an authorised instance (e.g., general assembly).
- Quantitative: The asset manages relevant information from authorised sources automatically (e.g., IoT sources).

Total supply: To which limit can the asset be generated?

- Fixed: The total supply of the asset is fixed.
- Conditional: The total supply of the asset is dependent on predefined conditions.
- Flexible: The total supply of the asset is managed flexibly by authorised parties.

Issuance: How is the asset generated?

- Once: After an initial issuance, no additional units of the asset are issued.
- Conditional: Additional units of the asset are issued once predefined conditions are met.
- Flexible: Additional units of the asset can be issued flexibly by authorised parties.

Burn condition: How is the number of outstanding assets reduced?

- No burning: The number of outstanding assets cannot be reduced.
- Fixed: The reduction of the number of outstanding assets follows a predefined protocol.

⁴ ERC-20 is a technical standard for Ethereum-based tokens, describing a set of rules that a token should follow in order to properly interact with the Ethereum blockchain. ERC-721 is a similar technical standard that, unlike the ERC-20 standard, focuses on building non-fungible tokens on the Ethereum blockchain.

- Conditional: The reduction of the number of outstanding assets is initiated once predefined conditions are met.
- Flexible: The reduction of the number of outstanding assets can be carried out flexibly by authorised parties.

Transferability: Can the asset’s ownership be transferred to another party?

- Transferable: The asset’s ownership can be transferred to another party.
- Non-transferable: The asset’s ownership cannot be transferred to another party.

Fungibility: Can the asset be interchanged with another asset of the same type?

- Fungible: The asset is substitutable with another asset of the same type.
- Non-fungible: The asset is not substitutable with another asset of the same type.

8.3. Classification Examples

This subchapter seeks to test the above-mentioned taxonomy with five selected examples. First, each of the three token types as defined by the *FINMA* token framework are evaluated using concrete examples, namely bitcoin, Ether, and the Crowdlitoken, followed by an assessment of CryptoKitties, which is a collectible, and traditional shares.

Bitcoin

Bitcoin (see Figure 8.2), which represents a payment token, does not hold any kind of legal claims and is not regulated under the existing law. It is based on the distributed ledger technology without a specific underlying (meaning it is not a stablecoin). Since bitcoin, the native token of the Bitcoin protocol, makes use of the proof-of-work consensus mechanism, finality on the state of the system is not guaranteed, but only probabilistic, and governance of the system is decentralised.

Claim Structure	No claim(s) 	Flexible claim(s)	Fixed claim(s)			
Technology	Physical	Digital		Distributed ledger technology		
Underlying	No underlying 	Company	Bankable asset	Cryptographic asset	Real asset	Contract
Consensus-/Validation Mechanism	Deterministic			Probabilistic 		
Legal Status	Regulated			Unregulated 		
Governance	Centralised			Decentralised 		
Information Complexity	Value	Transaction 		Contract	Turing completeness	
Legal Structure	No legal structure 	Foundation	Note/bond	Share	Other	
Oracle Interface	No interface 	Qualitative		Quantitative		
Total Supply	Fixed 	Conditional		Flexible		
Issuance	Once	Conditional 		Flexible		
Burn Condition	No burning 	Fixed	Conditional		Flexible	
Transferability	Transferable 		Non-transferable			
Fungibility	Fungible 		Non-fungible			

Figure 8.2: Classification of bitcoin

Furthermore, bitcoin’s information complexity is of a transactional type. It is not governed by a legal structure and there is no oracle interface. The total supply of bitcoin is capped at 21 million and the issuance of additional units is conditional on the creation of new blocks. There is no process of burning existing coins. Finally, bitcoins are easily transferable between parties and are fungible, i.e., equally interchangeable since all coins are approximately identical and thus worth roughly the same.

Ether

Ether (see Figure 8.3), which is classed as a utility token, is the native token of the Turing-complete Ethereum platform which is governed by the *Ethereum Foundation* located in the Crypto Valley. The token itself is unregulated. Although multiple decentralised systems which can act as a quantitative oracle interface for the plat-

form exist, there are no legal claims and no underlyings associated with the token. Consensus on the Ethereum platform is, at the time of writing, achieved based on the proof-of-work mechanism, and therefore is of a probabilistic nature. As a consequence, the governance of the token is decentralised. Like with bitcoin, the issuance of Ether tokens is conditional on the creation of new blocks, i.e., when miners get awarded with newly mined units, and the destruction of existing units is not possible. However, currently the total supply of Ether is not limited. All Ether tokens are transferable between parties and are fungible.

Claim Structure	No claim(s)	Flexible claim(s)	Fixed claim(s)
Technology	Physical	Digital	Distributed ledger technology Native token Protocol token
Underlying	No underlying	Company	Bankable asset Cryptographic asset Real asset Contract
Consensus/Validation Mechanism	Deterministic	Probabilistic	
Legal Status	Regulated	Unregulated	
Governance	Centralised	Decentralised	
Information Complexity	Value	Transaction	Contract Turing completeness
Legal Structure	No legal structure	Foundation	Note/bond Share Other
Oracle Interface	No interface	Qualitative	Quantitative
Total Supply	Fixed	Conditional	Flexible
Issuance	Once	Conditional	Flexible
Burn Condition	No burning	Fixed	Conditional Flexible
Transferability	Transferable	Non-transferable	
Fungibility	Fungible	Non-fungible	

Figure 8.3: Classification of Ether

Crowdlitoken

Crowdlitokens (see Figure 8.4) are classed as asset tokens and are tokenised real estate bonds, regulated under the existing law. They are issued on the Ethereum Blockchain under the ERC-20 standard and represent a contract including fixed claims (e.g., voting and interest payment). The token value is derived from the fundamental value of the issuing company, and only indirectly by its real estate portfolio. Due to the underlying distributed ledger technology, consensus on the state of the tokens is not final but only probabilistic. Crowdlitokens are structured as notes/bonds. They are governed in a centralised manner through a qualitative oracle interface since token holders are allowed to vote on changes proposed by the management. They can be issued and burnt (e.g., through token buybacks) flexibly by the corresponding company, implying a flexible token supply. The Crowdlitoken is both transferable and

fungible, whereby only persons who have successfully completed the KYC/AML audits can subscribe to the bonds and exercise all rights relating to them.

CryptoKitties

CryptoKitties (see Figure 8.5), as the last example from the crypto space, are collectible digital representations of cats created on the Ethereum blockchain. The corresponding smart contracts can generate over four billion variations of phenotypes and genotypes (CryptoKitties, 2019). CryptoKitties neither represent claims against a counterparty, nor a specific underlying. They are non-fungible - every cat is unique - but transferable ERC-721 tokens, without any regulatory or legal governance. Although the front-end as a traditional web app is managed by the development team, the token's governance, e.g., ownership, is decentralised. Since consensus of the underlying

Claim Structure	No claim(s)		Flexible claim(s)		Fixed claim(s)
Technology	Physical		Digital		Distributed ledger technology
Underlying	No underlying	Company	Bankable asset	Cryptographic asset	Real asset
Consensus/Validation Mechanism	Deterministic		Probabilistic		Native token
Legal Status	Regulated		Unregulated		Protocol token
Governance	Centralised		Decentralised		
Information Complexity	Value	Transaction	Contract	Turing completeness	
Legal Structure	No legal structure	Foundation	Note/bond	Share	Other
Oracle Interface	No interface		Qualitative	Quantitative	
Total Supply	Fixed		Conditional	Flexible	
Issuance	Once		Conditional	Flexible	
Burn Condition	No burning	Fixed	Conditional	Flexible	
Transferability	Transferable		Non-transferable		
Fungibility	Fungible		Non-fungible		

Figure 8.4: Classification of Crowdlitoken

Ethereum protocol is reached via a proof-of-work mechanism, the finality of the state of a CryptoKitties token is probabilistic. Also, there is no oracle interface related to CryptoKitties tokens. The creation of additional units is done by breeding two CryptoKitties, resulting in a new unique kitty, represented by a newly issued unique token, while destroying a unit is not possible. The corresponding smart contract allows for a total limit of around 4 billion cats that can be bred, implying a fixed total supply.

Traditional share

Traditional shares (see Figure 8.6), as the one example from traditional finance, are either physical or digital in nature and represent a contract including fixed claims (e.g., voting and/or profit participation)

against a counterparty, with its fundamental value also representing the underlying of the asset. Shares, as a legal form, are governed in a centralised manner and are subject to the existing law (e.g., Swiss corporate law), with the general assembly of shareholders being the supreme organ of a stock corporation, i.e., acting as a qualitative oracle interface. Consensus on the state of a share is deterministically given by the share registry. The creation of new shares as well as the reduction in share capital, for example through share buybacks, is left to the general assembly of the corporation. As a consequence, the total supply of traditional shares is flexible. Shares are typically transferable, with exceptions such as restricted shares, and fungible, i.e., substitutable with other shares of the same company.

Claim Structure	No claim(s) 		Flexible claim(s)		Fixed claim(s)	
Technology	Physical		Digital		Distributed ledger technology	
Underlying	No underlying 	Company	Bankable asset	Cryptographic asset	Real asset	Contract
Consensus-/Validation Mechanism	Deterministic				Probabilistic	
Legal Status	Regulated				Unregulated	
Governance	Centralised				Decentralised	
Information Complexity	Value	Transaction		Contract	Turing completeness	
Legal Structure	No legal structure 	Foundation	Note/bond	Share	Other	
Oracle Interface	No interface 		Qualitative		Quantitative	
Total Supply	Fixed 		Conditional		Flexible	
Issuance	Once			Conditional	Flexible	
Burn Condition	No burning 	Fixed	Conditional	Flexible		
Transferability	Transferable 			Non-transferable		
Fungibility	Fungible				Non-fungible	

Figure 8.5: Classification of CryptoKitties token

8.4. Conclusion

The proposed framework is robust and allows different types of assets to be represented in a consistent manner. It bridges the gap between physical, digital, and cryptographic assets, where sometimes the same asset can appear in all three forms, and thus creates a clear terminology. Thanks to the use of a morphological box, the individual dimensions can be broken down into any level of detail without changing the overall framework.

Claim Structure	No claim(s)		Flexible claim(s)		Fixed claim(s)	
Technology	Physical		Digital		Distributed ledger technology	
Underlying	No underlying	Company	Bankable asset	Cryptographic asset	Real asset	Contract
Consensus/Validation Mechanism	Deterministic			Probabilistic		
Legal Status	Regulated			Unregulated		
Governance	Centralised			Decentralised		
Information Complexity	Value		Transaction	Contract	Turing completeness	
Legal Structure	No legal structure	Foundation	Note/bond	Share	Other	
Oracle Interface	No interface		Qualitative	Quantitative		
Total Supply	Fixed		Conditional		Flexible	
Issuance	Once		Conditional		Flexible	
Burn Condition	No burning	Fixed	Conditional	Flexible		
Transferability	Transferable			Non-transferable		
Fungibility	Fungible			Non-fungible		

Figure 8.6: Classification of a traditional share

9. What Customers Want in Digital Retail Banking

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This chapter deals with the attitudes of Swiss bank clients towards various digital services and technologies. The results are based on a survey with 1,000 respondents. The chapter begins with a brief description of the study background (Subchapter 9.1), followed by the survey results (Subchapter 9.2). Finally, a summary and a conclusion are provided (Subchapter 9.3).

9.1. Background of the Study

The technological progress, the resulting changes in customer behaviour, and the entry of new competitors have led banks to intensively address the issue of digitisation and the associated opportunities and risks for some time now. In particular, the digitisation strategy in the highly standardised retail banking segment is a central cornerstone of a modern retail bank.

But which technologies should be relied on? Where should priorities be set? And above all, what do customers actually want?

9.2. Results from the Customer Survey

This subchapter deals with the design of the survey (Section 9.2.1) and its results, thereby distinguishing between the preferences of Swiss bank clients regarding digital interaction via e-banking and mobile banking (Section 9.2.2), an assessment of the relevant technologies in the field of banking (Section 9.2.3), and finally the evaluation of digital offers and channels (Section 9.2.4).

9.2.1. Design of the Survey

In order to determine the current and possible future behaviour on the customer side with regards to digital offers and services from banks, an online survey among 1,000 Swiss citizens was conducted in August 2019. The sample is representative in terms of gender, age, and level of education.

In order to cover all the aspects the survey seeks to investigate, the questionnaire was divided into four parts:

- a) Questions focusing on e-banking and mobile banking (19 questions)
- b) Questions on the assessment of different technologies (32 questions)
- c) Questions for the evaluation of digital offers and channels (40 questions)
- d) Statistical and background information (9 questions)

The following customer-side survey results are divided into the three areas “e-banking and mobile banking”, “the evaluation of relevant technologies”, and “the evaluation of digital offers and channels” and summarise the most important findings of the evaluation.

9.2.2. Findings on Digital Interaction via E-banking and Mobile Banking

Online banking and, increasingly, mobile banking have long been a mainstay of retail banking alongside branch banking. It can be assumed that in the future, bank customers will conduct an even greater proportion of their business via online and mobile banking. Therefore, in a first step, the 1,000 participants in the survey were asked about various aspects of using e-banking and mobile banking.

As the survey shows, e-banking in particular is a central channel for customers. 89 percent of all respondents stated that they use e-banking. On the other hand, eleven percent are still e-banking “refusers”. The main reasons for not using e-banking are security concerns (37 %) and a preference for personal contact (30 %). The probability of belonging to this group of “offliners” is particularly high for older people, women or people with a lower level of education.

Upon examining the type of use and frequency of use by e-banking users, it becomes clear that a typical bank client - unsurprisingly - primarily carries out regular account balance checks and initiates payments (see Figure 9.1). What is somewhat surprising, however, is the frequency of use: For example, 66 percent of those surveyed check their account balance at least weekly. This regular customer contact is gratifying from a banking perspective and offers interesting opportunities for the financial industry. In contrast, the two other types of use, “communication with the bank” and “trading with securities”, have a lower frequency of use. However, 18 percent of bank customers trade securities at least once a month. A typical trading user is male and on average around 42 years old.

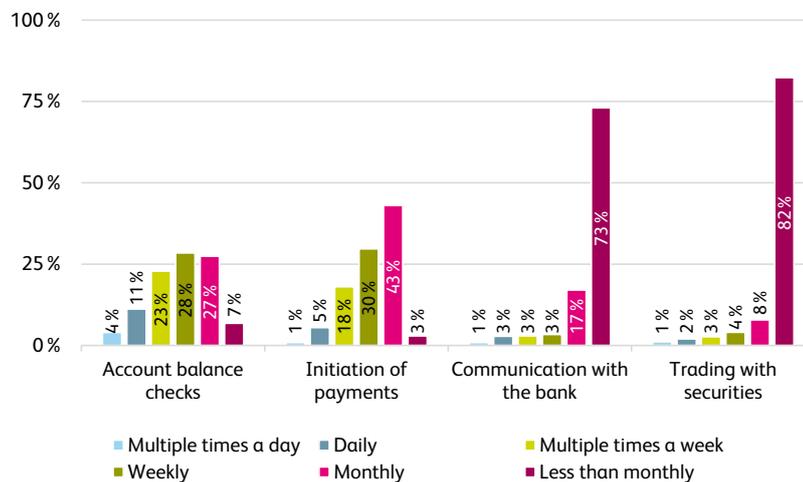


Figure 9.1: Purpose and frequency of use of e-banking (n=893, multiple answers possible)

54 percent of those participating in the survey use their smartphone or tablet to access the bank. The type of use in mobile banking is similar to that of e-banking, except for “account balance checks”, which are carried out by the majority of mobile banking users somewhat more frequently (“several times a week”). The reason for the increased frequency of the mobile phone/tablet for “account balance checks” is presumably that information can also be checked on the move using mobile devices.

We also note that the average age of mobile banking users is slightly lower (41 years) than that of e-banking users (46 years). In terms of usage by gender, there is no significant difference. However, it is interesting to note that around 36 percent of the Swiss population are “e-banking only” users. In other words, while these customers use online banking, they do not use mobile banking. On the contrary, only one percent of those surveyed use mobile banking but not e-banking (“mobile banking only users” category).

It is interesting to note that mobile banking users still perceive traditional e-banking as more user-friendly, more secure and faster. It is also particularly striking that only eight percent of mobile banking users rate mobile banking as “more secure” than e-banking. This suggests that even active mobile banking users do not yet fully trust the technology in terms of security -

even though experts rate the security of mobile banking as higher.

The main reason for not using mobile banking is security concerns. Around 52 percent of non-mobile banking users cited this as the most important issue.

9.2.3. Results for Assessing Relevant Technologies

In a second part of the survey, Swiss customers were asked about various aspects of different technologies in the field of banking (e.g., e-ID, biometric authentication procedures, language and voice recognition, location-based services, or platform economies).

