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IFZ FinTech Study 2018
An Overview of Swiss FinTech

Editors Prof. Dr. Thomas Ankenbrand, Prof. Dr. Andreas Dietrich, Denis Bieri

Institute of Financial Services Zug IFZ
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IFZ FinTech Study 2018

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1. Preface

The digital transformation of the financial industry has accelerated in the past few months. In order to cope with the pressure on both costs and revenues, banks not only increasingly focus on adopting the habits and culture of their digitally native customers, but also on streamlining internal business processes. The FinTech sector, as the provider of innovative solutions for the financial industry, has clearly profited from this trend in the past year. This is not only underlined by the steady growth in the total number of companies in the sector, amounting to 220 as per the end of 2017, but also in the record high in venture capital investments and the increased level of partnership and cooperation between established financial institutions and FinTech companies. Overall, the Swiss FinTech sector has grown in maturity throughout 2017 and has become a significant provider of innovative solutions for established financial services providers but also for companies in other sectors and private individuals. Due to the IT-driven business models of most Swiss FinTech companies, they should be understood as complements to established banks rather than competitors.

The main body of this study starts with chapter 2, in which a definition of the term «FinTech» is given and the framework of the subsequent analysis of the Swiss FinTech ecosystem is elucidated. Chapter 3 examines the environment of the Swiss FinTech sector. It starts with a qualitative description of the political/legal, economic, social, and technological developments relevant for the Swiss FinTech sector and ends with a quantitative ranking of the general conditions of globally leading FinTech centres. The subsequent chapter 4 focuses on analysing the Swiss FinTech sector on a company level. It is based on a proprietary database, consisting of publicly available data and a survey in the FinTech sector, and sheds light on the business models of Swiss FinTech companies and their most pressing challenges. In addition, the relevant developments and an outlook on all of the six FinTech product areas, i.e., *Analytics, Banking Infrastructure, Distributed Ledger Technology, Deposit & Lending, Investment Management,* and *Payment* are summarized. Chapter 5 is dedicated to the cryptocurrency market, which has attracted a lot of attention from the financial industry in 2017. The chapter includes an overview of the so-called «Crypto Valley» ecosystem, a brief analysis of the ICOs conducted by Swiss FinTech companies in 2017, as well as an evaluation of cryptocurrencies from an investor's perspective. A conclusion of the study's findings is given in chapter 6. Chapter 7 presents the factsheets of the 108 Swiss FinTech companies that participated in the study. These factsheets contain information on the companies' business models such as their value propositions, market orientation, and capitalization.

At this point, we would like to thank all parties who have contributed to the third edition of the IFZ FinTech study. A very special thanks goes to our sponsors *Finnova, Gemalto, Inventx, SIX, Swisscom* and *Swiss Bankers Prepaid Services* for their financial and content-related support. We also would like to express our appreciation to all the companies that participated in our survey. Last but not least, our thanks go to all guest authors and our research assistant Nicola Louise Illi for their substantial contribution to this study.

Prof. Dr. Thomas Ankenbrand
Head of the Competence Centre for Investments

Institute of Financial Services Zug IFZ

Prof. Dr. Andreas Dietrich
Head of the Institute

Institute of Financial Services Zug IFZ

Denis Bieri
Research Associate

Institute of Financial Services Zug IFZ

2. Definition & Framework of the FinTech Ecosystem

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

This chapter describes the overall framework of the study. In a first part, the term «FinTech» and its product areas are defined in order to determine the scope of the study. In a second stage, the PEST concept is clarified, based upon which the Swiss FinTech ecosystem is evaluated in chapter 3. Sections three and four focus on the framework of the survey, conducted to analyse the Swiss FinTech companies and to capture their attitudes towards current challenges in the sector.

2.1. Definition of FinTech

Due to the absence of a universally accepted definition of FinTech, the year 2017 has seen multiple attempts to fill this lack of research. Schueffel (2017), for example, defines the term «FinTech» as «a new financial industry that applies technology to improve financial activities» (Schueffel, 2017, p. 45). The Financial Stability Board (FSB) adopts a more specific definition, especially in terms of innovation requirements. The definition was firstly introduced by Carney (2017) and reads as follows: Fintech is a «technologically enabled financial innovation that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services» (FSB, 2017). As these two examples show, a consensus on a universal definition of FinTech has yet to be reached. Nevertheless, both are compatible with the definition of FinTech applied in our last year's study. Since it has proven its value, and in order to allow for comparsion with last year's results, the definition in this year's study remains unchanged:

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

Hence, to qualify as a FinTech under this definition, a company is required to offer finance-oriented solutions with a certain degree of innovation and with a

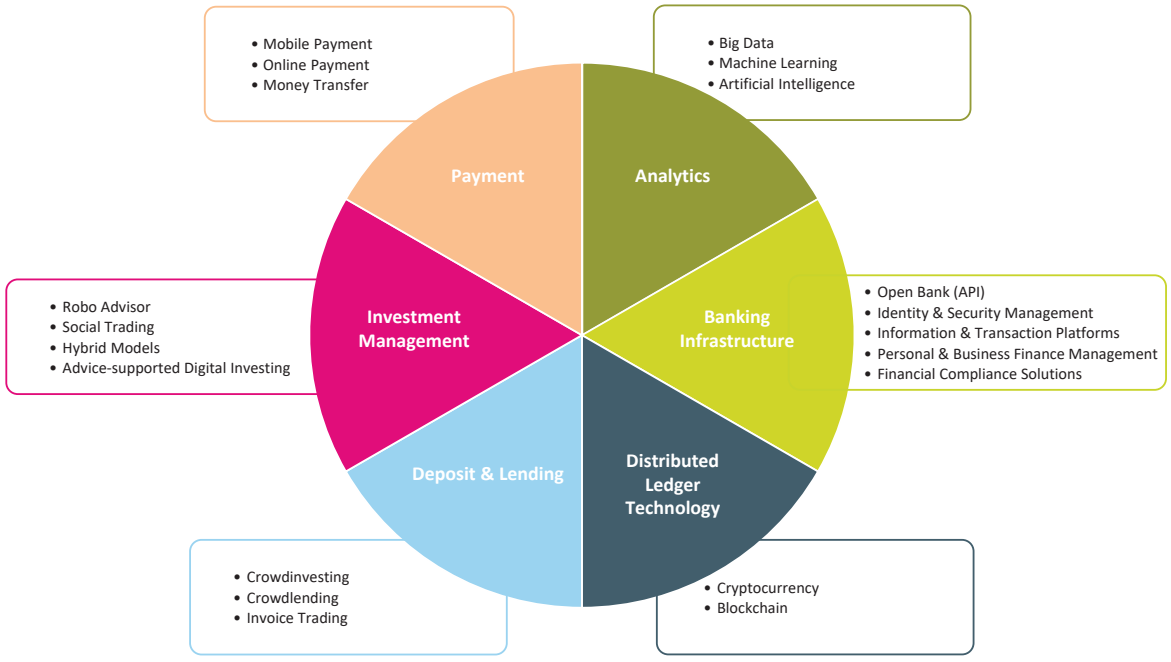


Figure 2.1.: Taxonomy of FinTech Business Models in Switzerland

strategic focus. This study only includes companies which are legally incorporated in Switzerland, independent of their business life cycle. It therefore includes both (incorporated) startups, as well as established companies. Analogous to last year's edition, all companies which are focused on insurance services surpass the scope of this study and are therefore neglected. In addition to the exclusion of the so called «InsurTechs», companies providing innovative technological solutions in the field of real estate («PropTech»), with the exception of real-estate crowdfunding platforms, are also excluded in this year's study. The distinction between FinTech and InsurTech/PropTech is straightforward since their product and services focus on different markets, i.e., the banking, insurance and real estate industry. In addition to the InsurTech and PropTech sector, companies providing applications to streamline regulatory compliance in a broad range of industries («RegTech») have emerged in recent years. This study only includes companies in the field of RegTech, which offer such applications mainly for the financial services industry.

Based on our definition of FinTech and the exclusion of companies in the field of insurance, real estate and non-financial compliance, a taxonomy of the business models of Swiss FinTech companies is illustrated in Figure 2.1. It shows six main FinTech product areas, i.e., «Analytics», «Banking Infrastructure», «Distributed Ledger Technology», «Deposit & Lending», «Investment Management», and «Payments» along with respective sub areas in the attached boxes. The taxonomy was derived by analysing the business models of Swiss FinTech companies and therefore does not claim to be a universal and comprehensive overview of all possible FinTech solutions.

2.2. PEST-Approach

The PEST-approach is a widely applied method for analysing the macroeconomic factors surrounding a specific sector. It derives its name from the first letters of the underlying dimensions, i.e., the political (including legal and regulation), economic, social, and technological dimension. Whereas the economic and technological environment cover factors such as the availability of venture captial and existing supporting programs for FinTech startups, as well as the state and development of the ICT environment, the political/legal and social dimensions include factors such as the regulatory framework and the availabilty of talent and skills. An overview of the FinTech ecosystem and its different dimensions is given in Figure 2.2.

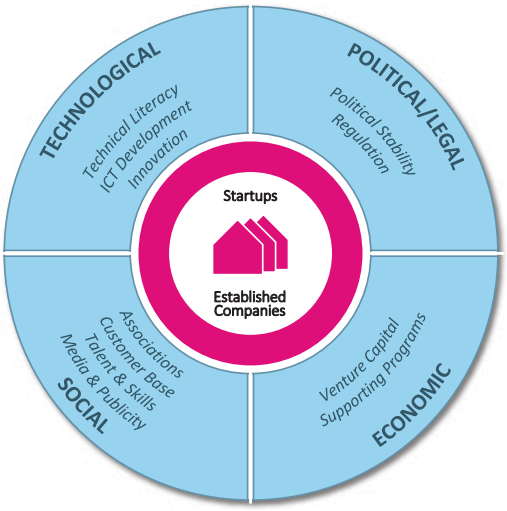


Figure 2.2.: FinTech ecosystem based on the PEST-approach

2.3. Business Model Canvas

The Business Model Canvas by Osterwalder & Pigneur (2010) is an established strategic management tool for developing new or decomposing existing business models. The concept distinguishes between nine building blocks, which constitute the initial parts of any business. Eight of these building blocks, i.e., «Key Partners», «Key Activities», «Key Resources», «Value Proposition», «Customer Relationships», «Channels», «Customer Segments», and «Revenue Streams», coloured dark blue and framed with red dashed lines in Figure 2.3, serve as a framework for our database of the Swiss FinTech sector and of the company factsheets in chapter 7. The building block «Cost Structure», coloured light grey and framed with a solid blue line in Figure 2.3, is neglected in this study for reasons of confidentiality and high similarity to the building block «Key Activities». The database, based on which the empirical analysis of the Swiss FinTech sector is

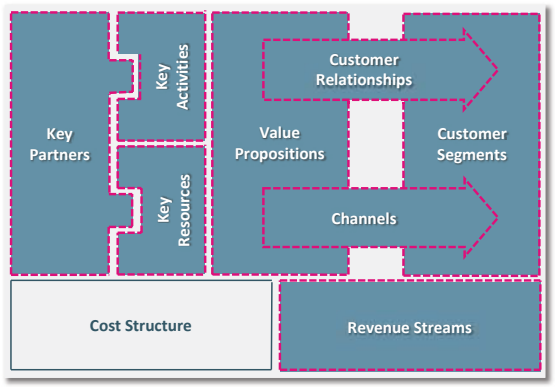


Figure 2.3.: Business Model Canvas (Osterwalder & Pigneur, 2010)

conducted, was constructed by gathering publicly available information on all companies that qualify under the definition in section 2.1. Every in-scope company was then asked to correct inaccurate information and to provide missing entries concerning its business model. The eight relevant building blocks of the Business Model Canvas are explained in the next segment. Further information on the structure of the database can be found in Appendix A.