At first glance, three aspects stand out:

1. Many customers are still in the process of forming an opinion. Around 20 percent of customers selected the “no opinion” response option for most of these technologies.
2. Only a minority of the customers currently have a positive attitude towards these technological innovations, i.e., would like to use these technologies if offered by the banks.
3. With regard to the proponents of technology, a fairly clear pattern was identified. In general, younger and more highly educated men are more positive about most technologies than the other groups.

Regarding the individual technologies selected, the following aspects can be noted:

Electronic identity: A single, secure digital identity card - a so-called e-ID - similar to the physical Swiss passport, which provides access to various online services, has the potential to improve many processes and greatly increase the customer benefit. The results show that around one third of customers have a positive attitude towards the e-ID, while another third of respondents say they do not want to use this option for any case (and for the time being). Finally, a considerable third of those surveyed do not know exactly what an electronic identity is.

Biometric authentication: According to the results of the survey, about 46 percent of all respondents welcome such forms of identification (namely the biometric fingerprint and the "Face ID"). 29 percent of those surveyed object to the use of such technologies also in banking, while 25 percent do not have a specific opinion on the subject at present. On the one hand, those who value biometric access or facial scanning are mainly justified by the aspect of it being more secure, followed by "it is faster", and "it is more convenient". On the other hand, "data protection concerns", "security concerns", "own bank does not offer it", "the currently used solution is faster, better or simpler" are mentioned as the main reasons for the refusal of biometric authentication. Younger and more highly educated people tend to have a more positive attitude towards this technology. No differences can be observed regarding gender.

Use of voice and speech recognition solutions for the operation of e-banking and mobile banking: Every day, more and more people give voice commands to smart speakers such as Echo (Amazon) or Google Home or via a smartphone to digital assistants such as Siri (Apple), Alexa (Amazon) or the Google Assistant. Although there are definite advantages, these voice control systems have not yet become widely accepted among Swiss people. Currently, only 16 percent of those surveyed use a digital assistant in their everyday lives. In terms of banking, the results are similar. 18 percent of respondents said they would welcome the possibility of controlling banking transactions by voice.

Situationally individual offers: Banks traditionally have a vast amount of data at their disposal, and as digitalisation progresses, both the amount of data and the analysis options continue to grow. On the one hand,

the question as to how banks can use this data for a personalised and individualised customer approach and thus indirectly monetise the data is of crucial importance. On the other hand, the question arises as to how customers perceive such projects. Our survey results show that customers are generally critical of this development. 59 percent of the survey participants state that they do not want proactive product proposals that result from the bank's data analysis and relate to their life situation or consumer behaviour. Only 19 percent of customers have a positive attitude towards such offers. At 22 percent, a high share of respondents have not yet formed an opinion on this issue. These figures in Switzerland are comparatively low. According to a study by *Accenture*, 55 percent of respondents worldwide are prepared to share sensitive data with their bank if they receive interesting offers in return (*Accenture*, 2019c). In Germany, the willingness to share data with banks is somewhat lower. Here, only 43 percent of consumers can imagine exchanging data with their bank for a meaningful offer. According to our survey, which was designed somewhat differently, this figure is even lower. However, it should be noted that a large number of people in our survey have not yet formed an opinion on such offers.

Overall, these survey results show that there are opportunities for banks to use data in a meaningful way, as long as they can present interesting offers and/or personalised products and services. In contrast to other industries, the banking world is still in the very early stages of development.

9.2.4. Results for the Evaluation of Digital Offers and Channels

The main findings on digital services and channels are as follows:

- *Online financing:* The survey confirms the so-called ROPO effect ("Research Online, Purchase Offline"), which is also known from other industries. 39 percent of people research relevant product information online to prepare a purchase decision. However, they still make the actual purchase "offline" - i.e., at the branch.
- *Online investment:* 26 percent of the participants in the survey search the Internet for investment opportunities. Younger men (average age: 38 years) in particular, make use of these opportunities. Those who have already made investments online evalu-

ate their experience as sufficient to good. The majority of mentions for the evaluation of experience were allocated the grade 4 (out of 1 to 6), the weighted average of all mentions is 4.5.

- *Digital retirement planning*: This topic is becoming an increasingly important priority for banks. The survey results support this. 46 percent of all survey participants - mainly men, people with above-average education and younger people - can imagine opening a retirement savings account online.
- *LiveChat communication*: Chat communication is not the preferred form of communication with banks. The main reason stated by the surveyed customers against using chats is that they judge the solution they are currently using to be faster, easier or better. It should be noted that customers still primarily use the telephone when communicating with their bank (see Service Excellence Cockpit, 2019). Communication via telephone (or e-mail) apparently works so well with Swiss banks that there is no need for additional communication channels.
- *Communication via chatbot*: In banking the topic of chatbots is currently playing a major role in discussions about the design of future self-service. It seems clear that bots offer an enormous savings potential. However, the risk to the customer relationship should not be underestimated. According to the survey, nine percent of those surveyed have already deliberately communicated with a chatbot of a bank at some point. The experience of the test persons with the chat offers of their own bank can be rated as “sufficient”. Measured on a scale of one to six, the weighted average of all responses is 4.2.
- *Personal finance management*: The offer of personal finance management (PFM) tools is increasingly becoming a hygiene factor in e-banking and mobile banking at various Swiss banks. According to the survey, 36 percent of all respondents already use PFM solutions to analyse their own income and expenditure. A further 15 percent of those surveyed would use PFM if their bank offered it. 49 percent of those surveyed - especially older people - say that such an offer is not of interest to them.
- *Digital onboarding for retail customers*: Another interesting offer is the option for private individuals to open an account digitally. Although this service is offered by 17 banks in Switzerland as of the end of 2018, it is still insignificant for most banks in relation to the number of accounts opened in their branches. Nevertheless, 36 percent of the survey participants stated that, in the future, they would like to use the Internet to open a bank account. Here, too, a disproportionately high number of men, more highly educated people, and younger people are open to this option. Reasons for rejection are “I have no need for it”, followed by “security concerns” and “the solution I currently use is easier/better/faster”.
- *Electronic signature*: Many bank documents are still printed out today because they require one or more handwritten signatures due to legal and internal bank requirements. This process means a lot of effort for the customer (printing, signing, scanning, possibly sending by post) and a delay in using the associated services. On the part of the bank, this process often leads to lower efficiency, increased complexity as a result of an archiving process and, last but not least, to a burden on the environment through the use and transport of paper. It therefore makes a lot of sense that banks should also become more involved with electronic signatures. As the survey results show, the Swiss are already open to the use of electronic signatures. 47 percent of those surveyed - mainly male, more highly educated and younger people - say they want to use an electronic signature (35 % do not want to use it; 18% have no opinion on this yet). The most important reasons for refusal are “security concerns”, “I have no need for it” and “the solution I currently use is easier/better/faster”.

9.3. Summary and Conclusion

In banking, the strategic focus in the future will be on further developing the business model and defending or expanding the customer interface. For this reason, the further development of digital products and services and the recognition and exploitation of the many opportunities in the field of new technologies are becoming increasingly relevant. In order for banks to be able to optimise, adapt or expand their business model, they must first understand these technological possibilities, also at the strategic level, and then systematically discuss and evaluate them.

Based on our survey results from a customer perspective, we come to the following conclusions and theses:

1. In principle, the banks seem to be right with their *current* assessments. However, there are also some solutions which are broadly accepted by customers today, but which banks do not yet offer on a broad scale. In our view, the potential is somewhat underestimated in the area of biometric authentication, digital pension solutions, and digital onboarding. The aspect of biometric authentication seems particularly relevant from our point of view. It enables the frictionless and simple processing of banking transactions desired by customers.
2. Complex products will continue to be concluded offline. We assume, however, that products in the area of digital investment or online mortgage extensions, for instance, will become so relevant in the market that the corresponding investments will be worthwhile.
3. However, the surveys also show that clients in Switzerland are not particularly technology-oriented when it comes to the digitisation of banking services. In all cases, there is a smaller or larger group of clients who would be interested in such solutions. However, scaling up in the small Swiss market is often difficult for many small and medium-sized banks - in contrast to global providers or providers from large retail markets. The cost of building new offerings is always the same, regardless of the number of end customers. This often makes the economic justification for such offers difficult. Against the background of these results, it can be said that digitisation and technology are only means to better or more easily fulfil customer needs. In order to successfully launch a new technology or even a digital product on the market, it must have a certain relevance in everyday life and the effort required to change behaviour should be minimal. There is very little willingness on the customer side to overcome additional hurdles, and many customers are sceptical about anything new. The need for new solutions is often not given by customers. Therefore, on the one hand, every new offer must provide a clear added value and is ideally developed with the involvement of the end customers. On the other hand, it must also be explained and marketed well. Therefore, an adequate marketing budget should be made available for new digital products. It often takes (more) time (than expected) to explain the offer to customers and even longer to bring about appropriate adoptions in behaviour. We also consider it central that new (digital) offers are developed together with customers.
4. The customer structure shows that the various technologies and digital products and services in the banking sector are still used disproportionately by men and that this group is more likely to innovate than others. This is basically a typical phenomenon of adoption behaviour in the case of technological innovations. However, the corresponding target segment is certainly interesting for banks, as this group of people often has above-average earnings. Furthermore, it should be noted that the gender gap reduces over time for some offers. For example, the proportion of women in the mobile payment sector has risen steadily over time.
5. The results also show that numerous customers of Swiss banks have not yet formed an opinion on many new digital possibilities (e.g. e-ID, digital assistants etc.). The corresponding proportion of those still undecided often lies between 20 and 35 percent of potential clients. Here too, it is noticeable that women are disproportionately strongly represented in this group.

10. Conclusion & Outlook

For the fifth time, the IFZ FinTech Study provides an annual overview of developments in the Swiss FinTech ecosystem and summarises them in the following five theses:

Switzerland's good conditions continue to pay off.

The Swiss FinTech sector continued to grow in 2019. By the end of the year, a total of 382 FinTech companies were active in Switzerland, implying a year-to-year growth rate of seven percent. Furthermore, in 2019, the sector continued to mature, a development which is highlighted both by the increase in the average number of full-time equivalents employed at Swiss FinTech companies, as well as their total funding. This development is not least due to the excellent conditions that FinTech companies find in Switzerland. Our FinTech hub analysis shows that Switzerland ranks second in an international comparison of the general factors affecting FinTech companies. A regression analysis showed that the relative size of the Swiss FinTech sector corresponds to the quality of the surrounding political/legal, economic, social, and technological environment. Overall, the relative size of a FinTech hub correlates the strongest with joint venture and venture capital activity in the given region.

While FinTech should seek to solve real problems, the industry is partly still in search of relevant use cases.

In a saturated market such as the Swiss financial market, additional value for the user is usually generated through a price or cost reduction, and/or increased convenience. Yet many FinTech companies are struggling to find clients: for example, different robo advisors exited the market, while the distributed ledger technology has not yet been able to demonstrate its relevance through the first widely used applications in the financial sector. This, despite recent developments in the field of DLT such as the licencing of the first two Swiss crypto banks by FINMA. In the future, however, DLT could potentially help to meet the growing demand for efficient, transparent, and traceable data marketplaces that enable integrated and seamless data exchange.

The importance of "Tech" versus "Fin" continues to grow. With seven of the ten largest companies worldwide (measured by market capitalisation) being classed

as BigTech companies, the relevance of "Tech" is apparent. The increased tendency towards the application of IT-typical revenue models in the Swiss FinTech sector supports this statement. Over the years, Software-as-a-Service has developed into the second most important source of revenue in the Swiss FinTech sector, following the commission model. Adding to this the frequency of application of the licence fee model, the revenue models typically pursued in the IT industry are becoming increasingly important compared to those from the traditional banking business.

Swiss banks: Only a few pioneers truly embracing technological innovation.

Overall, Swiss banks tend to be cautious in the adaptation to new technologies and focus mainly on run-the-bank operations. By contrast, change-the-bank activities, such as the implementation of new FinTech solutions, are of less relevance, as our survey among CIOs at Swiss banks revealed. However, the emergence of the first challenger banks targeting the Swiss market shows a group of pioneers pushing to bring technological innovation into the financial sector. This development, together with the increasing offer of financial services by competing BigTech and FinTech companies, could reinforce the innovation pressure on traditional financial institutions in the future.

The pace of change in the FinTech regulatory environment will likely pick up in the years to come.

Responses from Swiss lawmakers to FinTech have evolved and will continue to evolve through different stages. With the Financial Services Act and the Financial Institutions Act, in force since January 1, 2020, Switzerland's financial market architecture is changing fundamentally, impacting not only "traditional" financial service providers, but FinTech companies too. The next significant development could occur as early as 2021, should the Swiss DLT Draft Law be implemented as envisaged, thereby allowing for a legally robust tokenisation of financial products. Looking beyond Swiss borders, other countries and international bodies will continue to implement increasingly detailed rules addressing topics relevant for FinTech companies. Such initiatives will touch on issues like cyber security, open banking, cloud computing, data privacy, and the use of crypto assets.

11. Factsheets of Swiss FinTech Companies

This final chapter presents an overview of all the FinTech companies that participated in our survey, with the help of individual factsheets. These are based on the Business Model Canvas from Osterwalder and Pigneur (2010), which is described in Subchapter 2.3. In an initial step, the factsheets were filled with publicly available information sourced, for example, from the companies' websites and the commercial register. Next, the respective FinTech companies were asked to verify, correct, and complete their factsheet. The information provided by the companies was not verified again and only the factsheets returned by FinTech companies are included in the present chapter (n=152). Parts of the analysis of Swiss FinTech companies in Chapter 6, meanwhile, include all the companies which received a factsheet (n=382). At this point, we would like to express our thanks to all the participating companies for their efforts and valuable contribution.

Companies

3circlefunding	96	daura	115
Accounting	96	Descartes Finance	115
Accounto	97	Dufour Capital	116
Acredius	97	Dydon	116
additiv	98	Ecofin	117
Advanon	98	eCollect	117
AgAu	99	Element36	118
AlgoTrader	99	eligamo	118
Altoo	100	EM Exchange Market	119
AMNIS Treasury Services	100	Enterprise Bot	119
Amun	101	ERI Bancaire	120
Anova Partners	101	Etops	120
Apiax	102	Evolute	121
Ariadne Business Analytics	102	Ex indiciis	121
atfinity	103	FinForm	122
atpar	103	finnova	122
Aximetria	104	Flink AI	123
Beedoo	104	Forctis	123
Bitcoin Suisse	105	Foxstone	124
Bitmax	105	Futuræ Technologies	124
Bloomio	106	getBUTIK	125
BrickMark	106	GlaDIS	125
Byjuno	107	greenmatch	126
Canopy Europe	107	Hypothek.ch	126
Capnovum (Switzerland)	108	i2 invest	127
Cashare	108	ibani	127
CashSentinel	109	IFINITY	128
Clear Minds Investment	109	Imburse	128
Confinale	110	immocando	129
CoreLedger	110	IMPAAKT	129
CREALOGIX	111	investers.ch	130
Credit Exchange	111	InCube	130
creditworld	112	indigita	131
Crowd4Cash	112	Instimatch Global	131
Crypto Finance	113	Integration Alpha	132
Custodigit	113	Invemo	132
datalevel	114	Inventx	133
Datatrans	114	investiere.ch	133

Companies

Investment Navigator	134	SmartMoneyMatch	153
KLARA Business	134	Sonect	153
Kreditfabrik	135	Sparbatze	154
KYC Spider	135	Spitch	154
Lendity	136	Squirro	155
Lendora	136	Stableton Financial	155
Leonteq	137	Swiss Crypto Tokens	156
Loanboox	137	Swiss Crypto Vault	156
LumRisk	138	Swisscom Blockchain	157
Lykke Corp	138	SwissLending	157
meetinvest	139	SwissOne Capital	158
MoneyPark	139	swisspeers	158
Mt Pelerin	140	Swissquote	159
Nectar Digital Wealth	140	Sygnum	159
neocredit.ch	141	SYSMOSOFT	160
Netcetera	141	Systemcredit	160
Nimbo	142	Taurus	161
NVISO	142	Tensor Technologies	161
Oakura Ventures	143	Taylor	162
ONE PM	143	theScreener Investor Services	162
OpenMetrics Solutions	144	ti&m	163
Orca	144	Tilbago	163
Parashift	145	TimeStatement	164
Paymash	145	Tindeco Financial Services	164
Payment 21.com	146	Tokengate.io	165
Private Alpha Switzerland	146	TokenSuisse	165
Raizers	147	Tradeplus24	166
Relai	147	trustwise.io	166
Run my Accounts	148	turicode	167
Schlossberg & Co	148	Unity Investment	167
SEBA	149	Validity Labs	168
SecurionPay	149	Vestun	168
Securosys	150	VIAC	169
Selma Finance	150	WealthArc	169
SharesInside	151	WeCanGroup	170
Shift Cryptosecurity	151	Yapeal	170
SIBEX	152	Yova	171
SIX	152	Zenai	171

		3circlefunding GmbH www.3circlefunding.ch				
Year of foundation		2015		Valuation		
Headquarters		Zurich		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				4		
				4		
Multi-product crowdfunding platform - with the aim of giving both borrowers and lenders more freedom and control over their loans, 3circlefunding allows borrowers to set loan interest rates and investors to sell loan parts in its secondary market.						
Board members		Anthony McCarthy				
Management team		Anthony McCarthy				
Key partners		Bisnode, Creditreform, CRIF				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Accounting AG www.accounting.com				
Year of foundation		2018		Valuation		
Headquarters		Zug		Total funding		
Product category		Investment Management		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
Accounting is a management platform that allows you to easily track and manage your cryptocurrency portfolio and produce your tax report.						
Board members		Yann Robert Allemann, Alexander Stephen Lindenmeyer, Dennis Uwe Wohlfarth				
Management team						
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Accounto AG www.accounto.io					
Year of foundation		2018		Valuation			
Headquarters		Lucerne		Total funding			
Product category		Banking Infrastructure		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
				16			
				15			
<p>Accounto represents a paradigm shift in bookkeeping for SME by removing the actual booking and administrative work from the client's premise.</p>							
Board members		Dominique Andreas Kasper, Jan-Hendrik Heuing, Michael Manz, Alain Veuve, Alessandro Micera					
Management team		Jan-Hendrik Heuing, Kilian Perrin, Alessandro Micera					
Key partners		WIR Bank					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
					Licence fee		

		Acredius AG www.acredius.ch					
Year of foundation		2017		Valuation			
Headquarters		Zurich		Total funding			
Product category		Deposit & Lending		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
				5			
				4			
<p>Acredius is a Swiss independent crowdlending platform. Private and institutional investors can diversify their portfolios starting from a CHF 200 investment. SMEs and start-ups get access to fair loans using their traditional and non-traditional data.</p>							
Board members		Nada Chebli-Raafat, Ghassen Benhadjsalah, Thomas Hentz					
Management team		Ghassen Benhadjsalah					
Key partners		TMF Group, CRIF					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
					Licence fee		

		additiv AG www.additiv.com					
Year of foundation		1998		Valuation			
Headquarters		Zurich		Total funding			
Product category		Banking Infrastructure		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		150 ... of which in CH 50			
<p>additiv offers digital wealth- and credit-management-as-a-service today for the financial institutions of tomorrow and is a leading catalyst for change in the financial service industry through easy, quick, and affordable digitalisation. Our B2B SaaS cloud ecosystem orchestrates multi-channel financial services using full open APIs, thereby leveraging the existing technology base of the client.</p>							
Board members		Roger Steiner, Benjamin Paul Robinson, Thomas Scherr, Rolf Theo Schönauer					
Management team		Michael Stemmler (CEO), Dario Bernasconi, Bert-Jan van Essen, Yann Kudelski, Guy Levy, Vlad Magoreanu, Christine Schmid, Silvan Schriber, Adrian Weiss					
Key partners		Technology and expert partners: Microsoft, unblu, IDnow, fidentity, Edgelab, etc. Sales and implementation partners: Accenture, Qcentris, Thakral One, Fehr Advice, etc.					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		Advanon AG www.advanon.com					
Year of foundation		2015		Valuation			
Headquarters		Zurich		Total funding			
Product category		Deposit & Lending		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		12 ... of which in CH 12			
<p>Online platform that allows SMEs to prefinance their orders and invoices in the B2B and B2C sector. By that, they gain additional liquidity. Investors get access to invest in SME, which is a new asset class to diversify the portfolio.</p>							
Board members		Jörgen Karlsson, Daniel Gutenberg					
Management team		Phil Lojaco, Andrea Pünchera, Lukas Moser, Tobias Treiber					
Key partners		Deutsche Bank, AXA, bexio, BLKB, Swisscom, ETH Entrepreneur Club					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

 AgAu.io		AgAu SA www.agau.io					
Year of foundation		2017		Valuation		CHF 5,000,000	
Headquarters		Zug		Total funding			
Product category		Payment		Employees		approx. 10	
Tech category		Distributed Ledger Technology		... of which in CH		approx. 5	
The peer-to-peer electronic money system.							
Board members		Joe Thierry Arys Ruiz, Nicolas Chikhani					
Management team		Joe Thierry Arys Ruiz, Nicolas Chikhani					
Key partners		PwC, CVLabs, Falcon Bank, Tarco International					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

 ALGOTrader		AlgoTrader AG www.algotrader.com					
Year of foundation		2014		Valuation			
Headquarters		Zurich		Total funding		CHF 4,200,000	
Product category		Investment Management		Employees		35	
Tech category		Distributed Ledger Technology		... of which in CH		12	
Algorithmic trading software for trading companies such as hedge funds, proprietary trading and crypto currency trading firms. Execution and trading of digital assets for banks and brokers.							
Board members		Andreas Flury, Christian Ernst Hartwig Janson-Euteneck, Luzius David Meisser, Simon Moolman					
Management team		Andy Flury, Jakob Bosshard, Stuart Petersen, Patrick Mehrhoff, Gergely Bacso, Stefan Koller					
Key partners		Swisscom, Custodigit, Avaloq, Metaco, Espertech Inc.					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		Altoo AG www.altoo.ch				
Year of foundation		2017		Valuation		
Headquarters		Zug		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				23		
				23		
<p>The Altoo Wealth Platform provides private individuals with simplicity and control for complex wealth. By aggregating bankable and non-bankable assets on a daily basis, combined with all relevant information and documentation, wealthy individuals are able to keep track and control. They also have the possibility to collaborate with their trusted network through secure communication and document sharing.</p>						
Board members		Søren Holm Mose, Joris Engisch, Fabian Markus Tschan				
Management team		Martin Stadler (CEO), Stefan Thiel, Stefan Weber				
Key partners		Our clients are the key partners: Altoo stands for “altogether”. Our features and user experience have been developed in co-creatorship with our clients and they are our best ambassadors to win new clients.				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		AMNIS Treasury Services AG www.amnistreasury.ch				
Year of foundation		2014		Valuation		
Headquarters		Zurich		Total funding		
Product category		Payment		Employees		
Tech category		Process Digitisation / Automatisisation / Robotics		... of which in CH		
				5		
				5		
<p>Our fully automated electronic platform simplifies foreign exchange and international payments for SME.</p>						
Board members		Michael Wüst, Philippe Christen, Robert Bloch				
Management team		Daniel Toggenburger, Michael Wüst, Philippe Christen, Robert Bloch				
Key partners		VQF, Swiss Mechanic, Swiss Made Software, Swiss Finance Startups, banks				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Amun AG www.amun.com					
Year of foundation		2018		Valuation		USD 20,000,000	
Headquarters		Zug		Total funding		CHF 4,000,000	
Product category		Investment Management		Employees		18	
Tech category		Distributed Ledger Technology		... of which in CH		8	
<p>Amun makes investing in crypto assets as easy as buying shares. Investors can invest in cryptocurrencies easily, safely, cost effectively and in a regulated framework on multiple exchanges. Amun is led by a team of talented serial entrepreneurs and experienced professionals from the technology and financial world. We currently have eleven crypto ETPs listed and over \$60 million in AuM in total listed and planned ETPs.</p>							
Board members		Jürgen Kob, Ophelia Snyder, Hany Rashwan					
Management team		Ophelia Snyder, Hany Rashwan					
Key partners		Coinbase, SIX Swiss Exchange, Kingdom Trust, Jane Street, Flow Trader					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		Anova Partners AG www.anovapartners.com					
Year of foundation		2019		Valuation			
Headquarters		Appenzel Innerrhoden		Total funding		CHF 1,000,000	
Product category		Investment Management		Employees		11	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		11	
<p>We provide an independent marketplace where investors and manufacturers meet to achieve better investment decisions facilitated through technologically enabled investment, risk, product management, as well as execution services.</p>							
Board members		Jan Schoch					
Management team		Jan Schoch (CEO), Thomas Aebli, Eric Barthe					
Key partners		20 well-known issuers of structured products					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		Apiax AG www.apiax.com					
Year of foundation		2017		Valuation			
Headquarters		Zurich		Total funding CHF 8,100,000			
Product category		Banking Infrastructure		Employees 31			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH 16			
<p>Apiax offers the most powerful tools to master complex financial regulations digitally.</p>							
Board members		Sonja Stirnimann, Nicolas Blanchard, Jürg Steiger, Philip Schoch, Ralph Mogenicato					
Management team		Ralf Huber, Thomas Suter, Philip Schoch, Nicolas Blanchard					
Key partners		Swisscom, EY, PwC, BDO, Temenos, Aosphere					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Ariadne Business Analytics AG www.ariadne.swiss					
Year of foundation		2015		Valuation			
Headquarters		Zug		Total funding CHF 1,000,000			
Product category		Banking Infrastructure		Employees 15			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH 5			
<p>Core Banking - core infrastructure for banks or disintermediated financial institutions based on a lifecycle representation of smart financial contracts in the form of standardised algorithmic contract types and covering all financial instruments. Open banking - restful API-based and blockchain ready approach connecting to other related systems. Including risk analytics functions.</p>							
Board members		Willi Franz Brammertz, Shirish Kumar, Daniel Imfeld, Nils Bundi, Jeff Braswell, Wolfgang Breyman					
Management team		Willi Franz Brammertz, Daniel Imfeld, Shirish Kumar					
Key partners		Actus, atpar, Mobile First Finance, Oxial, Oded, Finelis, zhaw					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		atfinity GmbH www.atfinity.ch				
Year of foundation		2016		Valuation		
Headquarters		Zurich		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				11		
				11		
<p>atfinity provides a no-code-platform for business users to turn processes into digital applications. The empowerment of the business team makes processes more efficient, reduces inherent risks, improves client experience, and increases the overall agility of a company.</p>						
Board members		Alexander Balzer, Thorben Croisé, Ingo Drexler				
Management team		Alexander Balzer, Thorben Croisé				
Key partners		Business consultants, implementation consultants, legal content providers				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		atpar AG www.atpar.io				
Year of foundation		2019		Valuation		
Headquarters		Zurich		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				4		
				3		
<p>atpar builds financial infrastructure on Ethereum that empowers issuers to tokenise and manage all major financial assets from issuance to maturity at a fraction to today's cost.</p>						
Board members		Arie Levy Cohen, Johannes Pfeffer, Michael Svoboda				
Management team		Michael Svoboda (CEO), Johannes Pfeffer, Nils Bundi				
Key partners		Ariadne Software AG				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

 Aximetria		Aximetria GmbH www.aximetria.com					
Year of foundation		2018		Valuation		CHF 20,000,000	
Headquarters		Zug		Total funding		CHF 3,600,000	
Product category		Payment		Employees		16	
Tech category		Distributed Ledger Technology		... of which in CH		2	
<p>Aximetria is a mobile finance app which overcomes restrictions of local economies in order to make people richer. Users can buy, sell, transfer, and withdraw traditional- and cryptocurrencies instantly. Users can link their card with their Aximetria account and instantly enjoy their crypto-card.</p>							
Board members							
Management team		Alexey Ermakov					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

 BEEDOO		Beedoo SA www.beedoo.ch					
Year of foundation		2014		Valuation			
Headquarters		Vaud		Total funding			
Product category		Deposit & Lending		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
<p>A platform proposing real investment solutions with investment advice.</p>							
Board members		Maria Del Carmen Croisier					
Management team		David Croisier					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

 Bitcoin Suisse AG		Bitcoin Suisse AG www.bitcoinsuisse.com					
Year of foundation		2013		Valuation			
Headquarters		Zug		Total funding			
Product category		Banking Infrastructure		Employees > 110			
Tech category		Distributed Ledger Technology		... of which in CH 75			
<p>Bitcoin Suisse has been a pioneer in providing crypto-financial services. Bitcoin Suisse has helped to shape the crypto-and blockchain-ecosystem in Switzerland and has been a driving force in the development of the “Crypto Valley” and “Crypto Nation Switzerland”. As a regulated Swiss financial intermediary (SRO – VQF member), Bitcoin Suisse offers prime brokerage, storage, lending, payments, and other crypto-financial services.</p>							
Board members		Arthur Vayloyan, Niklas Nikolajsen, Luzius Meisser, Urs Bigger					
Management team		Arthur Vayloyan, Stefan Lütolf, Andrej Majcen, Lothar Cerjak, Fabian Hediger, Christian Holm, Lars Hodel, Rolf Gätzi, David Riegelng, Søren Nielsen, Mauro Casellini, Philipp Vonmoos, Armin Schmid					
Key partners		CoinRoutes Inc., Worldline, Amun AG					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

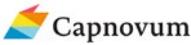
 Bitmax		Bitmax - BitIncubator & Ventures SA www.bitmax.ch					
Year of foundation		2017		Valuation		CHF 100,000	
Headquarters		Ticino		Total funding		CHF 100,000	
Product category		Banking Infrastructure		Employees		1	
Tech category		Distributed Ledger Technology		... of which in CH		1	
<p>bitmax.ch is one of the first exchangers in Switzerland, offering to exchange crypto for fiat currencies for institutional clients and working to launch the platform for retail clients too.</p>							
Board members		Lars Schlichting					
Management team		Lars Schlichting					
Key partners		Eidoo Sagl					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Bloomio AG www.bloomio.com					
Year of foundation		2017		Valuation			
Headquarters		Zug		Total funding CHF 2,200,000			
Product category		Investment Management		Employees 12			
Tech category		Distributed Ledger Technology		... of which in CH 3			
<p>Digital investment platform connecting retail investors and start-ups, offering a secondary market for start-up stakes. Easy access for investors from EUR 10 to alternative assets trading and liquid exit from traditionally illiquid financial products.</p>							
Board members		Alexey Raevsky, Maxim Lyadvinskiy, Yakov Polunkin, Ahmad Ahahin					
Management team		Maxim Lyadvinskiy, Alexey Raevsky, Elena Polunkin, Francesco De Santis					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		BrickMark AG www.brickmark.io					
Year of foundation		2018		Valuation CHF 60,000,000			
Headquarters		Zug		Total funding CHF 52,000,000			
Product category		Investment Management		Employees 8			
Tech category		Distributed Ledger Technology		... of which in CH 5			
<p>Providing universal access to the world's premier real estate in a secure and efficient way.</p>							
Board members		Stephan Rind					
Management team		Stephan Rind, Roger Hermann, Pavel Mayer, Mark Abramson, Alexander Funck					
Key partners		Swisscom Blockchain, EPRA					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

 byjuno Pay it easy		Byjuno AG www.byjuno.ch				
Year of foundation		2014		Valuation		
Headquarters		Zug		Total funding		
Product category		Payment		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				45		
				22		
Byjuno is a FinTech start-up within the payment and consumer finance industry for alternative payments.						
Board members		Mikael Ericson, Per Christofferson, Johan Brodin, Christian Stolz				
Management team		Christian Stolz (CEO), Mike Strahm, Michele Pintori				
Key partners		SBB, ZVV, Migros, Datatrans				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

 canopy		Canopy Europe AG www.canopy.cloud				
Year of foundation		2018		Valuation		
Headquarters		Zug		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				46		
				1		
Canopy is a private wealth account aggregation, portfolio analytics, and client reporting platform for high-net-worth individuals and their wealth managers. We provide a complete and accurate picture of a HNWI's entire wealth, from PDF or any data source, anonymously.						
Board members		Andrea Elia, Tanmai Sharma				
Management team		Tanmai Sharma, Amit Gupta, Michiel van Selm, Greg Rigby, Sinan Biren				
Key partners		Bloomberg, FactSet, Morningstar, Sustainalytics, Tableau, AWS, MS Azure				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Capnovum (Switzerland) GmbH www.capnovum.com				
Year of foundation		2016		Valuation		
Headquarters		Zurich		Total funding		
Product category		Banking Infrastructure		Employees 7		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH 1 – 10		
<p>Capnovum's cognitive compliance management platform provides an up-to-date repository of regulations, obligations, and regulatory news.</p>						
Board members						
Management team Inga Jovanovic						
Key partners Alumni of “SuperCharger FinTech Accelerator” and “Momentum London”						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Cashare AG www.cashare.ch				
Year of foundation		2008		Valuation		
Headquarters		Zug		Total funding		
Product category		Deposit & Lending		Employees 16		
Tech category		Process Digitisation / Automatisierung / Robotics		... of which in CH 16		
<p>As a innovative FinTech company, founded in 2008, we are the first crowd lending platform in Switzerland and thus a pioneer and leader at the same time. The start of Cashare's platform is acknowledged by the financial newspaper “Finanz und Wirtschaft” as a starting point of the customer oriented digitisation in the Swiss financial industry.</p>						
Board members						
Management team Michael Borter, Roger Müller, Michael Boge, Endre Marczi, Roland Burkard, Sabine Borter, Sanji Lingam, Ermin Trevisan						
Key partners Börse Stuttgart, BX Swiss, Cashgate, good finance, Bénédicte Schulen, PwC, PolyReg, Bisnode, CRIF, Creditreform, IAZI						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