Key Partners

Key partners are the most important relationships a company needs in order to successfully deliver its value proposition. They mostly focus on areas in which the company itself has a lack of resources or know-how. In the field of FinTech, many FinTech companies partner up with financial institutions in order to benefit from their established customer base and their regulatory status. The factsheets of the in-scope companies include the key partners in order to detect important partners in the FinTech sector.

Key Resources

The building block «Key Resources» comprises the most important assets of a company required to operate its key activities (see next segment) and ultimately, to successfully realize its business model. The database distinguishes between human capital, measured in full-time equivalents, and financial resources, measured in the total amount of funds raised.

Key Activities

Key activities refer to the tasks a company is currently focussing on in order to execute its value proposition. They typically depend on the stage of the business life cycle. Whereas FinTech startups often focus on developing their technological solution and finding first clients, established companies are increasingly active in operating their business. The factsheets distinguish between the key activities «Programming & Engineering», «Marketing/Finding Clients» and «Operative Business/Serving Clients». In particular, a company can either focus on setting up its website, platform, or mobile application («Programming & Engineering»), on marketing its solution in order to establish or extend the customer base («Marketing/Finding Clients»), or on running its daily business and serving the already established customer base («Operative Business/Serving Clients»). Note that these activities may not necessarily be mutually exclusive.

Value Proposition

The value proposition is the core of any business model. It encompasses the characteristics of a company's offering intended to differentiate itself from the competition and to satisfy the customer's needs. In FinTech, this differentiation is often achieved by applying technology-driven solutions to established services, products or processes. In the database and factsheet, the value proposition is included in the company description.

Customer Relationships / Channels

Since the building blocks «Customer Relationships» and «Channels» both focus on the way a company communicates and distributes its offering to their customers, they are treated as a single block in this study. Basically, the interaction between the company and its customer segments can be fully digital, fully personal, or a combination of both, i.e, a hybrid approach. A purely digital approach refers to a communication strategy in which the client does not need to personally communicate with the company to use its services or products since communication is realized via the company's platform, website, app, or other digital communication tools with high scalabilty. On the contrary, when a company pursues a personal only communication strategy, the company's service requires personal communication and does not include online tools. The hybrid strategy implies that a part of the company's services or products are conveyed

digitally, whereas other aspects require personal communication via e-mail, telephone, face-to-face, or other channels.

Customer Segments

Customer segments summarize a group of customers which a company is aiming to sell its products and services to. The database distinguishes between the type of target customers and their geographical location. In the database, a distinction is made between private individuals (B2C) and businesses (B2B) who are either located in Switzerland or abroad.

Revenue Models

The building block «Revenue Model» refers to the models of how a company generates income from its business activities. FinTech companies can earn money through the same approaches typically applied by banks, such as interest, commission or trading, by approaches from the software industry, such as licensing fees or Software-as-a-Service (SaaS), or by rather new models like selling advertising space or (analysed) data. Since many FinTech companies offer a broad range of products and services, the revenue models are not mutually exclusive.

2.4. Sentiment Analysis of FinTech Companies

A new addition to this year's study is a sentiment questionnaire, which was created in order to determine the perceived, most pressing issues faced by the Swiss FinTech sector. The questionnaire is based on the *Survey on the Access to Finance of Enterprises in the Euro area*, conducted by the *European Central Bank (ECB)* in 2017 among the countries of the European Union, and includes the eight challenges depicted in Figure 2.4. The in-scope companies were asked to evaluate each challenge on a scale from 1 (not pressing) to 10 (extremely pressing). Since the *Institute of Financial Services Zug IFZ* also conducted a similar survey among Swiss small and medium enterprises (SME) in 2017, consisting of all challenges depicted in Figure 2.4 except for the challenge referring to the expansion to international markets, conclusions from the comparison between the Swiss FinTech sector and Swiss SMEs can be drawn.

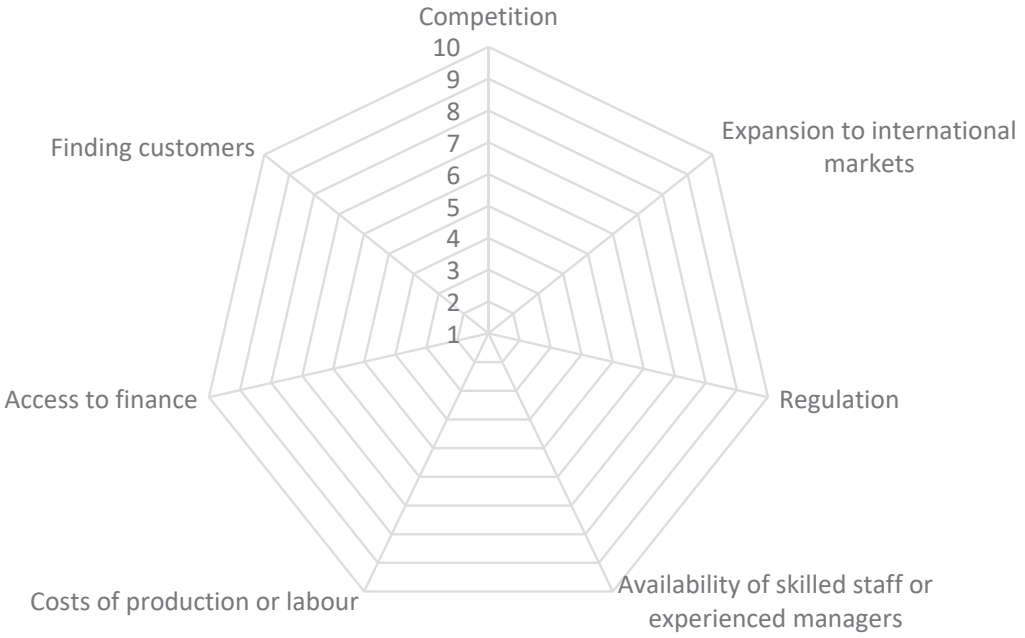


Figure 2.4.: Challenges faced by the Swiss FinTech sector

3. The Swiss FinTech Environment

3.1. Political & Legal Environment

By Dr. Benedikt Maurenbrecher, Daniel Haeberli & Dr. Urs Meier, Attorneys-at-Law, Homburger AG

FinTech companies all face a similar challenge: They need to analyse their business model against the applicable regulatory framework. In particular, an analysis of the financial market regulation is necessary in order to understand what activities can be undertaken without becoming a regulated entity, or, conversely whether regulatory authorisations or licenses are required.

The first part of this chapter discusses Switzerland's new FinTech specific regulation, which is partially in force since August 2017 (section 3.1.1). The second part provides a high-level overview of the current Swiss[1] regulatory[2] framework (section 3.1.2).

3.1.1. FinTech Regulation

In 2016, the Swiss Federal Council announced its plans to reduce «barriers to market entry» for FinTech companies[3]. On August 1, 2017, two of the three planned «pillars» of the new Swiss FinTech regulation entered into force: the innovation area («sandbox» exemption) (3.1.1.1) and the revised settlement account exemption (3.1.1.2). The third «pillar», the so-called FinTech license or «banking license light» (3.1.1.3), is still to be implemented.

3.1.1.1. New «Sandbox» Exemption

The Swiss «sandbox» exemption created an innovation space that allows to engage in activities, which under the former regulations would have triggered bank licensing requirements. Generally, only licensed banks are allowed to accept deposits from the public on a commercial basis *(gewerbsmässig)* and any person or entity continuously accepting more than 20 deposits from the public or publicly advertising to accept deposits is deemed to be acting on a commercial basis (see 3.1.2.1). Under the «sandbox» exemption, companies accepting deposits from the public are not considered to be acting on a commercial basis, provided

(i) the deposits accepted do not exceed the threshold of CHF 1 million,
(ii) the deposits accepted are neither invested nor interest-bearing, 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.

The threshold of CHF 1 million needs to be monitored closely. If it is exceeded, the company must notify FINMA within 10 days and must file a bank license application within 30 days. Provided the license application is filed within this timeframe, the company does not need to reduce or return the funds exceeding the threshold of CHF 1 million, i.e., it may continue its business operations until FINMA either grants or refuses to grant the bank license. However, during this interim period between the filing of the bank license application and FINMA's decision, 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.

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 the lack of FINMA supervision and the lack of deposit insurance protection for example in the company's 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 confirm expressly that they took note of the information. Therefore, it is advisable to use for example a pop-up window, which appears once a (potential) customer uses the website or application. This pop-up window should solely state that no FINMA supervision exists and that de-

[1] Regulatory frameworks of other jurisdictions are not discussed. Of course, activities in cross – border contexts and in particular internet/blockchain based activities, which generally have a global reach and often involve various jurisdictions, need to comply with applicable foreign laws and regulations as well.
[2] This contribution is focused on *regulatory* aspects. Of course there are other legal aspects which might be relevant for FinTech related activities such as questions relating to tax law, contract law, intellectual property or data protection.
[3] See Federal Department of Finance FDF (2016).

posits made are not protected by the Swiss deposit insurance protection. Other information (e.g. data protection/privacy waivers) should not be included in this pop-up window. The customer should then confirm that he read and understood the terms. Only then must that customer be allowed to deposit any funds or enter into any liability vis-à-vis the company.

The «sandbox» exemption is designed to create a safe space, where in particular FinTech companies shall be able to test their business ideas and provide certain financial services without becoming a regulated bank. 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 3.1.2.6) and may therefore nonetheless need to adhere to a series of regulations. Hence, the innovation area created by the «sandbox» exemption should not be misunderstood as a «regulation free» area.

3.1.1.2. New Settlement Accounts Exemption

Funds held in customer accounts of securities dealers, dealers of precious metals, asset 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 processed within a relatively short time. Under the former regulation, such funds needed to be processed within 7 days. The amended «settlement accounts exemption» now allows for the funds to be processed within up to 60 days. Hence, the exemption is now significantly less strict, thus facilitating the operation of funding platforms and allowing certain other business models which before were not possible without a banking license.

3.1.1.3. FinTech License

The third «pillar» of the Swiss FinTech regulation, the FinTech license («banking license light»), has not yet been implemented and will likely not enter into force before 2019. This license aims in particular at companies that accept deposits from the public but do not engage in activities such as for example interest difference transactions *(Zinsdifferenzgeschäfte)*[4]. Since such companies are not active in the «traditional» banking business, they shall be subject to less strict regulations.