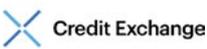
CashSentinel		CashSentinel SA www.cashsentinel.com					
Year of foundation		2012		Valuation		CHF 6,000,000	
Headquarters		Vaud		Total funding		CHF 2,300,000	
Product category		Payment		Employees		10	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		6	
<p>CashSentinel operates a digital contracts and escrow payment platform. The digital contract platform is marketed in a B2C/SaaS model, mainly serving the automotive industry. The escrow payment platform serves other payment operators and FinTechs, enabling use cases such as marketplace payment systems, asset tokenisation, etc.</p>							
Board members		Michael Chaille, Jean-Frédéric Thomas, Sylvain Bertolus, Jean Pascal					
Management team		Sylvain Bertolus, Milena Nikolic, Stéphane Ongagna					
Key partners		SIX Payment Services (Worldline), Société Générale, La Banque Postale, Swissquote					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

CLEAR MINDS		Clear Minds Investment AG www.clearminds.ch					
Year of foundation		2016		Valuation			
Headquarters		Basel-Stadt		Total funding			
Product category		Investment Management		Employees		6	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		4	
<p>Clear Minds offers regulatory compliant digital investment processes (advisory/discretionary) for B2C and B2B, fully integrating their B2B partners' proprietary investment solutions and communication processes to serve their end client.</p>							
Board members		Juerg Steiger, Alexa Ipen, Nils Patrik Ludvig Hansson, Thomas Leitner, Adrian Bernhard Schatzmann					
Management team		Patrik Hansson, Thomas Leitner, Adrian Schatzmann					
Key partners		Futurae, Djangostars, Swissquote, Wealtharc					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

 Digital Banking applied		Confinale AG www.confinale.ch					
Year of foundation		2012		Valuation			
Headquarters		Zug		Total funding			
Product category		Banking Infrastructure		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
				67			
				64			
<p>Confinale is a Swiss software development and consulting company, that specialises in digitalisation projects for the banking sector, whereby it focuses on tax, compliance, and wealth advisory solutions.</p>							
Board members		Thomas Twerenbold, Roland Staub, Jonas Misteli					
Management team		Roland Staub, Jonas Misteli, Andreas Egli, Florian Schrag, Fabian Erni					
Key partners		Avaloq, SIX, PwC, Investment Navigator, Flowable, Appway, Actico					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		CoreLedger AG www.coreledger.net					
Year of foundation		2017		Valuation		CHF 40,000,000	
Headquarters		Zug		Total funding		CHF 7,000,000	
Product category		Banking Infrastructure		Employees		18	
Tech category		Distributed Ledger Technology		... of which in CH		8	
<p>Token economy service provider, offering documentation, tokenisation, governance/compliance, and trading. Blockchain agnostic, with only five percent blockchain-specific code, CoreLedger TEOS can quickly be adapted to run on other blockchains. Real decentralisation, through patent-pending trading mechanism linked to form one decentralised marketplace.</p>							
Board members		Johannes Schweifer, Stefan Latzer, Richard Zbinden					
Management team		Jevgenijs Fjodorovics, Johannes Schweifer, Richard Zbinden					
Key partners		inacta, tokengate.io, Finemetal, Realunit, Aerum					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		CREALOGIX Group - Crealogix AG www.crealogix.com					
Year of foundation		1996		Valuation		CHF 150,000,000	
Headquarters		Zurich		Total funding			
Product category		Banking Infrastructure		Employees		750	
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		200	
<p>The CREALOGIX Group is an independent Swiss software house and the market leader for digital banking in Switzerland, ranked in the global FinTech Top 100 list.</p>							
Board members		Bruno Richle, Richard Dratva, Christoph Schmid, Ralph Mogenicato, Ruedi Noser					
Management team		Thomas Avedik, Richard Dratva, Daniel Bader, Volker Weimer, David Moreno, Oliver Weber					
Key partners		CGi, Cognizant, DXC, HPE, Oracle, redhat, Inventx, Meniga, unblu, Entersekt, Adesso, Promon, Syngenio, Synpulse, Zeb, Qontis, Vasco, etc.					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
				Licence fee			

		Credit Exchange AG www.creditexchange.ch					
Year of foundation		2018		Valuation			
Headquarters		Zurich		Total funding			
Product category		Deposit & Lending		Employees		5	
Tech category		Process Digitisation / Automatisations / Robotics		... of which in CH		5	
<p>Development of an open exchange for the mortgages business to fundamentally innovate and digitalise the mortgage market in Switzerland.</p>							
Board members		Thomas Müller, Fabio Perlini, Johannes Höhener, Reto Kuhn, Sven Rump					
Management team		Hanspeter Ackermann (CEO), Andrea Canonica					
Key partners		Bank Avera, EY, Glarner Kantonalbank, die Mobiliar, Vaudoise, Swisscom, Bank Linth, Bank CIC, Assepro					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
				Licence fee			

		creditworld AG www.creditworld.ch				
Year of foundation		2015		Valuation		
Headquarters		Zug		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				13		
				11		
The online marketplace for SME financing in Switzerland.						
Board members		Philipp Michael Schnyder, Kai Ren, Philipp Marc-André Viktor Schneider				
Management team		Kai Ren				
Key partners		Euler Hermes, Wenger & Vieli				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Crowd4Cash - Crowd Solutions AG www.crowd4cash.ch				
Year of foundation		2016		Valuation		
Headquarters		Zug		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				7		
				6		
Crowd4Cash is an innovative FinTech company, specialised in crowdlending solutions. Crowd4Cash offers a unique point of sales solution, enabling installments for purchases of goods and services directly in a fully digital process. This solution reduces the costs for the point of sales and enables up-selling opportunities.						
Board members		Roger Bossard, Peter Oesch				
Management team		Andreas Oehninger				
Key partners		More than 50 financial advisors and points of sale, other FinTech companies				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Crypto Finance AG www.cryptofinance.ch				
Year of foundation		2017		Valuation		
Headquarters		Zug		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				35		
				35		
<p>Crypto Finance AG is a financial technology company founded in June 2017. The company provides blockchain-related services through its three divisions asset management, brokerage, and storage.</p>						
Board members		Philippe Cottier, Raymond Bär, Tobias Reichmuth, Marc Bernegger				
Management team		Jan Brzezek (CEO), Lewin Boehnke, Jürg Egli, Simon Trippel				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Custodigit AG www.custodigit.com				
Year of foundation		2018		Valuation		
Headquarters		Zurich		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				9		
				< 10		
<p>Digital Asset Custody Platform. The Swiss pioneering solution for regulated financial services providers.</p>						
Board members		Roger Rolf Wüthrich-Hasenböhler, Manuel Caspar Krieger, Robert Gebel				
Management team		Peter Hofmann, Christian Bieri, Andreas Borg, Martin Worner, David Watrin				
Key partners		Swisscom, Metaco, Algotrader				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		datalevel AG www.datalevel.ch				
Year of foundation		2017		Valuation		
Headquarters		Zurich		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				5		
				5		
<p>Your data. Your innovation. Independent of the data format. No matter from which source. Whether in the financing, investing or payment sector. Whether for your customers, for your employees and/or for your management: datalevel's Data Refinery Box refines your financial data and forms the solid basis for the implementation of innovative banking models.</p>						
Board members		Manfred Köhl, Reinhard Stary, Wolfgang Millat, Peter Strittmatter				
Management team		Wolfgang Millat, Peter Strittmatter				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Datatrans AG www.datatrans.ch				
Year of foundation		1989		Valuation		
Headquarters		Zurich		Total funding		
Product category		Payment		Employees		
Tech category		Process Digitisation / Automatisierung / Robotics		... of which in CH		
				50		
				45		
<p>With our payment platform, we offer technical payment processing for larger customers with individual requirements and with PCI Proxy we offer a platform to enable companies to build PCI-compliant payment and reservation flows.</p>						
Board members		Hanspeter Maurer, Urs Kisling, Bettina Reimers				
Management team		Hanspeter Maurer, Urs Kisling, Bettina Reimers				
Key partners		SIX, Worldline, Worldpay, Flavon, TWINT, Paypal, Apple Pay, Google Pay, Mastercard, VISA, American Express, Fairtiq, Lezzgo, Parkingpay, Mathon, Mobility, Amadeus, Sita, etc.				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		daura AG www.daura.ch					
Year of foundation		2018		Valuation			
Headquarters		Zurich		Total funding			
Product category		Banking Infrastructure		Employees 4			
Tech category		Distributed Ledger Technology		... of which in CH 4			
<p>The company's objective is to digitise the shares of Swiss SMEs using the blockchain technology. The daura platform enables transfers of shares via blockchain transactions. These shares give unlisted companies access to the capital market. All the legal functions of the shares, such as the exercise of voting rights, are regulated in a smart contract and comply with Swiss regulations.</p>							
Board members		Johannes Höhener, Andreas Rudolf, Roger Wüthrich-Hasenböhler, Luka Müller					
Management team		Peter Schnürer (CEO)					
Key partners		Swisscom, MME, BDO, Raiffeisen Unternehmerzentrum, Custodigit, Sygnum, Wenger & Vieli, SIX					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

Descartes Finance		Descartes Finance AG www.descartes-finance.com					
Year of foundation		2015		Valuation			
Headquarters		Zug		Total funding CHF 1,300,000			
Product category		Investment Management		Employees 7			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
<p>Descartes is a leading digital Swiss wealth manager bringing together the latest insights in financial theory, leading technology, and successful investment specialists.</p>							
Board members		Adriano B. Lucatelli, Rino Borini					
Management team		Adriano B. Lucatelli, Marc Suter, Roger M. Levola					
Key partners		Blackrock iShares, OLZ AG, Swiss Rock Asset Management, Lakefield Partners, DWS, UBS, Vontobel, Credit Suisse, ZKB, Julius Bär					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Dufour Capital AG www.dufour-capital.ch					
Year of foundation		2011		Valuation			
Headquarters		Zurich		Total funding CHF 500,000			
Product category		Investment Management		Employees 5			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
<p>Dufour Capital is a leading FinTech company in the area of digital wealth management solutions. The company enables banks to establish and profitably grow their digital wealth management business with bespoke, white-labeled rule-based investment solutions. Via Dufour Capital's EAM business individuals and corporates may also directly invest in Dufour Capital's own range of discretionary investment strategies.</p>							
Board members		Marc Harry Weber, Roman Christian Timm, Werner Erismann					
Management team		Ryan Held, Sascha Freimüller					
Key partners		VZ VermögensZentrum, BlackRock iShares, ti&m					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Dydon AG www.dydon.net					
Year of foundation		2016		Valuation CHF 10,000,000			
Headquarters		Zurich		Total funding			
Product category		Investment Management		Employees 5			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH 1			
<p>Dydon developed a flexible AI platform which simplifies the usage of AI for business experts allowing them to utilise the advantages AI brings to their business without being forced to become an AI expert first.</p>							
Board members		Hans-Peter Güllich, Pierre Suhrcke					
Management team		Hans-Peter Güllich, Bhupesh Belchandan, Katharina Dalka					
Key partners		PwC, d-fine Germany					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

ECOFIN		Ecofin Holding AG www.ecofin.ch					
Year of foundation		1986	Valuation		> CHF 50,000,000		
Headquarters		Grisons	Total funding				
Product category		Investment Management	Employees		50		
Tech category		Process Digitisation / Automatisation / Robotics	... of which in CH		50		
<p>ECOFIN's offering is based on three pillars: a cost-efficient wealth manager, a dedicated investment consultant, a digital solution provider for banks, asset managers, pension funds, trusts, and family offices.</p>							
Board members		Alexandra Janssen, Hans Jörg Kistler, Martin Janssen					
Management team		Martin Janssen, Christian Dicke					
Key partners		Our customers					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

eCollect®		eCollect AG www.ecollect.org					
Year of foundation		2014	Valuation				
Headquarters		Zug	Total funding				
Product category		Payment	Employees				
Tech category		Process Digitisation / Automatisation / Robotics	... of which in CH				
<p>eCollect is an all-in-one platform for full cycle receivables management including invoicing, dunning and collection. We provide an advanced REST API and an easy to use web app for businesses and institutions who want to automate their receivables management and cut down costs and efforts.</p>							
Board members		Thimo Seidel					
Management team		Marc Schillinger, Rossitza Radieva					
Key partners		eCollect Bulgaria EOOD, eCollect Germany GmbH					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Element36 AG www.element36.io					
Year of foundation		2018		Valuation		CHF 1,400,000	
Headquarters		Zug		Total funding		CHF 200,000	
Product category		Payment		Employees		5	
Tech category		Distributed Ledger Technology		... of which in CH		2	
<p>We provide a bank-grade solid bridge between the old economy and the crypto world.</p>							
Board members		Walter Strametz, Maurus Riedweg					
Management team		Walter Strametz (CEO)					
Key partners		Consulteer, PXL.WDGTS					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		eligamo AG www.eligamo.com					
Year of foundation		2018		Valuation			
Headquarters		Zurich		Total funding		CHF 100,000 (foundation)	
Product category		Banking Infrastructure		Employees		4	
Tech category		Process Digitisation / Automatisisation / Robotics		... of which in CH		4	
<p>We put the bank's advisor in the centre of the client value chain and provide client management solutions with key functionality for the daily work with clients. With our unique hybrid cloud architecture, an innovative project approach combining design thinking and lean methodology, and by operating the solution ourselves, we are on a mission to make business agility a reality.</p>							
Board members		Gian Luca Semadeni, Dominique Emery, Yves Telani					
Management team		Yves Telani, Dominique Emery, Gian Luca Semadeni					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		EM Exchange Market GmbH www.exchangemarket.ch				
Year of foundation		2012		Valuation		
Headquarters		Zurich		Total funding		
Product category		Payment		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				6		
				3		
Exchange Market enables people to do currency exchanges.						
Board members		Michael Wychowaniec, Maria Vasquez-Wychowaniec				
Management team		Maria Vasquez-Wychowaniec, Michael Wychowaniec				
Key partners		Swiss Finace Startups, Zürcher Kantonalbank, PolyReg, AML Revisions AG				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Enterprise Bot GmbH www.enterprisebot.org				
Year of foundation		2017		Valuation		
Headquarters		Zug		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				28		
				6		
Enterprise Bot is an artificial intelligence company that provides white-labeled cognitive solutions in several languages to improve customer service and create operational efficiency for large corporate clients.						
Board members		Pranay Jain, Ravina Mutha, Penny Schiffer, Ralph Mogenicato				
Management team		Pranay Jain, Ravina Mutha				
Key partners		PwC, SIX, Generali, SWICA, SBB, AfterPay				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		ERI Bancaire SA www.eri.ch				
Year of foundation		1989		Valuation		
Headquarters		Geneva		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				400		
				180		
<p>ERI is an international company, specialising in the design, development, implementation, and support of an integrated, real-time banking software package: the OLYMPIC Banking System.</p>						
Board members		Monika Assaraf, Yehuda Assaraf, Blaise Grosjean				
Management team		Jean-Philippe Bersier, Nicholas Hacking				
Key partners		Numerous other software suppliers in areas that are complementary to our offering. We are also corporate sponsors of the F10 (initiated by SIX) start-up incubator in Zurich.				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- subscription
					Licence fee	

		Etops AG www.etops.ch				
Year of foundation		2010		Valuation		
Headquarters		Schwyz		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				41		
				10		
<p>We consolidate all your assets over all your custodians. We give you the transparency and overview that you need to manage your assets. We digitise your portfolio. Anywhere. Anytime.</p>						
Board members		Pius Stucki, Thomas Arthur Huber				
Management team		Pius Stucki (CEO)				
Key partners		Axeed, Atfinity, Assetmax, Qplex				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- subscription
					Licence fee	