This license will likely facilitate the implementation of various business models. To what extent more lenient standards will be enacted is, however, still being debated. It is expected that lower standards could in particular be implemented with regard to (i) minimum capital requirements, (ii) equity capital/liquidity requirements and (iii) accounting/audit requirements.

Initial Coin Offerings

The initial coin offering («ICO»)[5] market has grown rapidly and in 2017 regulators worldwide started to have a closer look at this phenomenon. For example, the Monetary Authority of Singapore published a «Guide to Digital Token Offerings» on November 14, 2017[6]. Furthermore, on December 11, 2017 the SEC Chairman released a much-noticed public statement[7] regarding ICOs, highlighting potentially problematic aspects from a U.S. securities law perspective.

In Switzerland, FINMA published a brief guidance regarding the regulatory treatment of ICOs on September 29, 2017[8], defining ICOs as «a digital form of raising funds from the public», which take place exclusively «using distributed ledger or blockchain technology». According to FINMA, ICOs usually involve the following basic elements: «financial backers» transfer a certain amount of virtual currency to a blockchain registered address[9], which is supplied by the «ICO organizers» and in return receive «blockchain-based coins or other tokens connected with a specific project or a company run by the ICO organizers».

[4] They do not borrow money and extend loans in their own name and for their own account in order to earn the spread between interest paid on the money borrowed and interest earned on the money lent.
[5] Other terms used to describe the same process are for example token sale, initial token offering or token generating event.
[6] See Monetary Authority of Singapore MAS (2017).
[7] See U.S. Securities and Exchange Commission SEC (2017a) and SEC's investigative report of July 25, 2017, concluding that DAO tokens were securities (U.S. Securities and Exchange Commission SEC (2017b)).
[8] See FINMA (2017).
[9] It should be noted that «financial backers» may also transfer regular (fiat) currency (e.g. CHF, USD, EUR) using for example credit cards, debit cards or bank wire transfers.

ICOs raise a series of legal questions concerning amongst others tax, contract law and in particular financial market regulation. In order to assess whether a planned ICO will trigger authorisation or licensing requirements, the structure and characteristics of the coins/tokens to be issued and in particular the rights attached to these coins/tokens need to be defined precisely.

From a Swiss regulatory perspective[10] in particular the following aspects could be relevant:

Deposits
Under Swiss law, only licensed banks are allowed to accept deposits from the public on a professional basis or to recommend themselves publicly for doing so. Generally, all *liabilities* via-à-vis clients qualify as deposits. Consequently, if a coin represents a liability (e.g. repayment obligation) of the issuer vis-à-vis a «financial backer» or if funds of «financial backers» are temporarily held by the issuer, bank licensing requirements may be triggered unless an exemption (e.g. the «sandbox» exemption or the settlement account exemption) applies (see 3.1.1.1, 3.1.1.2 and 3.1.2.1).

Securities Dealing
Depending on their structure and characteristics, the coins issued may qualify as securities (see 3.1.2.2) and therefore activities relating to coins issued in the course of such ICO may require a securities dealer license. For example, someone who, in a professional capacity, issues coins linked to the performance of a share or a project may qualify as a securities dealer (see 3.1.2.4).

Secondary Markets
Often, issuers aim at creating a secondary market, where the coins can be traded after the ICO. Trading venues, which enable such secondary trading may be subject to licensing requirements. Even a relatively simple platform that only allows to exchange bids and offers regarding such coins could qualify as a so-called organised trading facility, if the relevant coins either qualify as securities (see 3.1.2.2) or as other financial instruments[11].

Anti-money laundering
ICOs often involve accepting, holding on deposit or transferring assets, which belong to third parties or assisting in the investment or transfer of such assets. Persons engaging in such activities qualify as financial intermediaries and are therefore required to comply with anti-money laundering regulations (see 3.1.2.6). For example, accepting virtual currencies from «financial backers» and subsequently transferring these values/assets to an «ICO organiser» or any other third party may constitute a service related to payment transactions and hence qualify as financial intermediation.

Collective investments
If an ICO serves to raise funds for the purpose of collective investment, and if the funds raised are subsequently managed for the account of the «financial backers», collective investment schemes regulation may apply (see 3.1.2.8). A coin may for example represent a unit in a (Swiss or foreign) collective investment scheme or the «ICO organiser» itself may qualify as a collective investment scheme.

3.1.2. Swiss Regulatory Framework

The Financial Market Supervisory Authority FINMA is Switzerland's primary regulator supervising the financial market and its participants. FINMA's regulatory powers are based on the Federal Act on the Swiss Financial Market Supervisory Authority («FINMASA»).

The Swiss regulatory framework relevant for FinTech companies is in particular set out in the following federal acts and their implementing regulation:

- Banking Act («BA»): regulating banking activities as well as the supervision of banks
- Stock Exchange Act («SESTA»): governing the supervision of securities dealers
- Financial Market Infrastructure Act («FMIA»): governing the organization 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

[10] For an overview, see, for example, Müller & Vignon (2017).
[11] The term «financial instruments» is already being used in the FMIA, however, there is no statutory definition yet. The FinSA (see box in 3.1.2) will introduce a definition, which will likely cover equity securities, debt securities, units in collective investment schemes, structured products, derivatives, bonds and deposits.

– Anti-Money Laundering Act («AMLA»): regulating the prevention of money laundering and terrorist financing and the due diligence in financial relationships and transactions
– Consumer Credit Act («CCA»): governing consumer credits, i.e., loans granted on a professional basis to individuals for purposes other than business or commercial activities
– Collective Investment Schemes Act («CISA»): governing all collective investment schemes (irrespective of their legal status), the management of such schemes, the distribution of units in collective investment schemes as well as the safekeeping and segregation of assets held in them

Financial Services Act/Financial Institutions Act
In 2015, the Swiss Federal Council published the drafts of both the Financial Services Act («FinSA») and the Financial Institutions Act («FinIA»). The FinSA will introduce a new general regulatory regime governing the provision of financial services in Switzerland and the provision of such services to clients in Switzerland. The FinIA intends to implement a unified approach towards licensing and prudential supervision of financial services providers other than banks and insurance companies. Both laws are currently still in parliamentary deliberations but will most likely be approved by mid-2018. However, neither the FinSA nor the FinIA is expected to enter into force before 2019.

The following sub-chapters provide an overview of key elements of the Swiss regulatory framework applicable to banks (3.1.2.1), trading venues (3.1.2.2), payment systems (3.1.2.3), securities dealers (3.1.2.4), asset management (3.1.2.5), anti-money laundering (3.1.2.6), consumer credits (3.1.2.7) and collective investment schemes (3.1.2.8).

3.1.2.1. Banks

Banks require a license from FINMA[12] and are subject to supervision as well as strict and very detailed regulations.

Only licensed banks are allowed to accept deposits from the public on a professional basis or to recommend themselves publicly for doing so[13]. Also, only licensed banks are allowed to advertise such services in any form[14] and to use or refer to the term «bank» or «banker» in their company name, their company purpose or in advertisement for their company[15]. Any unauthorised acceptance of deposits or advertising of such services in any form may be subject to criminal punishment[16].

Generally, companies are considered to be banks amongst others[17] if they

(i) are mainly active in the financial sector; and
(ii) accept deposits from the public on a professional basis or recommend themselves publicly for this purpose[18].

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 asset management for itself or for third parties[19]. This requirement to be mainly active in the financial sector aims to exclude companies from the scope of banking regulation that are primarily active in the commercial and industrial sector. Such companies shall be allowed to engage in ancillary financing activities (e.g. retail financing, investment and management of their own assets or leasing transactions) without becoming subject to banking regulations.

[12] Article 1 and article 3 BA.
[13] Article 1(2) BA. Article 2 and 4(1) Banking Ordinance («BO»).
[14] Article 7 BO.
[15] Article 1(4) BA.
[16] Article 46 and 49 BA. Article 44 FINMASA.
[17] Companies are considered to be banks too 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 2(b) BO.
[18] Article 2(a) BO.
[19] Article 4(1)(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(1)(b) BO).

Unless an exemption applies (e.g. the «sandbox» exemption[20]; see 3.1.1.1) a company is deemed to accept deposits from the public *on a professional basis* if it (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)[21].

Generally all *liabilities* via-à-vis clients qualify as deposits[22]. There are, however, a number of exemptions. Amongst others the following liabilities are exempt, i.e., are not considered deposits[23]:

- 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 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 traders, asset 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 processed 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 or other debt instruments that are standardised and issued en *masse* if a prospectus complying with the prospectus requirements set forth in article 1156 of the Swiss Code of Obligations («CO») exists

Prospectus Requirements and White Papers

In Switzerland, public offerings of debt and equity securities are subject to certain disclosure requirements and the issuer must prepare a prospectus in compliance with the relevant provisions of the Swiss Code of Obligations[24]. The prospectus must cover specific items, for example information on the amount and structure of the issuer's share capital, the issuer's financial statements or the terms of the securities to be issued. Currently, such prospectus is not subject to review or approval by any Swiss regulator. This will, however, change under the FinSA (see box in 3.1.2).

Prior to an ICO (see box in 3.1.1.3), the project or company to be funded is generally described in detail in a so-called white paper. Most white papers contain a disclaimer stating that nothing in the white paper shall be deemed to constitute a prospectus of any sort.

Since coins/tokens are generally offered publicly in the course of an ICO (either to an indefinite number of potential «financial backers» or by means of public advertisement, e.g. in mass-mailings or on web pages/blogs etc. with unrestricted access) the Swiss prospectus requirements apply, if the coins represent a debt security (e.g. a bond) or an equity security (e.g. new shares). In such cases, a white paper would need to cover all relevant disclosure items and furthermore, any person responsible for drafting or contributing to the white paper could incur liability if (i) false or misleading information is contained in the white paper or (ii) if the white paper does not fulfil the legal disclosure requirements.

Furthermore, the following deposits are not considered to be deposits *from the public*[25]*:*

- 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

[20] Article 6(2) BO et seq.
[21] Article 6(1) BO.
[22] Article 5(1) BO. FINMA-Circular 2008/3 para. 10.
[23] Article 5(3) BO.
[24] See article 652a CO and article 1156 CO.
[25] Article 5(2) BO.

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). Therefore, depending on the specific features of a business model, the FinTech company or its clients may be deemed to take deposits from the public and may thereby become subject to banking regulation.

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. This is for example the case if the FinTech company does not settle any transactions via customer accounts or if funds held in customer accounts are processed within up to 60 days (see 3.1.1.2).
- If deposits are involved the FinTech company may stay within the ambit of the «sandbox» exemption (see 3.1.1.1) or it may avoid accepting more than 20 deposits from the public and refrain from recommending itself publicly for this purpose[26].
- FinTech companies may for example 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[27].
- FinTech companies may also decide to issue bonds or other debt instruments and to prepare a prospectus in compliance article 1156 CO in order to avoid deposit taking.
- Should the third «pillar» of the Swiss FinTech regulation (see 3.1.1.3) enter into force as planned, companies may probably obtain the newly created FinTech license already in 2019.

3.1.2.2. Trading Venues

Trading venues, i.e., stock exchanges and multilateral trading facilities are regulated financial market infrastructures[28]. They require a license from FINMA[29] 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[30].

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*[31].

The main 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.

Securities

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)*, derivatives[32] or intermediated securities *(Bucheffekten)*[33]. 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 standardized and suitable for mass trading. An instrument is deemed to be standardized 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

[26] 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.
[27] Article 5(3)(c) BO. See also the FINMA fact sheet «Crowdfunding».
[28] Article 2(a)(1) and 2(a)(2) FMIA.
[29] Article 4(1) FMIA.
[30] Article 26(b) FMIA.
[31] Article 26(c) FMIA.
[32] Derivatives are «financial contracts whose value depends on one or several underlying assets and which are not cash transactions». See article 2(c) FMIA and article 2(2) to 2(4) of the Financial Market Infrastructure Ordinance («FMIO»).
[33] Article 2(b) FMIA.

than 20 investors and has not been specifically created for a particular counterparty/investor[34]. It is important to keep in mind that not only listed but also unlisted instruments may qualify as securities.

Even if no securities are traded, an institution or trading platform can still qualify as a so-called organised trading facility. According to the statutory definition, organised trading facilities[35] 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[36]
- bilateral trading in securities or other financial instruments whose purpose is the exchange of bids

FinTech companies providing a platform that allows for trading of shares, standardised debt instruments or other financial instruments, including, possibly, coins or tokens, might qualify as regulated trading venues. Should a particular business model include such activities the main questions for FinTech companies will likely be whether they qualify as a multilateral trading facility (if securities are involved) or as an organised trading facility, and hence require a license as a bank, securities dealer or trading venue[37].

Virtual Currencies
Virtual currencies can be defined as digital representations of value that can be digitally traded and function as a medium of exchange, a unit of account and/or a store of value, but do not have legal tender status[38].

Today a broad range of virtual currencies or «cryptocurrencies»[39] exists and the underlying coins/tokens are based on a wide variety of platforms and share only a few, if any, common characteristics. However, a basic distinction can be made between «native» coins/tokens and «non-native» coins/tokens[40].

Virtual currencies like Bitcoin can be classified as «native currency tokens». Unlike «non-native» tokens, they neither grant any relative or absolute rights nor represent an underlying asset. Instead, «native currency tokens» solely serve as medium of exchange, unit of account and stores of value[41].

With regard to «native currency tokens» like Bitcoin is must be noted that they do not qualify as securities, since they are neither certificated securities nor uncertificated securities or derivatives (see 3.1.2.2).

Whether or under what circumstances «native currency tokens» (or other digital coins/tokens in general) may qualify as an object *(Sache)* is unclear and consequently, it is also unclear whether users/buyers of virtual currencies may qualify as «owners» from a Swiss property law perspective.

The question whether virtual currencies may qualify as objects or not has an impact amongst others on how ownership regarding such assets may be transferred[42] and how such assets are treated in bankruptcy. The latter may for example become relevant if a user/buyer mandates a service provider to «store» Bitcoins[43]. Whether these «stored» assets could be segregated in case of insolvency of the service provider is untested. However, users/buyers of virtual currencies should generally enjoy

[34] See article (2)1 FMIA.
[35] Article 42 FMIA.
[36] 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.
[37] Article 43(1) FMIA et seq.
[38] See the definition used by the Financial Action Task Force (FATF) in the FATF Report on Virtual Currencies of June 2014. See also the similar definitions used by the Swiss Federal Council in its report on virtual currencies of June 25, 2014 and by FINMA in its report regarding the revised anti-money laundering ordinance of February 11, 2015.
[39] See for an overview of the various cryptocurrencies for example https://coinmarketcap.com/.
[40] See for a possible classification of different types of coins / tokens in particular Müller et al. (2017) or Hess & Spielmann (2017).
[41] See Müller et al. (2017).
[42] See for an overview Hess & Lienhard (2017).
[43] See for an overview Maurenbrecher & Meier (2017).

a higher level of protection if they continue to keep the means to dispose of «their» units of the stored virtual currency. Also, at least indirectly, a higher level of protection in bankruptcy scenarios should generally apply if the service provider storing the virtual currency for users/buyers is a licensed Swiss bank.

3.1.2.3. Payment Systems

Payment systems are regulated financial market infrastructures[44]. A payment system is «an entity that clears and settles payment obligations based on uniform rules and procedures»[45]. Specific duties of payment systems (e.g. regarding settlement and liquidity) have been set out in the implementing ordinance of the FMIA[46].

A payment system requires a license from FINMA only[47]

(i) if this is necessary for the proper functioning of the financial market or the protection of financial market participants; and
(ii) 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»[48] 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[49]:

(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 deposits and hence no banking license is required.

3.1.2.4. Securities Dealers

Securities dealers require a license from FINMA[50] and are subject to supervision as well as a series of specific regulations.

The law provides for five categories of securities dealers: own-account dealers, issuing houses, derivatives firms, market makers, and client dealers[51]. Depending on the relevant business model and activities, FinTech companies might, in particular, qualify as own-account dealers or issuing houses.

– Own-account dealers are securities dealers (generally perceived as dealers) that, in a professional capacity, trade in securities for their own account on a short-term basis, with an annual turnover of at least CHF 5 billion.
– Derivatives firms are securities dealers that, in a professional capacity, create derivatives and offer them to the public on the primary market for their own account or for the account of third parties.
– Issuing houses are securities dealers that, in a professional capacity, underwrite securities issued by third parties on a firm basis or against commission and offer them to the public on the primary market.

It is questionable whether there are currently any examples of FinTech companies/business models that would meet these quantitative and qualitative criteria and would therefore require a securities dealers' license. However, in particular FinTech companies engaging in trading activities relating to coins or tokens, which could qualify as securities should make sure that they obtain a securities dealer license prior to engaging in any regulated securities dealing or a trad-

[44] Article 2(a)(6) FMIA.
[45] Article 81 FMIA.
[46] Article 82 FMIA i.c.w. article 66 et seq. FMIO.
[47] Article 4(2) FMIA.
[48] Article 5(3)(e) BO.
[49] FINMA-circular 2008/3, para. 18[bis].
[50] Article 10 SESTA.
[51] Article 3 SESTO.
[52] See the definition of derivatives in footnote 32 above.

ing venue license prior to operating regulated trading facilities (see 3.1.2.2)[53].

3.1.2.5. Asset Management

Under the current regulatory framework activities relating to asset management and investment advice do not generally trigger prudential supervision[54]. However, if the assets managed qualify as collective investment schemes or belong to a pension fund, specific supervision and licensing requirements exist. Also, asset managers will become subject to supervision and a stricter set of regulations once the FinSA and the FinIA enter into force (see box in 3.1.2).

3.1.2.6. Anti-Money Laundering

Ensuring compliance with anti-money laundering regulation is probably[55] one of the key regulatory challenges for FinTech companies, both organizationally and financially.

Swiss anti-money laundering regulation is based on three key elements:

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

Article 305bis 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 suitable to frustrate 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, securities dealers, insurance companies or central counterparties[56].
- 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»[57]. According to a non-exclusive list this definition covers in particular persons who: (i) carry out credit transactions, (ii) provide services related to payment transactions, (iii) trade for their own account or for the account of third parties in bank notes or cash, money market instruments, currency, precious metals, commodities and securities as well as their derivatives, (iv) manage assets, (v) make investments as investment advisers or (vi) hold securities on deposit or manage securities[58]. Before engaging in business activities, such financial intermediaries must either join a self-regulatory organisation recognised by FINMA or request a license from FINMA as a directly supervised financial intermediary[59].

Many FinTech related activities are subject to anti-money laundering regulation. For example, if a business model involves holding or depositing assets on behalf of third parties, e.g. clients, anti-money laundering regulations usually apply.

[53] In the future, it will have to be seen to what extent holders of a FinTech license (see 3.1.1.3) will be able to be recognised as a trading venue.
[54] FINMA also abolished the written client identification requirement, which existed with regard to certain contracts and was contained in the FINMA circular 2009/01 regarding «Guidelines on Asset Management».
[55] The Swiss government concluded, however, that anti-money laundering requirements are not «fintech-specific barriers to market entry». See the «Background Documentation» of the Swiss Federal Department of Finance dated November 2, 2016, p. 2.
[56] Article 2(2) AMLA.
[57] Article 2(3) AMLA.
[58] 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.
[59] Article 14(1) AMLA.

FinTech companies may in essence take one of the three following approaches in order to handle anti-money laundering regulation:

(i) they may refrain from financial intermediation activities in the first place in order to avoid being subject to anti-money laundering regulation
(ii) they may cooperate with a regulated financial intermediary, such as a bank, as far as financial intermediation activities are required
(iii) they may decide to comply with applicable anti-money laundering regulation themselves and either join a self-regulatory organisation or request a license from FINMA as a directly supervised financial intermediary

Apart from a few exceptions[60] all *professional* financial intermediaries are subject to the AMLA. A financial intermediary is generally deemed to engage in financial intermediation on a professional basis[61]:

– 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 AMLA[62] and implementing ordinances and regulations[63]. 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 Report Office

Under certain circumstances and provided that specific requirements are met reduced duties may apply. For FinTech companies the following exemptions may be relevant:

– Financial intermediaries do not need to comply with various duties if a business relationship only involves assets of low value and if there is no suspicion of money laundering or terrorist financing[64].
– Financial intermediaries do only need to comply with reduced duties in the context of specific small amount transactions involving cashless payment methods[65]. For example cashless payments of goods and services amounting to CHF 5,000 a month and/or CHF 25,000 a year to traders in Switzerland may be exempt from formal client identification duties[66].

3.1.2.7. Consumer Credits

The CCA applies to consumer credits, i.e., loans granted to individuals on a professional basis for purposes other than business or commercial activities.

If a FinTech company grants loans to individuals for purposes other than business or commercial activities, the CCA could be applicable and the special regulations relating to consumer credits would then need to be taken into account. The following duties/rights under the CCA may be of particular importance:

[60] Article 2(4) AMLA.
[61] Article 7(1) AMLO.
[62] See article 3 et seq. AMLA.
[63] 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.
[64] Article 7a AMLA.
[65] Article 11 Anti-Money Laundering Ordinance-FINMA («AMLO-FINMA»).
[66] Article 11(1)(b) AMLO-FINMA.

– duty to obtain a license in order to be allowed to grant or broker loans to consumers on a professional basis[67]
– restrictions relating to the advertisement for consumer credits[68]
– requirements regarding the form and content of consumer credit agreements[69]
– duty to not exceed the maximum effective annual interest rate set by the Swiss Federal Council[70]
– duty to check the consumer's creditworthiness[71] as well as the right to access the information made available by the Credit Information Office *(Informationsstelle für Konsumkredit)*[72]

3.1.2.8. 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»[73].

Anyone who manages or acts as custodian for collective investment schemes or distributes schemes of this kind to non-qualified investors or who distributes foreign collective investment schemes to qualified investors must be authorized by FINMA to do so[74].

Generally, collective investment schemes regulation must always be considered whenever a particular business model entails the pooling of funds or risks in connection with an investment.

An entity qualifies as a collective investment scheme if it meets the following criteria: (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. Financial products that meet these criteria will be considered a collective investment scheme.