		Evolute AG www.evolute.com				
Year of foundation		2016		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				35		
				12		
<p>Evolute is a seamlessly integrated software, from client risk profiling to portfolio solutions, covering the entire value chain of wealth management. Evolute closely links advisors and clients along the way - enabled by technology.</p>						
Board members		Patrick Barnert, Michael Hans Hartweg, Kathleen Traynor De Rose				
Management team		Andreas-Michael Ruffin, Dario Bühler				
Key partners		ThomsonReuters, SIX, CDDS, UnaVista, Investment Navigator, Numas, Cofex				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Ex indiciis GmbH www.exindiciis.com				
Year of foundation		2017		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				2		
				2		
<p>Ex indiciis provides a privacy-preserving recommender system for the service industry. With our system your company is able to provide a personal user experience to your client while complying with latest data privacy requirements. Don't let regulatory requirements and data privacy challenges prevent your business from generating additional revenues and improving your customer experience.</p>						
Board members						
Management team		André Luiz Carneiro Bertolace				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		FinForm AG www.finform.ch					
Year of foundation		2016		Valuation			
Headquarters		Bern		Total funding			
Product category		Banking Infrastructure		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
				60			
				34			
<p>Finform standardises, industrialises, and digitalises compliance formalities. We offer a complete digital customer onboarding and KYC formalities approving, for standard and complex cases.</p>							
Board members		Markus Fuhrer, Markus Binzegger, Peter Delfosse, Patrick Graf					
Management team		René Oppliger, Michael Rumpf, Stephan Käser, Ronny Fuchs, Silke Ragg, Ramona Medina					
Key partners		Axon Ivy, Axon FinTech, AxonActive, Post CH, CRIF, Deloitte, Soranus					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		finnova AG Bankware www.finnova.com					
Year of foundation		1999		Valuation			
Headquarters		Aargau		Total funding			
Product category		Banking Infrastructure		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
				400			
				400			
<p>Finnova is a leading provider of end-to-end banking software in the Swiss financial centre.</p>							
Board members		Hans Zehetmaier, Stephan Frohnhoff, Walter Knabenhans, Hanspeter Rhyner, Robert Gebel, Hendrik Lang					
Management team		Hendrik Lang, Simon Kauth, Raphael Widmer, Markus Metzger, Jörg Steinemann, Daniel Bernasconi					
Key partners		In addition to our strategic partners msg systems and Swisscom, Finnova maintains an actively managed network with more than 70 services, product, and technology partners.					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Flink AI AG www.flink.ai					
Year of foundation		2017		Valuation		CHF 1,200,000	
Headquarters		Zurich		Total funding			
Product category		Investment Management		Employees		8	
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH			
Flink AI develops advanced AI technology solutions for automated decision making in trading and investment.							
Board members		Daniel Patrik Egloff					
Management team		Daniel Patrik Egloff					
Key partners		NVIDIA					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		Forctis AG www.forctis.io					
Year of foundation		2017		Valuation		CHF 9,000,000	
Headquarters		Schwyz		Total funding		CHF 885,000	
Product category		Investment Management		Employees		8	
Tech category		Distributed Ledger Technology		... of which in CH			
Forctis creates a new DLT protocol for asset tokenisation and management, targeting mass adoption.							
Board members		Eduardo Salazar, Marc Degen, Marc Bettinger, Isabelle Ganz, Simon Tobler					
Management team		Eduardo Salazar (CEO), Isabelle Ganz, Gustavo Riesgo					
Key partners		Gartner					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		Foxstone SA www.foxstone.ch				
Year of foundation		2016		Valuation		
Headquarters		Geneva		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				15		
				10		
<p>Foxstone democratizes real estate investment by offering institutional quality opportunities to Swiss citizens and residents by increasing transparency and lowering the minimum investment amount.</p>						
Board members		Dan Amar, Michael Lahyani				
Management team		Dan Amar				
Key partners		Vaudoise, Investis Group, Fintech Fusion, Swiss Crowdfunding Association				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	SaaS/sub- scription
					Licence fee	

FUTURAE 		Futurae Technologies AG www.futurae.com				
Year of foundation		2016		Valuation		
Headquarters		Zurich		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				16		
				8		
<p>Futurae offers a strong suite of multi-factor authentication tools that provide a high degree of security and improve the customer experience while protecting the user's privacy.</p>						
Board members		François Robinet, Thomas Hilgendorff-Trampusch, Claudio Marforio				
Management team		Sandra Tobler, Claudio Marforio, Nikolaos Karapanos, Gaetano Mecenero				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	SaaS/sub- subscription
					Licence fee	

		getBUTIK - Dublin IT GmbH www.getbutik.com				
Year of foundation		2011		Valuation		
Headquarters		Zurich		Total funding		
Product category		Payment		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				5		
				5		
All-in-one retail solution including iPad register and online shops for e-commerce amongst other helpful tools.						
Board members		Matthias Linherr, Fabio Dubler				
Management team		Matthias Linherr, Fabio Dubler				
Key partners		SIX, PostFinance, DQ Solutions, dpd, Innocard, CCV				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		GlaDIS AG www.gladis.ch				
Year of foundation		2017		Valuation		
Headquarters		Zug		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				2		
				2		
GlaDIS AG: Digital and financial consulting, FinTech software for trading and asset management, MedTech software – Tumor board for clinics and pharma industry, multiuser platform for classified market.						
Board members		Franz W. Schmadl				
Management team		Franz W. Schmadl, Peter Troxler				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		greenmatch AG www.greenmatch.ch				
Year of foundation		2013		Valuation		
Headquarters		Basel-Stadt		Total funding		
Product category		Investment Management		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				13		
				13		
<p>Greenmatch is a financial modelling platform and a marketplace for renewable energy projects. The software empowers project developers, investors, and banks in making reliable decisions and in increasing the success of their transactions.</p>						
Board members		Matthias Stettler, Moris Isik, Jan Luechinger, Harald Dieter Zenke, Michael Beglinger				
Management team		Moris Isik, Tobias Bitterli, Andreas Socin, Matthias Stettler				
Key partners		All market participants in the renewable energy sector				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Hypothek.ch - GTF Gesellschaft für technologiebasierte Finanzdienstleistungen AG www.hypothek.ch				
Year of foundation		2019		Valuation		
Headquarters		Zurich		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				3		
				3		
<p>Hypothek.ch networks real estate owners with banks, insurance companies, and pension funds.</p>						
Board members		Florian Schubiger, Damian Gliott, Lars-Christian Schultz				
Management team		Florian Schubiger, Damian Gliott, Lars-Christian Schultz				
Key partners		VermögensPartner AG				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- subscription
					Licence fee	

		i2 invest AG www.i2invest.ch				
Year of foundation		2017		Valuation		
Headquarters		Zug		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				7		
				7		
Marketplace lending is revolutionising the classical banking system. i2 invest closes the information gap along the value chain. Following an automated process of data collection, -analysis, and -validation, our cutting-edge technology uses artificial intelligence to create investment recommendations, thereby reducing complexity and risk while offering superior returns.						
Board members		Eugen Stamm, Pascal Bucher, Dominik Hertig				
Management team		Dominik Hertig, Markus Benz, Marco Müller, Gregor Stadelmann				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		ibani SA www.ibani.com				
Year of foundation		2018		Valuation		
Headquarters		Geneva		CHF 4,500,000		
Product category		Payment		Employees		
Tech category		Process Digitisation / Automatisisation / Robotics		... of which in CH		
				8		
				8		
ibani is a smart currency exchange mobile app where you can easily send and receive money without paying the high fees of banks.						
Board members		Michael Ernst Felix Stumm, Arnaud Salomon, Reynald Besson				
Management team		Arnaud Salomon, Jingyao Jin, Sébastien Krafft, Yann Gerardi, Reynald Besson, Thomas Swiejkowski				
Key partners		VQF, Swiss Finance + Technology Association, Fusion, HUB612				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		IFINITY AG www.ifinity.ch					
Year of foundation		2015		Valuation			
Headquarters		Schwyz		Total funding			
Product category		Investment Management		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
<p>IFINITY AG is an independent service company and the perfect partner for independent asset managers and small/mid-sized banks located in Switzerland. As a core competence we are servicing the Temenos CRM and Portfolio Management System with a special focus on regulatory requirements and add-on applications.</p>							
Board members		Peter Werner Römer, Thomas Rutz					
Management team		Eliane Gmünder, Frank Müller-Erkelenz					
Key partners		Temenos, IMPAQ					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/sub- scription

		Imburse AG www.imbursepayments.com					
Year of foundation		2018		Valuation		CHF 10,000,000	
Headquarters		Zurich		Total funding		CHF 2,050,000	
Product category		Payment		Employees		10	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		2	
<p>Imburse is a cloud-based "Payments-as-a-Service" platform that unifies the processes for payments, voucher and bank partners and offers access to corporates as a service. Like a universal adapter for corporate IT systems into the global payments ecosystem. All the access, all the control, none of the IT integration work.</p>							
Board members		Oliver Werneyer, Carl Robert Stempel, David Joel Scott Turner, Ralph Mogenicato					
Management team		Oliver Werneyer, Mark Jerome, David Turner, Carl Stempel					
Key partners		Visa, WorldPay, Worldline, EY, Symbility Intersect					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/sub- subscription

		immocando AG www.immocando.ch					
Year of foundation		2018		Valuation			
Headquarters		Appenzell Innerrhoden		Total funding			
Product category		Investment Management		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
				3			
				3			
immocando.ch simplifies and accelerates the trading of investment properties for private and institutional investors as well as real estate service providers.							
Board members		Andreas Raphael Schmid					
Management team		Andreas Raphael Schmid					
Key partners		Feyn AG, Brühlhart & Partners AG, Müller + Spect AG, Fahrländer Partner AG					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		IMPAKT SA www.impaakt.com					
Year of foundation		2018		Valuation		CHF 3,300,000	
Headquarters		Geneva		Total funding		CHF 1,200,000	
Product category		Investment Management		Employees		7	
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		7	
Impaakt is a collaborative platform that harnesses the power of collective intelligence to produce an accurate, objective, and exhaustive assessment of the global impact of businesses.							
Board members		Bertrand Gacon, Sylvain Massot, Sébastien Allard					
Management team		Bertrand Gacon, Sylvain Massot, Sébastien Allard					
Key partners		The Graduate Institute Geneva, BNP Paribas					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		investers.ch - S2I (Swiss Innovative Investment) SA www.investers.ch					
Year of foundation		2019		Valuation			
Headquarters		Vaud		Total funding			
Product category		Deposit & Lending		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
<p>Investers is a crowdfunding platform for the real estate industry. Investers selects investment properties and offers them to be purchased in small tranches via our platform.</p>							
Board members		Nicolas Krauer, Cristiano Cardoso, Michel Barro, Stéphane Jagot-Lachaume					
Management team		Gillian Nespolo, Nicolas Krauer					
Key partners		Burnier Immobilier, Wüest Partner, Raiffeisen					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		InCube Group AG www.incubegroup.com					
Year of foundation		2009		Valuation			
Headquarters		Zug		Total funding			
Product category		Investment Management		Employees			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH			
				25			
				22			
<p>InCube is a Swiss-based FinTech and consulting company. Our team of highly skilled professionals focuses on intelligent and data-driven digitisation of financial services.</p>							
Board members		Andreas Felber, André Pierre Müller, Daniel Lenz, Erich Felder, Boris Rankov					
Management team		Andreas Felber, Erich Felder, Daniel Lenz, Boris Rankov					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		indigita SA www.indigita.ch					
Year of foundation		2016		Valuation			
Headquarters		Geneva		Total funding CHF 2,000,000			
Product category		Banking Infrastructure		Employees 14			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH 14			
indigita SA is a Swiss regulatory technology (RegTech) company headquartered in Geneva, which provides a suite of interactive trainings, digital tools, and APIs to support financial institutions and their employees to conduct cross-border business in a safe and compliant way.							
Board members		Patrick Genazzi, Alessandro Bizzozero					
Management team		Achille Deodato (CEO), Maria Arya-Gillioz					
Key partners		BRP Bizzozero & Partners					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Instimatch Global AG www.instimatch.com					
Year of foundation		2017		Valuation			
Headquarters		Zug		Total funding approx. CHF 7,000,000			
Product category		Deposit & Lending		Employees 12			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH 6			
Instimatch Global is a digital marketplace for trading cash deposits across multiple geographies, sectors, and currencies, offering unparalleled market depth. Clients include banks, corporations, pension funds, asset managers, family offices, insurance companies, and municipalities.							
Board members		Michael Schmidt, Hugh Macmillen, Lamine Brahimi, Adrian Edelmann, Gilat Alon Shemesh					
Management team		Daniel Sandmeier, Hugh Macmillen, Marco Rüfenacht, Britni Noel Doo					
Key partners		Vicenda Asset Management					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Integration Alpha GmbH www.integrationalpha.com					
Year of foundation		2014		Valuation			
Headquarters		Zug		Total funding			
Product category		Banking Infrastructure		Employees 70			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH 40			
<p>We built our data science platform “ferris.ai” a kind of “Swiss army pocket knife” stitching all relevant open source data science tools into one “enterprise-ready” platform.</p>							
Board members		Tom Debus, Marco Selva, Frank Kaminsky					
Management team		Frank Kaminsky, Marco Selva, Thomas Debus					
Key partners		Google for “ferris.ai”, Azure (ferris.ai), DxC, AXIOM SL					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Invemo GmbH www.invemo.ch					
Year of foundation		2017		Valuation		CHF 5,000,000	
Headquarters		Zug		Total funding		CHF 2,000,000	
Product category		Investment Management		Employees		6	
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		3	
<p>Invemo GmbH is a cryptocurrency asset management company that operates under Swiss jurisdiction and is supervised by VQF. The company offers retail and institutional investors exposure to the emerging crypto asset class by providing individual portfolio management services.</p>							
Board members							
Management team		Peter Kubli, Maxim Zimin					
Key partners		Bity, G-20 Strategies AG, Grivas Management Consulting					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Inventx AG www.inventx.ch				
Year of foundation		2010		Valuation		
Headquarters		Grisons		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				240		
				240		
<p>Inventx is the Swiss IT partner for leading financial institutions and insurance companies. The basis for our business activities are our values: innovation, interaction, and Swissness.</p>						
Board members		Gregor Stücheli, Hans Nagel, Ivo Furrer, Urs Saxer, Manuel Thiemann				
Management team		Gregor Stücheli, Hans Nagel, Urs Halter, Roland Eilinger, Christoph Züger, Patrick Hagen				
Key partners		Arcplace, Avaloq, Citrix, Crealogix, IBM, ivanti, Finnova, Oracle				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		investiere.ch - Verve Capital Partners AG www.investiere.ch				
Year of foundation		2007		Valuation		
Headquarters		Zug		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				34		
<p>investiere.ch offers accredited private and institutional investors direct and professional access to start-up investments and is opening up the asset class venture capital to a wider audience.</p>						
Board members		Michel Kaufmann, Peter Werner Quadri, Ralph Martin Zurkinden				
Management team		Lukas Weber, Steffen Wagner				
Key partners		Zürcher Kantonalbank, nest, Die Post, Corratierie Gestion				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

 INVESTMENT NAVIGATOR		Investment Navigator AG www.investmentnavigator.com				
Year of foundation		2014		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				15		
				14		
<p>We enhance the investment and advisory value chain from research to distribution with suitability assessments. We offer tailored platforms to banks, independent wealth managers, and the financial community.</p>						
Board members		Julian Köhler, Philipp Portman, Jochen Gutbrod, Maurus Fries, Alberto Rama				
Management team		Alberto Rama (CEO), Julian Köhler, Maurus Fries				
Key partners		FE fundinfo, UBS, Refinitiv/Lipper, KPMG				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

 KLARA Macht dein Büro einfach.		KLARA Business AG www.klara.ch				
Year of foundation		2017		Valuation		
Headquarters		Lucerne		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				125		
				55		
<p>KLARA takes care of your administrative tasks for you - at work and at home. It automatically communicates with authorities, tax offices, insurance companies, and banks - so you don't have to worry about the paperwork.</p>						
Board members		AXON Active Group, Die Mobiliar, Die Post				
Management team		Renato Stalder, Jens Margraf, Daniel Gauch, David Schnetzer				
Key partners		Die Post, Die Mobiliar, Valiant Bank, Credit Suisse, etc.				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- subscription
					Licence fee	

		Kreditfabrik AG www.kreditfabrik.ch					
Year of foundation		2016		Valuation			
Headquarters		Zurich		Total funding			
Product category		Deposit & Lending		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
<p>Kreditfabrik offers ambitious clients a comprehensive service for the settlement, management, and risk assessment of mortgages.</p>							
Board members		Walter Boreatti					
Management team		Emil Meier (CEO), Gerhard Kurt Gfeller					
Key partners		Base Net Informatik AG, Base Net IT Services AG, Peax AG					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		KYC Spider AG www.kyc.ch					
Year of foundation		2003		Valuation			
Headquarters		Zug		Total funding			
Product category		Banking Infrastructure		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
<p>We offer a comprehensive solution that is used to improve regulatory processes in the financial services sector as well as for FinTech or industrial companies.</p>							
Board members		Markus Georg Gröninger, Luka Müller-Studer, Peter Schäuble					
Management team		Miki Vayloyan, Friedrich Benno Bettschart, Melanie Spiess					
Key partners		MME Legal Tax Compliance, Eurospider Information Technologies, Intrum AG					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Lendity AG www.lendity.com					
Year of foundation		2018		Valuation			
Headquarters		Zurich		Total funding			
Product category		Deposit & Lending		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
Investment and technology solutions for private debt. F10 participant.							
Board members		Rafael Karamanian, Armen Karamanian					
Management team		Rafael Karamanian, Armen Karamanian					
Key partners		SIX, PwC, Julius Bar and F10					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Lendora SA www.lendora.ch					
Year of foundation		2016		Valuation		USD 6,000,000	
Headquarters		Vaud		Total funding		CHF 1,200,000	
Product category		Deposit & Lending		Employees		5	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		5	
Lendora is a Swiss crowdlending platform that connects borrowers and investors online to make credit more accessible and investing more rewarding.							
Board members		Jean-Jacques Frey, Philippe Suter, Chrystelle Bégin-Proth, Jonathan Bory					
Management team		Simon Pelletier					
Key partners		Swissquote					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription	
					Licence fee		

		Leonteq AG www.leonteq.com					
Year of foundation		2007		Valuation		CHF 610,000,000 ¹	
Headquarters		Zurich		Total funding		CHF 436,000,000	
Product category		Investment Management		Employees		495	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		342	
<p>Leonteq is an independent expert in structured investment products and long-term savings solutions.</p>							
Board members		Christopher Chambers, Hans Isler, Jörg Behrens, Patrick de Figueiredo, Susana Gomez Smith, Richard Laxer, Thomas Meier, Dominik Schärer					
Management team		Lukas Ruffin, Marco Amato, Jochen Kühn, Manish Patnaik, Reto Quadroni, David Schmid, Ingrid Silveri					
Key partners		Aargauische Kantonalbank, Cornèr Bank, Crédit Agricole CIB, Deutsche Bank, EFG International, J.P. Morgan, PostFinance, Raiffeisen Switzerland, Standard Chartered Bank, Helvetia, Swiss Mobiliar					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		Loanboox - Swiss FinTech AG www.loanboox.ch					
Year of foundation		2015		Valuation		CHF 122,000,000	
Headquarters		Zurich		Total funding		CHF 30,000,000	
Product category		Deposit & Lending		Employees		50	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		25	
<p>Loanboox is the independent debt capital market platform. We revolutionise the B2B lending of credits, by making it simple and transparent.</p>							
Board members		Andreas Burri, Dario Zogg, Stefan Mühlemann, Dominique Hügli					
Management team		Stefan Mühlemann, Andreas Burri, Dario Zogg, Ivo Francioni, Dominique Hügli, Martina Bühler					
Key partners		Independent Credit View AG, FINMA certified Swiss datacentre					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

¹ Market cap as of December 17, 2019.