The marketing of units in collective investment schemes is subject to a series of regulations including approval and licensing requirements. Marketing of units in collective investment schemes is defined very broadly. It includes all activities that directly or indirectly aim at offering or selling shares or other units in a particular collective investment scheme or particular investment schemes to investors. This includes the use of any kind of advertising material, such as print and electronic media, information sheets, websites, emails, cold calling, road shows, investors meetings or websites.

3.2. Economic Environment

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

The economic environment constitutes the second pillar of the Swiss FinTech ecosystem. Venture capital investments and supporting programs, such as accelerators, incubators and awards, account for important factors hereof and are therefore addressed in this section in detail. Note that section 3.2.1 explicitly focuses on venture capital investment. Funds raised by initial coin offerings (ICOs) are not classified as traditional venture capital for reasons of different structuring.

3.2.1. Venture Capital in FinTech

The year 2017 has seen considerable progresses in the venture capital environment of FinTech startups. Examples hereof are the foundation of two new Swiss-based venture capital funds. In June, dozens of representatives of Swiss banks, insurances and foundations signed a declaration to found the *Swiss Entrepreneurs Foundation*, a fund with an overall target budget of CHF 500 million, dedicated to providing the Swiss start-up scene with venture capital and to foster the domestic entrepreneurial culture (Fintechnews, online). The launch of the fund was largely driven by Johann Schneider-Ammann, the Swiss minister of economic affairs, education and research. The second venture fund was launched by *SIX*. In November, the Swiss

[67] Article 39 CCA.
[68] Article 36 CCA et seq.
[69] Article 9 CCA et seq.
[70] Article 14 CCA.
[71] Article 22 CCA and article 28 CCA et seq.
[72] Article 23 CCA et seq.
[73] Article 7 CISA.
[74] Article 13(1) CISA.

financial infrastructure provider announced to establish a CHF 50 million venture fund for the promotion of innovation in the Swiss financial industry.

2017 has been a record year for venture capital investments in Switzerland. According to the *Swiss Venture Capital Report 2018* by *Startupticker.ch*, a total of CHF 938 million was invested into Swiss startups in 175 financing rounds. Especially the Swiss FinTech sector has witnessed a large increase in venture capital investment rounds in the last year, as shown in our proprietary database. Figure 3.1 (left chart) reveals that in 2017, a total of 68 public venture capital funding rounds took place in the Swiss FinTech sector, compared to 29 in 2016 and 25 in 2015. This study distinguishes between three different types of venture capital funding rounds, i.e., Seed funding, Series A funding, and Series B funding[75], whose characteristics are listed in Table 3.1. Figure 3.1 additionally includes ICOs which are not classified as traditional venture capital in the following[76].

Of the total of 68 financing rounds which took place in 2017, 20 are classified as Seed, 26 as Series A and 22 as Series B financing. The share of Series A and B funding of the total amount of founding rounds has

Founding Round	Typical Investors	Financing Purpose
Seed	– Founders – Family – Friends	– Covering first operational expenses (market and product research, prototyping, etc.) – Attracting Venture Capitalists
Series A	– Venture Capitalists – Angel Investors	– Hiring experienced talent – Optimizing products and services – Building a customer base
Series B	– Venture Capitalists – Private Equity Investors	– Hiring further talent (sales, advertising, tech, support, etc.) – Expanding market reach

Table 3.1: Types of funding rounds (Delventhal, 2017)

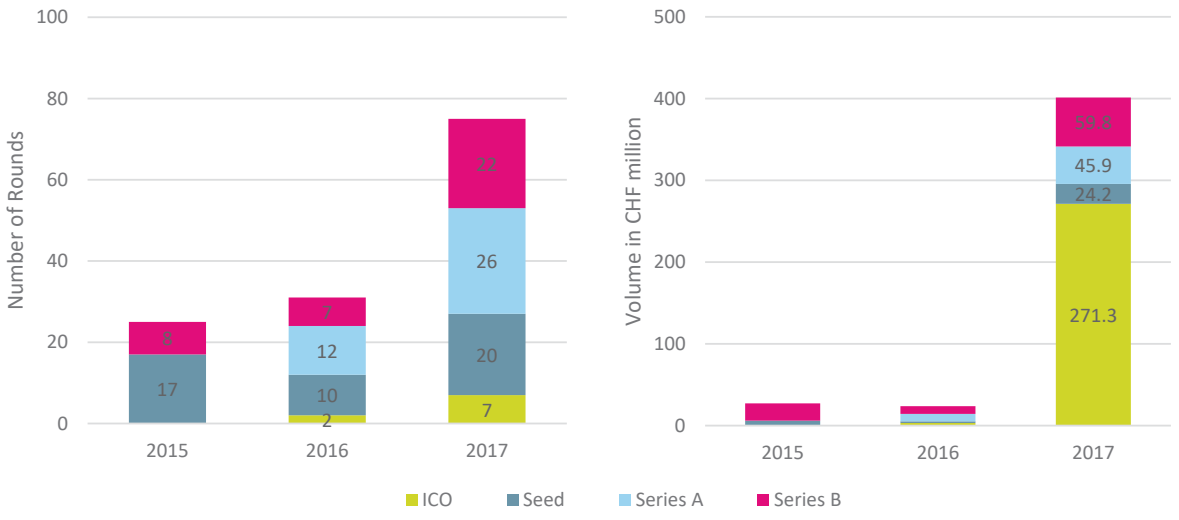


Figure 3.1.: Venture capital investments and ICO volume in the Swiss FinTech sector[77]

[75] Note that Series B also includes later stage funding rounds in this study.
[76] For more information on ICOs see section 5.2.
[77] The US Dollar ICO volume has been converted into Swiss Francs at a rate of 0.9849.

increased continuously over the past two years. This development points towards an increasing maturity of the FinTech sector, since companies at an advanced state in the business life cycle account for an increasing share of the total number of financing rounds. This is underlined by the total volume raised by the different financing types, shown in Figure 3.1 (right chart). In 2017, the Swiss FinTech sector raised a total of CHF 129.9 million in venture capital, more than a six-fold rise in comparison to the year 2016. With CHF 59.8 million, Series B rounds account for little less than half of the total venture capital invested. But Seed and Series A investment volumes have also surged in 2017, amounting to CHF 24.2 million and CHF 45.9 million, respectively. The increasing number of corporate ventures such as *Swisscom Ventures, Zürcher Kantonalbank Ventures, Post Ventures,* and *AXA Ventures* which, among other sectors, are also targeting FinTech companies, as well as the recent foundations of venture capital funds, indicate that the comparably large volume of venture capital investments in FinTech in 2017 may not be an exception, but rather a continuous trend.

3.2.2. Incubators, Accelerators, Challenges & Awards

Incubators, accelerators and awards provide important resources for the growth and development of the Swiss FinTech ecosystem. The following sections focus on the most important FinTech-related initiatives that took place in 2017.

Fusion is an accelerator based in Geneva, focusing on startups in the three verticals FinTech, LifeTech and PropTech. In 2017, *Fusion* admitted seven startups to 12-month programs of their FinTech vertical, including the following Swiss-based startups[78]:

- *Wealtinitiative,* platform for non-financial assets aiming to improve private banks' and family offices' offerings
- *Yawave,* software to empower people and organizations to better leverage network connections
- *Systemkredit,* Blockchain-based credit risk system
- *Izi,* personal stock investing assistant

F10 is an incubator and accelerator based in Zurich and organized by *SIX*, focusing on FinTech, InsurTech and RegTech startups. *F10* provides three different programs. The first of which is a 48-hour design thinking workshop to transfer an idea into a prototype. The second program focuses on startups who want to convert their existing prototype into a product. Teams that reach their predefined milestones are granted CHF 15,000. The third and last program aims to bring existing products onto the market by fostering collaboration between participants and *F10* corporate members, i.e., *Baloise Group, eny Finance, ERI Bancaire, Generali, Julius Baer Group, PwC, Raiffeisen, SIX,* and *Zürcher Kantonalbank.* In June 2017, *F10* announced 14 startups that were selected for the second program, among which the following are located in Switzerland (Startupticker, 2017):

- *Appetita,* AI-based waiter that learns consumer behavior
- *Billte,* billing system to foster fast payment of bills
- *CashSentinel,* payment system to simplify and secure the purchase or sale of vehicles
- *Hoken,* solution that allows customers to manage their insurances by phone
- *LINGS,* digital insurance risk protection coverage scheme
- *Oyoba,* digital banking platform
- *Riskifier,* investment risk profiling tool
- *Shift Devices,* hardware devices for securing and authenticating digital assets
- *Synacts,* cryptographic identity layer that gives users a self-sovereign identity
- *Think Yellow,* platform focusing on ethical investments
- *Vestr,* lifecycle management platform for Actively Managed Certificates (AMCs)

In 2018, the program will take place from March 5th to August 23rd.

Kickstart Accelerator is an initiative from *digitalswitzerland,* operated by the *Impact Hub Zürich.* Its 11-month program focuses on international startups in the fields of FinTech, Food, Robotics & Smart Systems, Smart Cities, Healthcare, and EdTech. Participants are provided with up to CHF 15,000 Seed funding per startup and a chance to get an additional grant of up to CHF 25,000. In addition, startups can receive other services such as mentoring, a shared office space and access to

[78] Note that some of the startups in this section are not part of the analysis in chapter 4 because of the lack of a status as a legal entity.

industry partners and the Swiss startup ecosystem. In 2017, *Kickstart Accelerator* received more than 1,500 applications for their program over all six verticals. Ten startups were admitted to the FinTech program, including the following Swiss-based companies:

– *AAAcell,* research and development of solutions for the financial industry
– *Apiax,* solution for better access to compliance and regulations
– *Pricehubble,* machine learning and big data-based solution for real estate valuation and prediction

Together with *Fjuul,* a Finnish FinTech startup, *Apiax* emerged as the winner in the FinTech category. *AAAcell* finished as the runner-up.

Venture Kick is a second program line of digitalswitzerland's startup enablement program. It was launched in 2007 with the goal to double the number of university spin-offs in Switzerland, to reduce their time-to-market, and to raise their attractiveness to investors and industrial partners. In over 10 years *Venture Kick* supported over 520 startups by providing CHF 21 million in venture capital. The Swiss FinTech company *Futurae Technologies,* a provider of an innovative authentication solution using surrounding sounds, was elected as the winner of the *Venture Kick* final in March 2017, and was granted CHF 130,000.

The Incubator, launched in early 2017, is a 6-month program hosted by *Thomson Reuters Labs* in Baar. The program focuses on startups in the fields of FinTech, RegTech, LegalTech, NewsTech, and provides various services such as office space, mentorship, and access to data, tools and a global network. By the end of 2017, the following startups were part of *The Incubator:*

– *Open Mineral,* digital marketplace for trading physical commodities
– *WealthArc,* wealth management platform for financial advisors
– *Ariadne Business Analytics,* risk management solution built on the smart financial contract standard ACTUS
– *Smart Valor,* marketplace for tokenized alternative investments and secure custody for crypto assets

Thomson Reuters Labs also served as the location for the *Thomson Reuters Hack The Valley 2017* hackathon in January 2017. The event focused on solutions in the field of Blockchain with challenges regarding fighting fraud in the supply chain, exploring intersection of Blockchain and IoT, and user-generated content monetisation. In total, 14 teams participated in the event. The winning team from *BNP Paribas CIB* received a reward of CHF 10,000. The two runner-ups *The Smarties* and *B9lab* were paid CHF 2,000 each.