		LumRisk SA www.lumrisk.com					
Year of foundation		2013		Valuation			
Headquarters		Vaud		Total funding			
Product category		Investment Management		Employees 22			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH 22			
<p>A plug-and-play risk aggregation and reporting service providing rapid, transparent, and high-quality portfolio risk data to help simplify complexity for investment decision making.</p>							
Board members		Arpad Busson, Alejandro Bonilla, Pierre Udriot, Marc Fisher					
Management team		Alejandro Bonilla, Jens Janke, Regino Alonso, Pierre Udriot					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Lykke Corp AG www.lykke.com					
Year of foundation		2013		Valuation			
Headquarters		Zug		Total funding			
Product category		Banking Infrastructure		Employees 23			
Tech category		Distributed Ledger Technology		... of which in CH 23			
<p>Lykke deploys FX and investment products and services on the blockchain, while running a proprietary exchange where clients can buy, sell, and store many types of tokenised assets. We also support incumbents in embracing the new technology via its B2B business and intend to launch one of the first regulated security token exchanges upon receipt of the Swiss Securities Dealer and OTF licence from FINMA.</p>							
Board members		Richard B. Olsen, Heinrich Zetlmayer, Samuel Hügli, Iulian Circo					
Management team		Richard B. Olsen (CEO), Cameron Fletcher, Reta Hall-Hierholzer, Marina de Mattos, András Puskás					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		meetinvest AG www.meetinvest.com					
Year of foundation		2014		Valuation			
Headquarters		Zug		Total funding CHF 2,700,000			
Product category		Investment Management		Employees 4			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH 4			
Sharing investment knowledge to empower everyone and providing world class digital investment solutions to wealth management financial institutions.							
Board members		Michel Jacquemai, Maria Jacquemai					
Management team		Michel Jacquemai, Maria Jacquemai					
Key partners		Integrated in the Temenos T24 core banking system (sandbox and marketplace)					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		MoneyPark AG www.moneypark.ch					
Year of foundation		2012		Valuation			
Headquarters		Schwyz		Total funding			
Product category		Banking Infrastructure		Employees 220			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH 220			
With around 80,000 happy customers, MoneyPark is the leading independent mortgage specialist in Switzerland and offers the most advanced mortgage advice in Switzerland with maximum transparency, the widest selection and best interest rates. Advice is provided either in one of the more than 25 branches or via telephone.							
Board members		Ralph Jeitziner, Samuel Hügli, Uwe Bartsch, Leo Grünstein, Stefan Heitmann, André Keller, Martin Tschopp					
Management team		Stefan Heitmann, Benjamin Tacquet, Michael Rogenmoser, Fabrice Lanz, Shahram Shad, Stéphane Mischler, Jasser Kassab, Kay Foerschle, Lukas Vogt, Claudia Heck					
Key partners		More than 100 partners (banks, insurances, and pension funds) in Switzerland					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Mt Pelerin Group SA www.mtpelerin.com					
Year of foundation		2018		Valuation		CHF 40,000,000	
Headquarters		Geneva		Total funding		CHF 2,150,000	
Product category		Banking Infrastructure		Employees		9	
Tech category		Distributed Ledger Technology		... of which in CH		8	
<p>Mt Pelerin is creating a new kind of bank in Switzerland. Built on the blockchain, it will refocus on the bank's core purpose: protect your money and finance your future.</p>							
Board members		Arnaud Salomon, Reynald Besson					
Management team		Arnaud Salomon, Reynald Besson, Jingyao Jin, Sébastien Krafft, Yann Gerardi, Thomas Swiejkowski, Suzanne Drouet, Stéphane Deramaux, David Llobet-Calaf					
Key partners		PwC, Lenz & Staehelin, CMTA, Saxo Bank, ibani, Fusion Foundation, Fusion Fintech, Swiss Finance + Technology Association, Crypto Valley Association, etc.					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/sub- scription

		Nectar Digital Wealth AG www.nectarfinancial.com					
Year of foundation		2018		Valuation			
Headquarters		Zurich		Total funding			
Product category		Investment Management		Employees		15	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		8	
<p>We provide wealth managers with Investment Management and portfolio services in order to improve end-client experience and investment returns.</p>							
Board members		Thomas Oeschger, Michael Frank Appenzeller					
Management team		Neil Patrick Stiefel, Michael Frank Appenzeller					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/sub- scription

		neocredit.ch AG www.neocredit.ch				
Year of foundation		2018		Valuation		
Headquarters		Bern		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				5		
				5		
Fast, simple, and transparent financing for SMEs.						
Board members		Guillaume Arnaud, Thomas De Bourayne, Bruno Férolles, Charles Perraudin				
Management team		Torsten Schittenhelm (CEO)				
Key partners		La Vaudoise Assurances, Credit.fr				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Netcetera AG www.netcetera.com				
Year of foundation		1996		Valuation		
Headquarters		Zurich		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				550		
				200		
Netcetera supports its customers worldwide with cutting-edge services, products, and custom software. As a market leader in 3-D Secure in the DACH region, the software company offers innovative digital payment products and software development for financial institutions.						
Board members		Andrej Vckovski, Hansruedi Vonder Mühl, Mike Franz, Ronnie Brunner, Thomas Flatt				
Management team		Andrej Vckovski, Darko Butina, Mark Faris, Thomas Zangerl				
Key partners		Braingroup, Cognism, Done, proCentric, Rhumbnet, SwissWallet				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Nimbo AG www.nimbo.ch				
Year of foundation		2017		Valuation		
Headquarters		Basel-Stadt		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				1		
				1		
<p>NIMBO creates more transparency in the valuation of medium-sized companies and links entrepreneurs with suitable consultants at a business succession.</p>						
Board members		Michael Grass, Jürg Kurmann, Bettina Ingrid Pfeiffer, Marc Uhlmann				
Management team		Marc Uhlmann				
Key partners		Network of independent M&A consultants in Switzerland, Germany, and Austria				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		NVISO SA www.nviso.ai				
Year of foundation		2005		Valuation		
Headquarters		Vaud		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				15		
				15		
<p>NVISO are leading experts in artificial intelligence and deep learning to accurately detect and predict human behaviours using visual intelligence.</p>						
Board members		Matteo Sorci, Timothy Llewellynn				
Management team		Matteo Sorci, Timothy Llewellynn				
Key partners		Darwin Digital, PainChek, Cetera Financial Group, EPFL, HES-SO, Bonseyes Community Association, UCLM, FHNW, etc.				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Oakura Ventures AG www.oakura.io				
Year of foundation		2018		Valuation		
Headquarters		Zug		Total funding		
Product category		Investment Management		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				7		
				5		
Oakura is a DLT-based digital platform for transacting company shares.						
Board members		Daniel Naeff, Christian Meisser, Pascal Kalbermatten				
Management team		Daniel Naeff, Christian Meisser, Pascal Kalbermatten				
Key partners		UZH Blockchain Center, ETH Juniors				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		ONE PM AG www.one-pm.com				
Year of foundation		2015		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				12		
				11		
ONE PM enables open banking beyond cash and offers cloud-based, API-driven multi-custody asset management services by excelling existing bank-interfacing capabilities and overcoming missing standards with self-learning mechanisms.						
Board members		Peter Mark Schweighofer, Giulio Giuseppe Rosamilia, Andreas Ahlm, Tobias Widmer				
Management team		Christian Egli				
Key partners		SWIFT, ebics, Sitrox, ergon				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		OpenMetrics Solutions GmbH www.openmetrics.ch					
Year of foundation		2016		Valuation			
Headquarters		Zurich		Total funding			
Product category		Investment Management		Employees		2	
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		2	
Our mission is to be the leading provider of investment and portfolio analytics technology for the financial industry.							
Board members							
Management team		Félix Fernandez Martinez, Tobias Setz					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/sub- scription

		Orca AG www.orca.xyz					
Year of foundation		2017		Valuation			
Headquarters		Zurich		Total funding		CHF 2,500,000	
Product category		Investment Management		Employees		7.5	
Tech category		Process Digitisation / Automatisisation / Robotics		... of which in CH		6	
A tailor-made collaboration suite for family offices, trusts, and investment companies.							
Board members		Daniel Danay Brenner, Tomas Hurcik, Christoph Baumann, Gregor Feichtinger					
Management team		Tomas Hurcik, Christoph Baumann, Gregor Feichtinger					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/sub- scription

		Parashift AG www.parashift.io				
Year of foundation		2017		Valuation		
Headquarters		Basel-Land		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				23		
				15		
Parashift offers a versatile AI-based document extraction cloud platform.						
Board members		Kurt Willi Strecker, Daniel Burkhardt, Olivier Frédéric Jaquet				
Management team		Alain Veuve, JH Heuing, Thilo Rossa, Manuela Rohr, Andreas Isenring				
Key partners		UiPath, Google				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Paymash AG www.paymash.com				
Year of foundation		2016		Valuation		
Headquarters		Zurich		Total funding		
Product category		Payment		Employees		
Tech category		Process Digitisation / Automatisisation / Robotics		... of which in CH		
				15		
				5		
Manage your business from one central platform. Start selling in your store, online or create and send invoices.						
Board members		José Manuel Rodriguez Amor				
Management team						
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Payment 21.com - Moving Media GmbH www.payment21.com					
Year of foundation		2002		Valuation			
Headquarters		St Gallen		Total funding			
Product category		Payment		Employees			
Tech category		Distributed Ledger Technology		... of which in CH			
<p>The award-winning Bitcoin cashier system from Payment21.com provides collection and exchange services. The gateway supports the Lightning Network enabling customers to accept blockchain transactions at the speed of light. Our proprietary technology protects the privacy of users while complying with AML/KYC regulation.</p>							
Board members							
Management team		Bernhard Kaufmann					
Key partners		ACI Worldwide					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/subscription

		Private Alpha Switzerland AG www.privatealpha.ch					
Year of foundation		2017		Valuation			
Headquarters		Lucerne		Total funding			
Product category		Investment Management		Employees			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH			
				5		5	
<p>Private Alpha enhances existing investment strategies with artificial intelligence technology.</p>							
Board members		Christoph Züllig, Andreas Perreiter, Christoph Josef Gum					
Management team		Christoph Josef Gum, Christoph Züllig, Marco Tresch, Alan Solansky					
Key partners		Universal Investment Gesellschaft mbH, Privatbank Berenberg, Bank Vontobel					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/subscription

		Raizers SA www.raizers.com				
Year of foundation		2014		Valuation		
Headquarters		Vaud		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				8		
				1		
<p>Raizers is an online investment platform that allows every person or company to lend to real estate developers, thus providing access to investment opportunities, selected by our team of analysts, previously limited to institutional investors.</p>						
Board members		Maxime Pallain, Gregoire Linder				
Management team		Maxime Pallain, Gregoire Linder				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Relai - Bravis GmbH www.relai.ch				
Year of foundation		2018		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
<p>We're a group of people who like to invest in crypto but think there must be an easier way to do it. We're developing a smartphone app that allows everybody to invest in Bitcoin within one minute: no account, no verification, no deposit required.</p>						
Board members		Julian Lucas Liniger, Dario Bürgi, Simon Leuenberger				
Management team		Julian Lucas Liniger, Stefaan Ponnet				
Key partners		Bity.com				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Run my Accounts AG www.runmyaccounts.com				
Year of foundation		2008		Valuation		
Headquarters		Zurich		Total funding		
Product category		Payment		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				65		
				58		
Accounting made simple. Run my Accounts has invented the automated accounting process for SME. We offer an end-to-end solution with personal services and support, enabling SMEs and startups to focus on their business.						
Board members		Jean-Jacques Suter, Thomas Brändle, Martin Christoph Schlatter Villiger				
Management team		Thomas Brändle, Andréina Plath				
Key partners						
Customer segments		Channels		Key activities		
Revenue streams						
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Schlossberg & Co AG www.schlossbergco.com				
Year of foundation		2013		Valuation		
Headquarters		Zug		Total funding		
Product category		Investment Management		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				5		
				5		
Schlossberg&Co generates wealth with the help of the most sophisticated quantitative algorithms - we call it SB Model. Schlossberg&Co clients experience their wealth in a holistic digital one-stop-shop - we call it SB Portal. Schlossberg&Co stores all assets natively and digitally on a hyper-secure storage at the most trusted academic institutions - we call it SB Custody.						
Board members						
Management team		David Bühlmann				
Key partners						
Customer segments		Channels		Key activities		
Revenue streams						
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		SEBA Bank AG www.seba.swiss					
Year of foundation		2018		Valuation		CHF 350,000,000	
Headquarters		Zug		Total funding		CHF 100,000,000	
Product category		Banking Infrastructure		Employees		76	
Tech category		Distributed Ledger Technology		... of which in CH		76	
<p>SEBA is a licenced and supervised Swiss bank providing the most comprehensive, secure, and easy-to-use bridge between digital and traditional assets. Store, trade, and manage your crypto currencies, digital and traditional assets all in one place.</p>							
Board members		Andreas Amschwand, Reto Kunz, Sébastien Mérillat, Erich Ettlin, Urs Zulauf, Guy Schwarzenbach, Peter Gerlach, Francis Leung, Jin Hian Goh					
Management team		Guido Bühler, Philipp Baretta, Urs Bernegger, Markus Blattmann, Per Magnusson, David Matter, Thomas Nietlispach					
Key partners		Julius Bär, Finstar, SmartTrade Technologies, Geissbühler Weber & Partner, Loomis International, Jaeksoft SaRL, BPC, Taurus Group SA					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
				Licence fee			

		SecurionPay - Online Payments Group AG www.securionpay.com					
Year of foundation		2014		Valuation			
Headquarters		Schwyz		Total funding			
Product category		Payment		Employees		30	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		3	
<p>SecurionPay is a PSD2-ready platform that keeps security, technology, and user experience at the forefront. A fully customisable and flexible solution gives merchants operational efficiencies and simplifies payment processing across markets and in various currencies.</p>							
Board members		Daniel Ronzani					
Management team		Lucas Jankowiak					
Key partners		European acquiring banks					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
				Licence fee			

securosys		Securosys SA www.securosys.com					
Year of foundation		2014		Valuation		CHF 25,000,000	
Headquarters		Zurich		Total funding		CHF 1,350,000	
Product category		Banking Infrastructure		Employees		21	
Tech category		Distributed Ledger Technology		... of which in CH		19	
<p>Securosys SA is a market leader in cybersecurity, encryption, and in securing digital identities. Securosys offers a wide range of enterprise-grade security network appliances and services, from encrypted communications to key generation and key management. All products are developed and manufactured in Switzerland and free from contaminating influences.</p>							
Board members		Andreas Curiger, Robert Rogenmoser, Hans-Jörg Bärtschi, Andrea Schlapbach					
Management team		Robert Rogenmoser, Andreas Curiger, Marcel Dasen, Christian Willemin, Reto Stäubli, Geraldine Critchley					
Key partners		Electronic Manufacturing Services Enics AG, GPV Switzerland SA					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

SELMA		Selma Finance AG www.selmafinance.ch					
Year of foundation		2016		Valuation			
Headquarters		Schwyz		Total funding		CHF 1,200,000	
Product category		Investment Management		Employees		7	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		3	
<p>Selma is a digital financial advisor that helps you to do the right things with your money, like a private banker in your pocket.</p>							
Board members		Kevin Linser, Stefan Andri Jaecklin, Patrik Schär					
Management team		Patrik Schär, Kevin Linser, Mikael Roos, Valeria Gasik					
Key partners		Saxo Bank (Schweiz) AG, VZ VermögensZentrum					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