Another program that was initiated in 2017 was the *venture leaders FinTech* program by *venture lab.* Ten Swiss FinTech companies, the so called «Swiss FinTech National Team 2017», were selected by a jury. The program offered a one-week trip to New York to pitch the company's solution to investors and to take part in network events. The «Swiss FinTech National Team 2017» consisted of:

– *Advanon,* platform that allows SMEs to sell their open invoices to investors
– *AlgoTrader,* software for automated trading strategies
– *Carbon Delta,* platform for evaluating climate change risks for the financial sector
– *Creditgate24,* platform connecting borrowers with private and institutional investors
– *Futurae Technologies,* sound-based authentication solution
– *KiWi/eBOP,* platform for micro-merchants
– *Monito,* comparison of money transfer services
– *OneVisage,* 3D facial authentication solution
– *Qumram*[79], provider of digital compliance and risk management solutions
– *Sonect,* SaaS enabled marketplace for cash

Other accelerators and incubators that do not primarily focus on Swiss FinTech startups include *nexuslab, Swiss Startup Factory, BlueLion, RisingStar Accelerator, Fongit, MassChallenge Switzerland, Swisslife Lab,* and *PostVenture.*

Besides accelerator and incubator programs, there is a variety of FinTech related challenges and awards in Switzerland. In March 2017, the third consecutive *SIX Hackathon* took place in Zurich. 150 people from 14

[79] On November 9th, 2017, *Dynatrace,* a provider of application performance management (APM) solutions, announced its acquisition of *Qumram.*

different countries took part in the event, which focused on the development of innovative concepts, applications or prototypes for the financial industry. 15 teams were admitted in order to pitch their solution to a broader audience. The solutions *Waitless* (mobile application to order and pay in restaurants), *AK-5* (real-time market surveillance and compliance monitoring), and *Nona* (virtual reality application for the retail industry) were ranked on the first, second and third place, respectively.

Also in March 2017, *Visa* hosted the European *Everywhere Initiative,* a competition that has been held in other continents since 2015, which targets innovative solutions in the field of payments. The live competition in front of 130 *Visa* clients and business partners took place in Barcelona and included the five finalists *Evopark, Kwik, Maintool, Wia,* as well as the Swiss FinTech company *Biowatch,* a provider of an authentication solution using vein patterns. *Biowatch* was selected as the winner and was granted the prize of €25,000.

In August 2017, the *Swisscom Startup Challenge* announced its winners. Of the total of 201 applications from the fields of applications, FinTech, social networks, machine learning, healthcare, e-commerce, energy and ad tech, the Swiss FinTech company *AlgoTrader* was among the five winners who were invited to a one-week acceleration program in the Silicon Valley.

The *UBS Future of Finance Challenge 2017* was organized by *UBS* and took place in four regions of the world. *Alyne,* a provider of risk management and compliance solutions, succeeded in the EMEA Zurich region and was granted a reward of $20,000 along with 250 hours of coaching and mentoring from *UBS* experts and innovation partners.

In collaboration with *The Next Web,* the *Swiss FinTech Innovation Association* organized three events in October 2017, so called *Launchpad Meetups,* where startups were invited to solve innovation challenges presented by its members *Generali, Hypothekarbank Lenzburg* and *SIX Group.* By solving the challenges set, participating startups got the chance to connect with established players, pitch their solution, and to build new partnerships.

Another pitching event that took place in October 2017 was the *Swiss FinTech Pitch,* organized by the *Swiss Finance + Technology Association.* For the event, which aimed to connect entrepreneurs with investors, five startups and four investors were selected. The group of startups consisted of *BeeSolar* (offering impact investments by installing solar panels), *Lend* (crowdlending platform), *Werthstein* (digital wealth manager), *IMburse* (marketplace for payments), and *Protos Cryptocurrency Asset Management* (hedge fund in the cryptocurrency and digital token space), the group of investors was composed of *Swisscom, Redalpine, Swiss ICT Investor Club,* and *Diventures.* At the event, the participating investors were judged by the startups and vice versa. In addition, the audience also received a vote. *IMburse* assumed the first place among the startups and the *Swiss ICT Investor Club (SICTIC)* ranked first in the investors' category.

Besides taking part in the *Swiss FinTech Pitch, SICTIC* organized various investor-related events. In 2017, the non-profit association hosted multiple events, the so-called *SICTIC Investor Days,* in which startups from the tech-field were allowed to pitch their solution to attendant investors. One event, held on November 15th in Zurich, exclusively focused on solutions in the field of FinTech. The participating startups included the Swiss-based companies *1bank4all* (creating a social, ethical and eco- logical bank), *Adjoint* (blockchain designed for mission critical applications), *Carbon Delta, Diamond Digital* (developer of *DiamondCoin,* a crypto-currency fully backed by diamonds), *Quantreex* (platform for building trading strategies), *Smart Valor* and *wemakeit* (crowdfunding platform).

In addition to challenges, there have been multiple award ceremonies in the Swiss startup ecosystem in 2017. One of which was the *WealthBriefing Awards,* organized by London-based *ClearView Financial Media*. *Qumram* was voted the winning company in the FinTech vertical focusing on Switzerland, *WealthArc* ranked first on the Europe-wide scale. Another award was the *Top 100 Swiss Startups Award 2017* ceremony held in Zurich on September 7th, 2017. *Bexio,* a provider of cloud-based business and accounting software, ended up on position four, as the best-ranked Swiss FinTech company. An initiative focusing on awarding the leading Swiss FinTech companies and FinTech influencer are the *Swiss FinTech Awards 2017.* At the event, which was organized by the *Finanz und Wirtschaft Forum* on March 3rd, 2017, the winners *Crowdhouse* («Early Stage Start-Up of the Year»), *Qumram* («Growth Stage Start-Up of the Year»), and *Swiss Fi-*

nance Startups («FinTech Influencer of the Year») were presented. On a larger scale, the *European FinTech Awards 2017,* which took place on September 27th, 2017, in Brussels, elected the best European FinTech companies in nine different verticals. *Carbon Delta* was the only Swiss-based company among the 27 finalists. The company took the first place in the «Risk, Intelligence & Security» vertical.

3.3. Social Environment

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

The social environment, as the third pillar of the Swiss FinTech sector, covers the social conditions under which FinTech companies operate. In this section, we focus on the characteristics of the Swiss customer base, the availability of talent and skills, the media coverage, and sector-related associations as important factors concerning FinTech.

3.3.1. Customer Base

FinTech companies can focus on businesses (business-to-business, B2B), private individuals (business-to-customers, B2C), or a combination of both as their target customers. Both costumer types are described in the following in more depth.

B2C Business Models

With roughly 8.4 million residents in Switzerland, the Swiss market is too small for many FinTech business models in the B2C-segment. This statement was one of the key findings of our last year's study. But despite the limited market size, the Swiss society is very tech-savvy. As of June 2017, 89.4 percent of the residents were regularly connected to the internet, as opposed to 84.9 percent over all OECD countries (OECD, 2017a). In addition to the comparably high internet penetration, the mobile penetration is also above average in Switzerland: Whereas the OECD countries account for 118 mobile cellular subscriptions per 100 residents, Switzerland counts 136 as per the end of 2016 (World Bank, online). These numbers underline that the Swiss customer base in the B2C segment principally is technology savvy enough for products and services in the field of FinTech. Nevertheless, the usage of FinTech solutions is relatively low in Switzerland. According to a report from *Ernst and Young* (2017), only 30 percent of Swiss residents regularly use FinTech solutions for

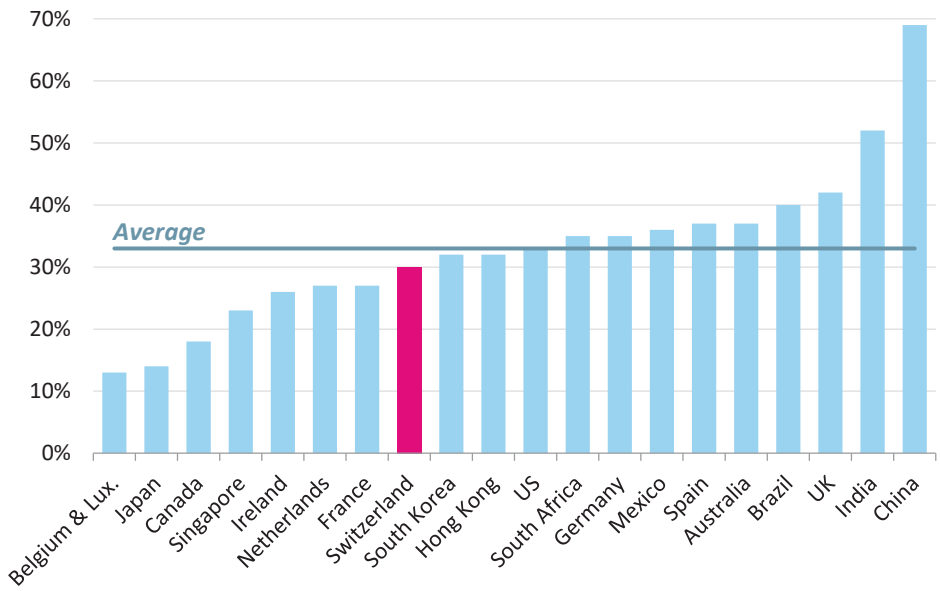


Figure 3.2.: FinTech adoption across 20 countries (EY, 2017)

money transfers and payments, financial planning, savings and investment, borrowing, or insurance (see Figure 3.2). With 33 percent, the global average for the adoption of FinTech solutions is slightly higher. Emerging markets such as Brazil, China, India, Mexico and South Africa have an even higher adoption rate of 46 percent.

One of the main reasons for the relatively low adoption in Switzerland could be the lack of need for FinTech solutions. However, the adoption is expected to increase to 44 percent in the future. Due to the strong presence of established financial institutions, the growth rate is expected to be lower than that calculated on a global scale, which anticipates a future use of FinTech of 65 percent (EY, 2017). To summarize, FinTech companies focusing on Swiss individuals are confronted with a relatively small yet tech-savvy market, but which expresses a limited need for FinTech solutions.

B2B Business Models

Switzerland is one of the world's principal financial centres. As per the end of 2016, 261 banks were located in Switzerland (Swissbanking, 2017). The financial sector therefore offers a large potential customer base for FinTech companies in the B2B segment, especially for products and services in the area of banking infrastructure.