 SharesInside AG www.sharesinside.com						
Year of foundation	2016	Valuation				
Headquarters	Zurich	Total funding				
Product category	Investment Management	Employees	15			
Tech category	Analytics / Big Data / Artificial Intelligence	... of which in CH	7			
<p>The next generation platform for investors, listed companies and stock exchanges to engage.</p>						
Board members	Yves Gelin, Bruno Vogt, Marco Andrea Caluori					
Management team	Dave Hannam					
Key partners						
Customer segments		Channels	Key activities	Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

 Shift Cryptosecurity AG www.shiftcrypto.ch						
Year of foundation	2015	Valuation				
Headquarters	Zurich	Total funding	CHF 4,500,000			
Product category	Banking Infrastructure	Employees	18			
Tech category	Distributed Ledger Technology	... of which in CH	13			
<p>Shift Cryptosecurity builds physical keys for the crypto world.</p>						
Board members	Jonas Schnellli, Douglas Bakkum					
Management team	Douglas Bakkum, Arnold Sternberg					
Key partners						
Customer segments		Channels	Key activities	Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		SIBEX AG www.sibex.io					
Year of foundation		2019		Valuation		CHF 6,250,000	
Headquarters		Zug		Total funding		CHF 1,780,000	
Product category		Banking Infrastructure		Employees		5-10	
Tech category		Distributed Ledger Technology		... of which in CH		3	
<p>The SIBEX peer to peer network removes intermediaries from digital asset financial markets, exposing a new world of trading strategies and market opportunities for professionals.</p>							
Board members		Gilbert Rochat, Patrick Susse, Zhao Chen, Rob Shavell					
Management team		Daniel Haudenschild (CEO), Justin Smith, Quentin Reyes					
Key partners		SIX, Accomplice, Fenbushi Venture Capital, PAXOS, Bridgewood					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		SIX - SIX Group AG www.six-group.com					
Year of foundation		2002		Valuation			
Headquarters		Zurich		Total funding			
Product category		Banking Infrastructure		Employees		2,600	
Tech category		Process Digitisation / Automatisisation / Robotics		... of which in CH			
<p>SIX operates the infrastructure for the Swiss financial center, thus ensuring the flow of information and money between financial market players. SIX offers exchange services, financial information and banking services - and is building a digital infrastructure for the new millennium.</p>							
Board members		Thomas Wellauer, Sabine Keller-Busse, Herbert J. Scheidt, Jürg Bühlmann, Lorenz von Habsburg Lothringen, Stefan Helfenstein, Søren Mose, Shannon Thmye Klinger, Jürg Gutzwiller, Thomas Gottstein					
Management team		Jos Dijsselhof, Daniel Schmucki, Jochen Dürr, Thomas Zeeb, Marco Menotti, Marion Leslie, Chris Landis					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		SmartMoneyMatch - 4finance AG www.smartmoneymatch.com					
Year of foundation		2007		Valuation		CHF 5,000,000	
Headquarters		Zug		Total funding			
Product category		Investment Management		Employees		4	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		1	
<p>SmartMoneyMatch offers a platform for investment products and service providers (matching search and find), due diligence exchange, RFPs, jobs, events, social network activities for the asset management industry.</p>							
Board members		Martin Signer					
Management team		Martin Signer					
Key partners		See www.smartmoneymatch.com/business-directory					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Sonect AG www.sonect.ch					
Year of foundation		2016		Valuation			
Headquarters		Zurich		Total funding		CHF 8,450,000	
Product category		Payment		Employees		25	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		20	
<p>Withdraw cash with your smartphone - anytime, anywhere. Simple access to financial services, for everyone, everywhere.</p>							
Board members		Rüdiger Jürgen Krieger, Sandipan Chakraborty, Fritz Thomas Klein					
Management team		Sandipan Chakraborty, Rik Krieger, Arindam Bajpayee					
Key partners		PostFinance AG, SixThirty, Loomis, FIS					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Sparbatze AG www.sparbatze.ch					
Year of foundation		2018		Valuation			
Headquarters		Zurich		Total funding			
Product category		Investment Management		Employees 4			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH 4			
Sparbatze aims to disrupt the pension planning industry by offering state-of-the-art, cost-efficient and tailor-made investment portfolios for Switzerland.							
Board members		Oliver Patrick Steeg, Ivan Sosio, Andreas Siemers					
Management team		Oliver Patrick Steeg, Ivan Sosio					
Key partners		A cantonal bank and an insurance company					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Spitch AG www.spitch.ch					
Year of foundation		2014		Valuation			
Headquarters		Zurich		Total funding			
Product category		Banking Infrastructure		Employees 50			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH 18			
Spitch is the Swiss company providing business solutions for multiple verticals based on an omni-channel conversational platform, operating in a direct voice-to-voice mode. It has produced the first and most accurate speech-to-text engine for Swiss German dialects and delivers a wide range of end-to-end solutions on premise and in cloud, based on its own high precision ASR, NLU, and conversational engines.							
Board members		Kirill Tatarinov, Alexey Popov, Vadim Shchepinov, Igor Nozhov, Joe Novak, Georgii Kravchenko					
Management team		Alexey Popov (CEO), Sascha Andreas Nafz, Saglara Dzhavkaeva, Igor Nozhov, Juerg Schleier, Stephan Fehlmann, Vadim Shchepinov, Piergiorgio Vittori, Georg Theunissen, Gary Williams and others					
Key partners		Acapela, Avaloq, Audeering, Axelero, BSS, Crealogix, Genesys, Oracle, Swisscom, Nexteria, IFS, System EVO, etc.					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Squirro AG www.squirro.com					
Year of foundation		2009		Valuation			
Headquarters		Zurich		Total funding			
Product category		Investment Management		Employees			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH			
				40			
				20			
Squirro is a cognitive insights engine that enables companies to turn meaningless data into actionable insights.							
Board members		Andrew James Honess, Carmen Schlatter, Dorian Selz, Nityen Lal, Patrice Marcel Neff					
Management team		Anton Martin Birrer, Miguel Rodríguez Fernández, Dorian Selz					
Key partners		Synpulse, AdNovum, Refinitiv, Dow Jones, Accenture, DXC, Wipro, CMCI, Salesforce, ServiceNow					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		Stableton Financial AG www.stableton.com					
Year of foundation		2018		Valuation			
Headquarters		Zug		Total funding			
Product category		Investment Management		Employees			
Tech category		Process Digitisation / Automatisisation / Robotics		... of which in CH			
				8			
				8			
Stableton Financial's alternative investment Fintech platform is striving to become the global leading market network for qualified and institutional investors seeking exposure to liquid alternatives, private equity, including venture capital, private debt, and real assets. Our investors benefit from easy access, unique opportunities, performance, and measurable impact across absolute return strategies and alternative investment content.							
Board members		Andreas Bezner, Konstantin Heiermann					
Management team		Andreas Bezner, Konstantin Heiermann, Ethan Schaerer, Vinzent Zerner, Carmine Meoli					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		Swiss Crypto Tokens AG www.swisscryptotokens.ch				
Year of foundation		2018		Valuation		
Headquarters		Zug		Total funding		
Product category		Payment		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				1		
				1		
<p>The purpose of Swiss Crypto Tokens is to provide comprehensive services related to the issuing of tokens, including the issuance of our own tokens. The first token, a stablecoin XCHF, pegged to CHF, was launched in October 2018.</p>						
Board members		Niels Niklas Bang Nikolajsen, Luzius David Meisser				
Management team		Armin Eduard Schmid				
Key partners		Bitcoin Suisse AG as our main partner. CryptoFranc (XCHF) is listed on multiple exchanges: Bitfinex, IDEX, Uniswap, etc.				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Swiss Crypto Vault AG www.swisscryptovault.ch				
Year of foundation		2017		Valuation		
Headquarters		Zug		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
<p>Swiss Crypto Vault offers its proprietary, Hardware Security Module (HSM) based vault solution for the safe custody of digital assets as a technology provider. The core infrastructure of the vault is in Switzerland and the private key never leaves Switzerland. It is built to the highest physical and cryptographic security standards and support a wide range of tokens.</p>						
Board members		Niels Niklas Bang Nikolajsen, Andrej Francisco Majcen, Ludwig Xaver Karl				
Management team		Philipp Vonmoss, Emil Kassow				
Key partners		Bitcoin Suisse				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Swisscom Blockchain AG www.blockchain.swisscom.com					
Year of foundation		2017		Valuation			
Headquarters		Zurich		Total funding			
Product category		Banking Infrastructure		Employees 22			
Tech category		Distributed Ledger Technology		... of which in CH 22			
Swisscom Blockchain AG provides blockchain advisory, solutions, and products (incl. infrastructure) to enable corporates to make use of blockchain technology productive and at scale. Swisscom Blockchain AG is industry and technology agnostic and serves clients in its home market Switzerland and internationally.							
Board members		Roger Rolf Wüthrich-Hasenböhler, Robert Gebel, Horst Gaiser					
Management team		Lukas Hohl, Kamal Youssefi, Jorge Alvarado Flores					
Key partners		Custodigit, Sovrin, Hedera Hashgraph, R3, Hyperledger, Ethereum, Linxens, daura, NEO, Ripple					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		SwissLending SA www.swisslending.com					
Year of foundation		2015		Valuation			
Headquarters		Geneva		Total funding			
Product category		Deposit & Lending		Employees 1			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
The Swiss real estate crowdlending specialist. SwissLending is the first crowdlending platform in Switzerland specialising in loans for real estate professionals. Club deals and tokenisation will be added in 2020.							
Board members		Christophe Capelli, Dominique Goy					
Management team		Dominique Goy					
Key partners		Groupe Capelli					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		SwissOne Capital AG www.swissone.capital					
Year of foundation		2018		Valuation			
Headquarters		Zug		Total funding			
Product category		Investment Management		Employees 10			
Tech category		Distributed Ledger Technology		... of which in CH			
<p>We provide common sense solutions to real world opportunities and challenges.</p>							
Board members		Cornelis Jan Quirijns, Antony Turner, Hugo van Veen, Michael Pawlowski					
Management team		Michael Pawlowski, Steffen Bassler, Anthony Turner, Hugo Van Veen, Kenny Hearne					
Key partners		AKJ Jenson					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		swisspeers AG www.swisspeers.ch					
Year of foundation		2016		Valuation			
Headquarters		Zurich		Total funding			
Product category		Deposit & Lending		Employees 8			
Tech category		Distributed Ledger Technology		... of which in CH 8			
<p>swisspeers provides small and medium-sized companies with access to capital and thus supports Switzerland's largest employer, the SMEs, to become fit for the future. Swisspeers offers investors the opportunity to invest directly into small and medium sized enterprises (SMEs) as an alternative investment opportunity escaping the investment drought in the fixed income market.</p>							
Board members		Jürg Hunziker, Urs Hofer, Christoph Ammann, Karin Rhomberg, Peter Sami					
Management team		Alwin Meyer, Andreas Hug, Stefan Nägeli					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/subscription
						Licence fee	

		Swissquote Group Holding SA www.swissquote.ch				
Year of foundation		1999		Valuation		
Headquarters		Vaud		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				633		
				555		
Swissquote Group is the Swiss leader in online banking.						
Board members		Markus Dennler, Monica Dell'Anna, Beat Oberlin, Martin Naville, Jean Christophe Pernollet				
Management team		Marc Bürki, Paolo Buzzi, Michael Ploog, Morgan Lavanchy, Gilles Chantrier Jan De Schepper, Yvan Cardenas, Lino Finini				
Key partners		Postfinance, Basellandschaftliche Kantonalbank, Bitstamp, etc.				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
				Licence fee		

		Sygnium Bank AG www.sygnium.com				
Year of foundation		2018		Valuation		
Headquarters		Zurich		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				> 60		
				> 50		
Sygnium is the world's first digital asset bank, founded on Swiss and Singapore heritage, operating globally. Rooted in two of the world's leading financial hubs, Switzerland and Singapore, we empower institutional and private qualified investors, corporates, banks and other financial institutions to invest in the digital asset economy with complete trust.						
Board members		Luka Müller, Gabriela Maria Payer, Thomas Buess, Chua Kim Leng, Johannes Höhener, Petter Wuffli				
Management team		Manual Krieger, Mathias Imbach, Guido Hüppin, Helmut Kaufmann, Stephan Kunz, Fabian Dori				
Key partners		Swisscom, Custodigit, daura				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
				Licence fee		

 sysmosoft		SYSMOSOFT SA www.sysmosoft.com				
Year of foundation		2010		Valuation		
Headquarters		Vaud		Total funding		
Product category		Banking Infrastructure		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				10		
				10		
<p>Legally binding electronic signatures for banks. Sysmosoft's vision is to become the world's leader in digital trust relationships between financial institutions and their customers. Sysmosoft's mission is to digitise human based processes aiming to provide trust in the banking field. We rely on legally binding technologies, such as electronic signatures, to achieve digital trust in a user friendly and secure manner.</p>						
Board members		Nagi Moustafa, Julien Probst				
Management team		Frédéric Mauger, Mark Vincent				
Key partners		Swisscom, Temenos, Entrust Datacard, Signatys, ERI				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
				Licence fee		

 Systemcredit Together. Better. Credit.		Systemcredit AG www.systemcredit.com				
Year of foundation		2018		Valuation		
Headquarters		Zurich		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				6		
				6		
<p>Systemcredit builds Switzerland's supermarket for small and medium business loans. We support small and medium businesses in preparing for financing and then provide them with the best offers in the market. Simple and fast, with less paperwork and at better terms. Just like a supermarket - only for small and medium business loans.</p>						
Board members		Andreas R. Herzog, Daniel V. Christen, Daniel Bont, Thomas Billeter				
Management team		Daniel V. Christen (CEO), Gino Giuliano, Partner				
Key partners		Systemcredit cooperates with many lenders such as banks and crowdlenders to provide the best offers to ist SME-clients. Research cooperation with IFZ from the HSLU.				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
				Licence fee		

		Taurus Group SA www.taurusgroup.ch					
Year of foundation		2018		Valuation			
Headquarters		Geneva		Total funding			
Product category		Banking Infrastructure		Employees 15			
Tech category		Distributed Ledger Technology		... of which in CH 15			
Taurus is a financial services firm specialised in digital assets and blockchain.							
Board members		Lars Christian Robert Gellerstad, Oren-Olivier Puder, Lamine Brahim, Sébastien Dessimoz					
Management team		Lamine Brahim, Sébastien Dessimoz					
Key partners		ELCA, Swiss Federal Institute of Technology (EPFL), HES-SO Sierre					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Tensor Technologies AG www.tensor-tech.io					
Year of foundation		2018		Valuation			
Headquarters		Zug		Total funding			
Product category		Investment Management		Employees 14			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH 14			
Tensor Technologies is a proprietary algorithmic trading company. We develop software and algorithms to trade in financial markets. We use the latest technologies to allow our small team to efficiently scale across many markets globally.							
Board members		Leo Rüst, Andreas Meyer de Voltaire, Gerhard Pfister					
Management team		Andreas Meyer de Voltaire, Leo Rüst, Andreas Razen, Martin Marciniszyn					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Taylor AG www.taylor.io					
Year of foundation		2018		Valuation		EUR 4,500,000	
Headquarters		Zurich		Total funding		CHF 1,250,000	
Product category		Deposit & Lending		Employees		11	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		5	
The simple business loan for German businesses.							
Board members		Patrick Stäuble					
Management team		Patrick Stäuble					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		theScreener Investor Services AG www.thescreener.com					
Year of foundation		2000		Valuation			
Headquarters		Zug		Total funding			
Product category		Investment Management		Employees		30	
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH			
We assist leading financial institutions in optimising advice and performance.							
Board members		Andreas Lusser					
Management team		Farwagi Alain (Co-CEO), Andreas Lusser (Co-CEO)					
Key partners		Refinitiv, Factset, Morningstar, SIX, vwd, WFG, various IT suppliers					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		ti&m AG www.ti8m.ch					
Year of foundation		2005		Valuation			
Headquarters		Zurich		Total funding			
Product category		Banking Infrastructure		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
				357			
				347			
<p>ti&m is a Swiss leader in digitisation, security, as well as innovation projects and products.</p>							
Board members		Thomas Wüst, Markus Jordi, Urs Buner, Markus Nigg					
Management team		Thomas Wüst, Markus Nigg, Marius Matter, Samuel Scheidegger, Daniel Walther, Björn Sörensen, Holger Rommel, Philip Dieringer					
Key partners		Microsoft, Jive, IBM, contovista, edorasware, finnova, Liferay, Magnolia, MeaWallet, Oracle, Qumram, Quo Vadis, Red Hat, Shopware, Swisscom, USP, aws, Google, Azure					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
				Licence fee			