The growth in the total balance sheet of Swiss banks has been achieved without hiring additional staff. The same holds true when looking at the assets under management. These efficiency gains could be based on an increased level of digitization and/or outsourcing. This is underpinned in Figure 3.4. It reveals that the increase in total balance sheet of Swiss banks comes with higher expenses in administration, but also with higher personnel expenses. Since the size of the workforce in banks has been stable over the past years, higher payroll costs indicate that banks require an increasing amount of experts with higher salaries. Increasing expenses in administration, on the other hand, open up potential for FinTech companies which provide solutions to increase revenue margins or to lower costs since banks seem to invest in software and sourcing solutions.

Established financial institutions are not only potential customers, but can also act as valuable partners for FinTech companies, and vice versa. Banks, for example, can integrate FinTech solutions to better serve the needs of digitally orientated customers, whereas FinTech companies can access the banks' customers, be it private individuals or businesses. As a consequence, the last months have seen a variety of cooperation and partnerships in the financial sector. Examples hereof are the partnerships between *Crowdli* and *PwC*, *Contovista* and *Raiffeisen*, *Descartes* and *Deutsche Asset Management*, *Raizers* and *Banque Piguet Galland*, *True Wealth* and *Basellandschaftliche Kantonalbank*, *Squirro* and *Synpulse*, *Payrexx* and *WIR Bank*, and *Veezoo* and *AXA*, among others. As stated in a report by *PwC* (2017a), more than half of the Swiss financial institutions have existing cooperation with FinTech companies and more than 80 percent expect to increase partnerships over the next three to five years (see Figure 3.5).

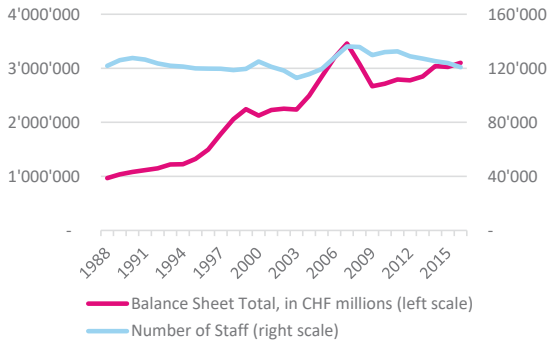


Figure 3.3.: Growth in total balance sheet of Swiss banks versus growth in number of employees (Source: SNB, online)

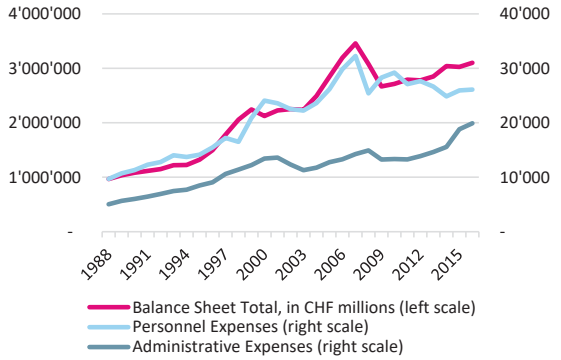


Figure 3.4.: Growth in total balanace sheet of Swiss banks versus growth in expenses (Source: SNB, online)

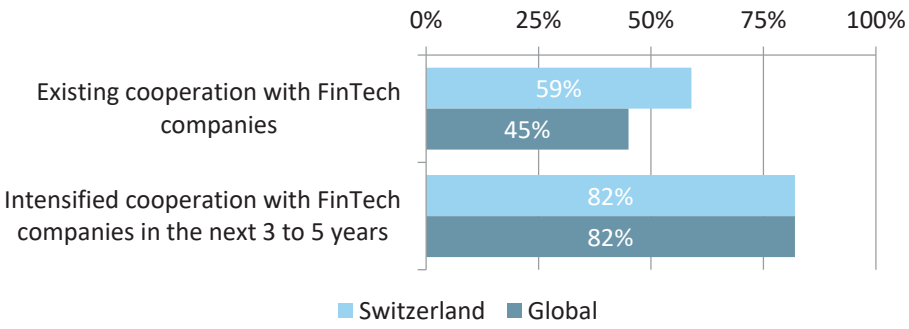


Figure 3.5.: Cooperation between banks and FinTech companies (PwC, 2017)

With 59 percent, Switzerland is above the global average when it comes to existing cooperation between FinTech companies and established financial institutions. In three to five years, however, this discrepancy is expected to level out at 82 percent (PwC, 2017a). To summarize, the significant size of the Swiss financial sector presents great potential for FinTech companies in the B2B segment to thrive. The established financial institutions can either be targeted as direct customers, especially in the field of banking infrastructure, or as gateways to Swiss private individuals and businesses by entering into partnerships and cooperation agreements.

3.3.2. Talent & Skills

Since Switzerland is a country with only little natural resources, a high level of education and the accumulation of know-how has always been a crucial factor for the country's success. As stated by the *IMD World Talent Ranking 2017,* Switzerland has an outstanding educational system which fosters the cultivation of talent. Besides the accumulation of home grown talent, Switzerland is also very attractive for foreign workers (International Institute for Management Development IMD, 2017). As a consequence, and as stated by the *Hays Global Skills Index 2017,* Switzerland is home to a flexible and highly-skilled labor force (Hays, 2017).

As pointed out in section 3.3.1, Swiss residents are relatively technology savvy, indicating a certain potential for FinTech solutions. In order to provide such solutions, FinTech companies depend on the availability of human resources, especially in the fields of programming and business know-how. The former field has increasingly moved into the focus of the Swiss government in an attempt to cope with the challenges which digitization pose for the Swiss economy. Especially for countries like Switzerland, with its large service sector, it is of crucial importance to unlock the full potential of digitization. This particularly holds true for the Swiss financial sector, due to its significant share of roughly 13 percent in total GDP (SwissBanking, 2017) and the decreasing margins along with increasing competitive threats. For this reason, the Swiss federal council has commissioned an evaluation to identify Switzerland's current weaknesses in the field of digitization and to derive fields of actions to approach them. The report states that education, research and innovation are the key factors for the development, application and utilization of new technologies (SBFI, 2017). It is therefore of great importance for Switzerland to ensure that the increasing demand for skilled ICT-professionals can be met. In an international comparison, Switzerland has a relatively high share (5%) of ICT-specialist, compared to the total labor force of the country. However, when looking at the share of intensive ICT users with basic development skills, Switzerland is mid-table. Not only the scarcity in intensive ICT users, but also the comparably low research activities pose a threat to the digitization of the Swiss economy. Especially the clustering of ICT-related research activities around the ETH, as well as the comparably low patent activity level indicate some room for improvement. To tackle this situation, the Swiss government has developed a catalogue of eight measures. Four of which concern the field of education and include the improvement of digital competencies in schools, usage of ICT in teaching and learning, fast

adaption of the educational system to the needs of the Swiss market, and coordination and communication in educational cooperation. The other four measures focus on the higher education sector, including the reinforcement of digital skills, the securing of the interdisciplinary research on the consequences of digital transformation on economy and society, the strengthening of competencies in basic research, and the fostering of innovation by accelerating the knowledge exchange (SBFI, 2017).

The *Commission for Technology and Innovation* (CTI) is another governmental organization that is proactively stimulating the Swiss economy by promoting respective R&D projects. In 2017, the funding budget amounted to more than CHF 200 million (CTI, 2017). A minimum of CHF 30 million was allocated to the field of ICT (OECD, 2017b). As of January 1st, 2018, the CTI was transformed into a public-law entity called *Innosuisse* in order to optimally promote innovation in Switzerland (Innosuisse, online).

There have been additional measures from various sides to encourage FinTech developments and basic ICT skills in Switzerland and to draw attention to said fields. On September 4th, 2017, the second *Swiss FinTech Day* was held in Zurich. The event brought together major stakeholders from the Swiss FinTech ecosystem to share their various perspectives on the theme «The Ecosystem in Digitization». The Federal Council Johann Schneider-Ammann joined the event as the guest of honor. A second measure has been taken by the Swiss Conference of Cantonal Ministers of Education (EDK) by promoting ICT to a compulsory subject in secondary school, analogous to the business and legal education (EDK, 2017). A third initiative was launched by *digitalswitzerland* by organizing the first *Digitaltag* in Switzerland on November 21st, 2017. More than 40 leading Swiss corporations, organizations and research institutes partnered over 80 events all across Switzerland. The initiative aimed to inform the broad population on the megatrend of digitization and its consequences on society, economy, work, and personal life.

3.3.3. Media

A few years ago, the term «FinTech» could only have been found in specialised literature. With the growing number of products and services in operation and the maturity of the ecosystem as a whole, FinTech has increasingly been subject to mainstream media. In 2017, the Swiss press published over 2,100 articles on FinTech, 25 percent more than in the same period in 2016, and over 2.5 times more than in 2015 (Swissdox, online).

Despite the growing number of articles in the Swiss media, the search volume for «FinTech» has been decreasing in the last year. Figure 3.6 shows the respective search volume on *Google* by Swiss residents, along with a cantonal breakdown of the total volume in the

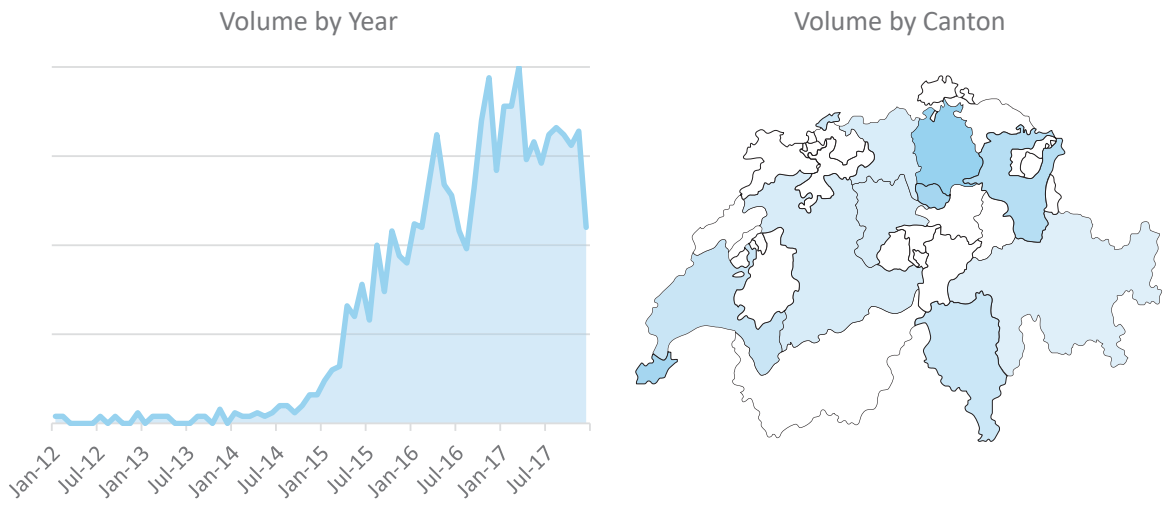


Figure 3.6.: Search term «FinTech» on Google (Google Trends, online)