		Tilbago AG www.tilbago.ch					
Year of foundation		2016		Valuation			
Headquarters		Lucerne		Total funding			
Product category		Payment		Employees			
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
<p>The software of Tilbago AG enables companies to process debt collection proceedings and loss certificates online. The intelligence of the software leads creditors straight forward to collect the money. Key elements are 7x24h active monitoring, maximum cross-linking/integration of relevant sources, intuitive use, all inclusive flat rate per case up to 20 years.</p>							
Board members		Harley Krohmer, David Fuss, Oliver Wolf, Mathias Strazza					
Management team		David Fuss (CEO), Oliver Wolf					
Key partners		PostFinance					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
				Licence fee			

		TimeStatement AG www.timestatement.com					
Year of foundation		2017		Valuation		CHF 6,000,000	
Headquarters		Zug		Total funding			
Product category		Banking Infrastructure		Employees		10	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH			
TimeStatement is a modern cloud solution that allows you to track and bill your time quickly and easily.							
Board members		Daniel Bernard					
Management team		Daniel Bernard					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/sub- scription

		Tindecos Financial Services AG www.tindecos.com					
Year of foundation		2010		Valuation			
Headquarters		Zug		Total funding		CHF 5,000,000	
Product category		Investment Management		Employees		10	
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH			
Tindecos VISION is an award-winning front to back Investment Management platform. Our VISION CORE Technologies covers CRM, PMS, RISK and OMS. It can either a) act as the core solution for any wealth/asset manager of any size/type or b) provide them with the actions they need to take to implement the products/solutions they have sold to their clients.							
Board members		Michael Kaimakliotis, Neil McLachlan, Moritz von der Linden, Mike Pearl					
Management team		Michael Kaimakliotis, Neil McLachlan					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data Licence fee	Saas/sub- scription

		TokenGate.io - DSENT AG www.tokengate.io					
Year of foundation		2018		Valuation > CHF 10,000,000			
Headquarters		Zug		Total funding			
Product category		Investment Management		Employees 5			
Tech category		Distributed Ledger Technology		... of which in CH 5			
<p>Animating the new token economies by tokenising, creating, and distributing new tokens like digital twins or crypto assets.</p>							
Board members		Marco Bumbacher, Ralf Hans Glabischnig					
Management team		Daniel Peter Rutishauser					
Key partners		Bank Zarattini, Falcon Bank, Bank Frick, Crypto Brokers AG, Intrum, Lexpert Partners, Capital Management Partners AG, Crypto Consulting AG, Heymate, JUR, EOS, NEO, etc.					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		TokenSuisse AG www.tokensuisse.com					
Year of foundation		2017		Valuation CHF 15,000,000			
Headquarters		Zug		Total funding			
Product category		Investment Management		Employees 6			
Tech category		Distributed Ledger Technology		... of which in CH 6			
<p>TokenSuisse AG is a blockchain investment advisor with the mission to provide simple access to the world of blockchain technologies and crypto assets. TokenSuisse offers the following services: asset management, brokerage, consulting.</p>							
Board members		David Viktor Bisang, Alain Kunz, Dionys Berwert					
Management team		Alain Kunz, Claudio Alexander Rossi					
Key partners		TokenPay Swiss AG, ICONOMI Ltd., Hypothekbank Lenzburg					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Tradeplus24 AG www.tradeplus24.ch				
Year of foundation		2016		Valuation		
Headquarters		Zurich		Total funding		
Product category		Deposit & Lending		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				15		
				11		
An innovative financing solutions designed for SMEs, helping them to optimise their working capital through tating up liquidity against domestic and international receivables.						
Board members		Benjamin James, Martijn Corbee, Stephen Pike, Andreas Iten, Andreas Laule				
Management team		Benjamin James (CEO), Martijn Corbee, Stephen Pike, Matthias Kribbel				
Key partners		CS, AIG, EulerHermes, SIX				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		trustwise.io AG www.trustwise.io				
Year of foundation		2017		Valuation		
Headquarters		Basel-Land		Total funding		
Product category		Investment Management		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				8		
				2		
trustwise.io ag provides a regulatory compliant blockchain access platform for the management of private equity.						
Board members		Adrian Markus Hutzli, Christoph Niemann, Emanuel Dettwiler, Rolf Ramseier				
Management team						
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		turicode AG www.turicode.com					
Year of foundation		2016		Valuation			
Headquarters		Zurich		Total funding CHF 100,000 (incorporation)			
Product category		Banking Infrastructure		Employees 15			
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH 15			
Unlock the full potential of your documents using machine learning.							
Board members		Patrick Emmisberger, Aaron Richiger, Benjamin von Deschwanden, Martin Keller					
Management team		Patrick Emmisberger, Aaron Richiger, Benjamin von Deschwanden, Martin Keller					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Unity Investment AG www.unityinvestment.ch					
Year of foundation		2017		Valuation			
Headquarters		Schwyz		Total funding CHF 5,000,000			
Product category		Payment		Employees 7			
Tech category		Distributed Ledger Technology		... of which in CH 7			
We are creating a one of a kind crypto-mining token that will allow anyone in the world to benefit from the mining revolution. We provide payment solutions and a crypto custody platform.							
Board members		Alessandro Fancelli, Sean Prescott					
Management team		Sean Prescott, Alessandro Fancelli					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission	
				Marketing & finding clients	Trading	Advertising	
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription	
					Licence fee		

		Validity Labs AG www.validitylabs.org				
Year of foundation		2016		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Distributed Ledger Technology		... of which in CH		
				12		
				9		
<p>Validity Labs is the technical partner of choice for a range of start-ups as well as large corporates, offering support and know-how in the areas of blockchain-enabled solutions, decentralised applications, tokenisation, initial coin offerings (ICO) and security token offerings (STO). Engineering smart contracts as well as build novel Web3 solutions from front end to back end.</p>						
Board members		André Wolke				
Management team		André Wolke, Sebastian Bürgel				
Key partners		Web3 Foundation, ETH Library Lab, Wenger & Vieli, Froriep, Homburger, Finoa, Shift Cryptosecurity				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		Vestun GmbH www.vestun.com				
Year of foundation		2019		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				9		
				4		
<p>Vestun is an Investment Management company employing quantitative techniques and AI technologies to elaborate investment strategies on different financial assets leveraging both alternative and financial data. The company also uses data encryption to leverage crowdsourcing and collaborative intelligence to train and improve its investment models.</p>						
Board members		Chayan Asliyalfani, Gaurav Anand, Christ Brupacher				
Management team		Chayan Asliyalfani, Gaurav Anand, Guillaume James				
Key partners		Credit Suisse AG, Innosuisse				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/subscription
					Licence fee	

		VIAC AG www.viac.ch				
Year of foundation		2017		Valuation		
Headquarters		Lucerne		Total funding		
Product category		Investment Management		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				3.4		
				3.4		
<p>VIAC is a fully digital 3rd pillar offered by the Terzo Vorsorgestiftung from WIR Bank. In 2020 the offer will be expanded to the vested benefits as well (2nd pillar).</p>						
Board members		Germann Wiggl, Max Peter, Heinz Zimmermann				
Management team		Daniel Andreas Peter, Christian Mathis, Jonas Gusset				
Key partners		Terzo Vorsorgestiftung, WIR Bank, Credit Suisse (custodian)				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		WealthArc GmbH www.wealtharc.com				
Year of foundation		2015		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				40		
				7		
<p>WealthArc is a next generation wealth management platform for external asset managers. It offers PMS and CRM, including digital client interaction, real-time portfolio analytics and automatic custodian consolidation.</p>						
Board members		Krzysztof Marcin Gogól				
Management team		Krzysztof Marcin Gogól				
Key partners		Refinitiv, Microsoft, Swisscom, Google				
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		WeCanGroup SA www.wecangroup.ch					
Year of foundation		2015		Valuation		USD 10,000,000	
Headquarters		Geneva		Total funding		CHF 2,000,000	
Product category		Investment Management		Employees		14	
Tech category		Distributed Ledger Technology		... of which in CH		13	
<p>Wecan co-creates joint-ventures with strategic partners. It is focused around the blockchain technology.</p>							
Board members		Vincent Pignon, Dominique Goy					
Management team							
Key partners		Wisekey, Capelli, Geneva Management Group, Libra, Emakina, CREA - INSEEC, Request, Buxum					
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		Yapeal AG www.yapeal.ch					
Year of foundation		2018		Valuation			
Headquarters		Zurich		Total funding		CHF 2,500,000	
Product category		Payment		Employees		15	
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		15	
<p>Yapeal builds a new digital bank and redefines the way people bank.</p>							
Board members		Hans Kuhn, Theodor Keiser, Werner Vontobel					
Management team		Thomas Hilgendorff, Christian Meier, Enrico Bauer					
Key partners							
Customer segments		Channels		Key activities		Revenue streams	
B2B National	B2C National	Personal	Personal & digital	Programming & engineering		Interest	Commission
				Marketing & finding clients		Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients		Data	Saas/sub- scription
						Licence fee	

		Yova AG www.yova.ch				
Year of foundation		2017		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Process Digitisation / Automatisation / Robotics		... of which in CH		
				16		
				16		
<p>Yova makes it easy to invest in companies that create positive environmental and social impact - without compromising your financial returns.</p>						
Board members		Helmut Fink				
Management team		Tillmann Lang, Erik Gloerfeld, Christoph Birkholz				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

		Zenai AG www.zenai.ch				
Year of foundation		2016		Valuation		
Headquarters		Zurich		Total funding		
Product category		Investment Management		Employees		
Tech category		Analytics / Big Data / Artificial Intelligence		... of which in CH		
				9		
				9		
<p>We provide strategic machine learning services and develop augmented intelligence software for financial institutions and the like.</p>						
Board members		Tilman Gerhards, Urs Ingold, Alexander James Rüegg				
Management team		Alexander Rüegg (CEO)				
Key partners						
Customer segments		Channels		Key activities		
				Revenue streams		
B2B National	B2C National	Personal	Personal & digital	Programming & engineering	Interest	Commission
				Marketing & finding clients	Trading	Advertising
B2B Int.	B2C Int.	Digital		Operative business & serving clients	Data	Saas/sub- scription
					Licence fee	

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Appendix A

Indicator sources of the FinTech hub ranking:

Publisher	Factor	Source	Dimension
2THINKNOW	Innovation Cities	Innovation Cities Index 2019	Technological
App Annie Intelligence, International Monetary Fund	Mobile App Creation	World Economic Outlook Database October 2018	Technological
AT Kearney	Global Cities Report	A.T. Kearney 2019 Global Cities Report	Social
Clarivate Analytics	Scientific and Technical Publications	World Economic Outlook Database October 2018	Technological
Ernst & Young	FinTech Adoption	EY FinTech Adoption Index 2019	Economic
Hays	Global Skills	The Hays Global Skills Index 2019/20	Social
Henley & Partners	Visa Restriction	Henley & Partners Passport Index 2019 Q3	Political/Legal
HSBC	Expat Ranking	League Table HSBC Expat Explorer Survey 2019	Social
IHS Markit	Political and Operational Stability	Country Risk Scores 2018	Political/Legal
IMD	Digital Competitiveness	IMD World Digital Competitiveness Ranking 2019	Technological
	Talent Competitiveness	IMD World Talent Ranking 2019	Social
Insead, The Adecco Group, Google	Labour Force Quality	2020 Global Talent Competitiveness Index	Social
Institute for Economics and Peace	Global Peace	Vision of Humanity 2019 Global Peace Index	Political/Legal
International Labour Organization	Female Employment Advanced Degree	ILOSTAT Annual Indicators	Social
	Knowledge-Intense Employment	ILOSTAT Database of Labour Statistics (2009-2018)	Social
International Monetary Fund	Foreign Direct Investments	International Financial Statistics and Balance of Payments Databases, World Bank, International Debt Statistics and World Bank and OECD GDP Estimates; Extracted from the World Bank's World Development Indicators Database	Economic
	Domestic Credit to Private Sector	International Financial Statistics and Data Files and World Bank and OECD GDP Estimates; Extracted from the World Bank's World Development Indicators Database	Economic
International Telecommunication Union	Mobile Cellular Subscriptions	International Telecommunication Union, World Telecommunication/ICT	Technological
	ICT Access	Development Report and Database World Telecommunication/ICT	Technological
	ICT Use	Indicators Database World Telecommunication/ICT	Technological
	Cybersecurity	Indicators Database Global Cybersecurity Index 2018	Technological
KPMG	Corporate Tax Rates	Corporate Tax Rates Table	Political/Legal
Mercer	Cost of Living	Mercer's 2019 Cost of Living Ranking	Social
	Quality of Life	Mercer's 2019 Quality of Living City Ranking	Social

Publisher	Factor	Source	Dimension
NUMBEO	Prices by City of Average Monthly Net Salary	NUMBEO Database 2009-2020	Economic
OECD	PISA Ranking	PISA 2018 Results	Social
PwC	Ease of Paying Taxes	PwC Database	Political/Legal
QS Quacquarelli Symonds LtdSymonds Ltd	University Ranking	QS World University Ranking 2017/2018, Top Universities	Social
Reporters without Borders	Press Freedom	2019 World Press Freedom Index	Political/Legal
Tax Justice Network Limited	Financial Secrecy	Financial Secrecy Index 2018	Economic
The Global Entrepreneurship and Development Institute	Entrepreneurship Activity	Global Entrepreneurship Index 2019	Economic
The World Bank	Value of Stocks Traded	World Federation of Exchanges Database	Economic
	Infrastructure Quality	The World Bank LPI Global Rankings 2018	Social
	Domestic Market Scale	World Economic Outlook Database October 2018	Economic
	Cost of Redundancy Dismissal	Doing Business 2019: Training for Reform 2019	Political/Legal
	Ease of Getting Credit	Doing Business 2019: Training for Reform	Economic
	Ease of Protecting Minority Investors	Doing Business 2019: Training for Reform	Economic
	Ease of Resolving Insolvency	Doing Business 2019: Training for Reform 2019	Economic
	Starting a Business	Doing Business 2019: Training for Reform 2019	Economic
	Applied Tariff Rates	TRAINS Database, WTO Integrated Data Base and CTS Database	Economic
	Gov. Effectiveness	Worldwide Governance Indicators 2018 Update	Political/Legal
	Regulatory Quality	Worldwide Governance Indicators 2018 Update	Political/Legal
	Human Capital	Human Capital Index and Components 2018	Social
The World Bank and Turku School of Economics	Logistics Performance	Logistics Performance Index 2018, Arvis et al., 2018, Connecting to Compete 2018, Trade Logistics in the Global Economy - The Logistics Performance Index and List Indicators	Social
Thomson Reuters	Joint Venture Deals	Thomson One Banker Private Equity, SDC Platinum Database; International Monetary Fund World Economic Outlook Database, October 2018	Economic
	VC Deals	Thomson One Banker Private Equity Database; International Monetary Fund, World Economic Outlook Database, October 2018	Economic
Transparency International	Corruption Perception	Corruption Perceptions Index 2018	Political/Legal
UBS	Purchasing Power	UBS Purchasing Power Filtered by Net Annual Income	Economic

Publisher	Factor	Source	Dimension
UNESCO Institute for Statistics	Expenditure on Education	UIS Online Database 2008-2017	Social
	R&D Expenditure	UIS Online Database; Eurostat, Eurostat Database, 2019	Technological
	Government Funding per Secondary Student	UIS Online Database 2008-2017	Social
	Graduates in Science and Engineering	UIS Online Database 2010-2018	Social
	Tertiary Level Inbound Mobility	UIS Online Database 2008-2017	Social
	Pupil-Teacher Ratio	UIS Online Database 2008-2018	Social
	Research Talents in Businesses	UIS Online Database; Eurostat, Eurostat Data Base, 2019	Technological
	Researchers	UIS Online Database; Eurostat, Eurostat Database, 2019	Technological
	School Life Expectancy	UIS Online Database 2008-2018	Social
	Tertiary Enrolment	UIS Online Database 2010-2018	Social
United Nations	High-Tech Imports	Comtrade Database; Eurostat, Annex5: High-tech Aggregation by SITC	Technological
United Nations Public Administration Network	E-Participation	E-Government Survey 2018	Technological
	Gov. Online Services	E-Government Survey 2018	Technological
World Economic Forum	Cities Competitiveness	The Global Competitiveness Report 2019 World Economic Forum	Economic
	Cluster Development	Executive Opinion Survey 2018	Social
	University-Industry Collaboration	Executive Opinion Survey 2018	Technological
World Federation of Exchanges	Market Capitalization	World Federation of Exchanges Database; Extracted from the World Bank's World Development Indicators Database 2011-2017	Economic
World Intellectual Property Organization	Patents in at Least Two Offices	Intellectual Property Statistics	Technological
World Trade Organization	ICT Services Imports	Trade in Commercial Services Database	Technological
	IP Payments	Trade in Commercial Services Database	Technological
Z/Yen Group, China Development Institute	Global Financial Centres	Global Financial Centres Index 26	Economic

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