Year	Association	Description
1912	SwissBanking swissbanking.org	The *Swiss Bankers Association* 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 one of the most disrupting factors for the business models of banks, it has intensively devoted itself to this topic for some time.
2010	SICTIC SWISS ICT INVESTOR CLUB sictic.ch	The *Swiss ICT Investor Club (SICTIC)* is a non-profit association aiming at connecting early stage tech startups, including those in the FinTech sector, with its network of business angels. The process of the deal, as well as the match-making is organized by *SICTIC*. The association, however, does not invest or hold equity in any of the pitching startups.
2013	Bitcoin Association Switzerland "Money is coined freedom." - Fyodor Dostoyevsky bitcoinassociation.ch	The *Bitcoin Association Switzerland,* located in Zurich, aims to promote digital currencies, especially *Bitcoin,* by organizing regular events, resolving open legal questions, and educating the public in the matter. It is composed of an active community of supporters and also corporate members. The association organizes regular meetups in various locations in Switzerland.
2014	SWISS FINANCE STARTUPS swissfinancestartups.com	*Swiss Finance Startups (SFS)* is a non-profit organisation run and organized by the ventures involved. The association wants to foster the common Swiss startup spirit, support the exchange of ideas as well as industry know-how, and help to educate the outside, non-startup world about the brilliant ventures. Startups, as well as supporters are admitted to the association.
2015	Swiss Finance + Technology Association swissfinte.ch	The *Swiss Finance + Technology Association (SFTA)* is a volunteer-led independent association, which aims to connect Swiss FinTech to leading global centres, offer meaningful information and content, advocate and mediate for a more supportive business, regulatory, and innovation environment, and strengthen Switzerland as a financial centre. The FinTech community *Swiss Financial Technology* is connected to the SFTA.
2015	digitalswitzerland digitalswitzerland.com	*digitalswitzerland* is a cross-industry association with the purpose of making Switzerland a leading hub for innovation and technology. The association focuses on multiple industries like FinTech, Life Science, Fashion and MedTech. The following key areas are of particular importance: Attracting digital talent from abroad, supporting its members in mastering the digital transformation and improving the Swiss startup ecosystem.
2015	SWISS CROWDFUNDING ASSOCIATION swisscrowdfundingassociation.ch	The *Swiss Crowdfunding Association* consists of more than 40 platforms of the type crowddonation, crowdlending, crowdinvesting and real estate crowdfunding. 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	*Swiss FinTech Innovations* 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 to bring FinTech startups and established companies to work collaboratively.
2017	Crypto Valley cryptovalley.swiss	The *Crypto Valley Association* is an organization destined to coordinate, accelerate, and scale the further development of Crypto Valley into the world's best ecosystem for crypto technologies and businesses. *Bitcoin Suisse, Bussmann Advisory, iprotus, Lucerne University of Applied Sciences and Arts, Luxoft, Monetas,* and *Thomson Reuters* are the founding members of the association.
2017	MAMA Multichain Asset Managers Association mama.global	The *Multichain Asset Managers Association (MAMA)* is an association initiated by *Melonport AG*, which represents asset management companies, investors, technology providers, service providers and ecosystem players interested in working towards a new vision for asset management using Blockchain and other supporting decentralised technologies.
2017	CryptoPolis cryptopolis.city	The *CryptoPolis Association* is an independent, institutional-supported association established to take full advantage of Switzerland's strengths and the proximity to the metropolis of Milan to build one of the leading Blockchain, cryptographic technologies and FinTech ecosystem around the city of Chiasso.

2017	IRTA International RegTech Association regtechassication.org	The *International RegTech Association (IRTA)* is an international non-profit association for regulatory technology with a chapter in Switzerland founded in 2017. The *IRTA* 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.

Table 3.2: Associations of the Swiss FinTech ecosystem

year 2017. It reveals that the interest in FinTech started to grow in early 2015 and peaked in the first quarter of 2017. Since then the total amount of search queries for the term «FinTech» has been decreasing. By the end of 2017, the interest dropped to the level of mid-2016. An explanation for this decline could be the increasing differentiation in the terminologies of the tech-field. In particular, whereas the relatively broad term «FinTech» has lost in search volume, more specific queries such as «InsurTech», «RegTech», and «PropTech» have attracted growing interest in the past months (Google Trends, online).

Figure 3.6 also shows the volume of *Google* search queries for FinTech in relation to the total amount of search queries for every canton in the past five years. It reveals that the relative interest in FinTech was highest in Zurich, followed by Geneva and Zug, the three cantons with the largest number of FinTech companies in Switzerland.

3.3.4. Associations

Associations constitute another integral part of the Swiss FinTech ecosystem. They typically intermediate between startups, established players, regulatory bodies, investors, and accelerators/incubators, with the objective to create and foster a vital ecosystem in a specific discipline. Associations also pool the interests of their members in order to strengthen their political and medial power.

In 2017, four new associations were launched in the Swiss FinTech ecosystem, three of which dedicating their focus to Distributed Ledger Technology, one to regulatory technology. An overview of FinTech-relevant active associations located in Switzerland is given in Table 3.2. Besides the foundation of formal associations, a variety of informal meetups and other events focusing on FinTech-related topics were initiated in the past months. They mostly aim to foster networking and knowledge sharing about technology and entrepreneurship.

3.4. Technological Environment

By Prof. Dr. Tim Weingärtner,
Lucerne School of Information Technology

The technological environment is traditionally an important driver of the FinTech ecosystem. The following sections give an overview of the relevant upcoming developments of information technologies and their predicted influence on the field on finance.

3.4.1. Trends in Information Technologies

Gartner identifies the following 10 strategic technology trends for 2018, grouping them into the following three main categories «Intelligent», «Digital» and «Mesh» (Gartner, online).

Intelligent consists of the three trends «AI Foundation», «Intelligent Apps and Analytics» and «Intelligent Things». Artificial Intelligence (AI) will determine our lives: through ever-greater computing power, algorithms will be more effective and will be available even in an offline mode. While currently used in selected areas and applications, Artificial Intelligence will be included in many everyday products and applications. This gradual change will make a seamless coexistence between human intelligence and artificial intelligence normal to most of us. Meanwhile, all data will be analysed, allowing predictive models to give suggestions for future behaviour. Machine Learning will break away from supervised learning and become more and more autonomous. First successes in the strategy game *Go* by *Alpha Go Zero* (AlphaGo, online) have shown the performance of Deep Reinforcement Learning (DLR) algorithms. They learn not by traditional method of observing previous knowl-

edge, but by applying a method of trial and error and adopting the most successful variants. With this method, an algorithm was able to teach itself chess in four hours and defeat the most sophisticated chess computer in several chess games afterwards. This learning process, based on the motto «Survival of the Fittest», shows what neuronal networks with the corresponding computing power are now capable of in a very short time frame. «Intelligent Things» combine physical products with Artificial Intelligence. Thus, sensors can act autonomously and intelligently. Such as the camera that automatically analyses facial expressions and only takes a picture when we smile.

Digital consists of the four trends «Digital Twin», «Cloud to the Edge», «Conversational Platform» and «Immersive Experience». These trends lead to digital copies of physical objects. These digital twins are driven by IoT (Internet of Things) sensor data and can be experienced with immersive 3D technologies. Conversational systems allow for natural language interaction. Examples include *Alexa, Google Home* or *Siri*. These trends are making the border between the digital and the real world more fluid, opening up new possibilities (HSLU, 2017). With the upcoming changes in hardware prices, the number of supporting devices like in-ear translation services or wearable computers with large computational power, will rise in the future.

Mesh is made up of the three trends «Blockchain», «Event-Driven» and «Continuous Adaptive Risk and Trust». While Bitcoin is on everyone's lips at the moment, we will see a more sophisticated usage of the Blockchain technology in the next years. Smart Contracts especially will gain importance as the number of usage opportunities will rise. Due to more and more information, change is channelled towards event driven communication. Since the number of players in global networks will rise dramatically, security and trust will become one of the main priorities. The frequency of threats and their permutation asks for adaptive methods to handle those risks. Blockchain can be one answer to guarantee trust, but there are still a lot of open questions about how to deal with the energy consumption and rising amount of data exchanged.

In addition to these technological trends from *Gartner,* changes in user interface (UX) design are foreseen for 2018 (Babich, online). There will be a clear focus on content. This will lead to functional, minimalistic design with a lot of whitespace and room for content. The blogging platform *Medium* is a representative example for this. Minimalistic interface also means timesaving design with a strong focus on the essential input values in user interaction. To assure this, personalized user interfaces will allow reacting on different levels of experience. This is where Artificial Intelligence comes into place. Analysing the interaction patterns allows to automatically choose the right level of experience for each user.

However, user interface design focuses primarily on desktop computers, tablets or mobile computers with the same user interface. Responsive design manages to expand the application. With the emergence of much more diverse interaction possibilities like wearable computers, voice interfaces, face recognition, or IoT devices, Omnichannel UX will become of greater importance by allowing a humanized digital experience. This means that interacting through all these different channels should be as if interacting with other people. Therefore, for example, a voice interface should not ask for special command words and a wearable computer should collect and transmit its data seamlessly, without any complex manoeuvers.

2018 will be the year of Augmented, Mixed, and Virtual Reality. Augmented Reality is the addition of information to the real world. Virtual Reality, on the other side of the spectrum, encloses the user into a complete virtual world. Mixed Reality lies in between and includes virtual objects, persons, or information in the real environment, as if there were no difference between real and virtual objects. We will see many new devices revealing innovative possibilities for the visualization of information. Augmented Reality and, to an even greater extent, Mixed Reality will gain importance for business and industry since the overlay of the real world by computer generated content will enhance the abilities of the user. This will require completely new interaction patterns and user interfaces. All this will lead to a stronger focus on interaction design and the job of a UX designer will become more important.

3.4.2. Impact in the Field of Finance

The impact of technological trends on the finance industry has always been tremendous. Although some technologies take several years to be implemented in

the productive environment, when they emerge, media publicity changes the strategies of financial institutions. The following sections predict some potential impacts on concrete areas of the financial institutes.

Customer Interaction has gained momentum in the finance industry, as focusing on the customer became more important. This trend will continue and even increase. Through the combination of the different technologies, new services and interactions with the customer will become possible. Trends like natural language processing, mobile computing, geo-positioning, and Artificial Intelligence allow individually tailored responses to customer needs, like instant and secure mobile payment, speech based banking services, or structured account information. First e-banking solutions already adopted clean and minimalised user interfaces. With self-learning interfaces this trend will continue and reduce the content to the necessary information.

Digitalisation means the adoption of new technologies and questioning existing business models. Like the role of a financial institute in the education of the use of money. Once, piggy banks were a symbol of banks for children. On the one hand, it was a fundamental way to keep customers. On the other, it was a way to educate children on how to handle money. Digitalisation does not mean implementing a digital piggy bank. Rather, a bank has to question which new technologies will enable their young customers to learn about how to better handle money. Why not implement a learning payment app, suggesting how to reach a savings target while adopting aspects of Gamification and Augmented Reality like *Pokémon Go*.

User Story 1
Francis and George are looking for a new home. A first research attempt on the web portal gave them several locations matching their requirements like traveling time to their employer, shopping possibilities, or sports activities. Equipped with their Augmented Reality devices they are able to take a walk through the specific area in Lucerne. Free flats are visualised by green areas. The price is automatically checked against their possible budget and the alternative lending fee. Their intelligent adviser informs about the seller's contact information and additional costs. Once having found their dream home, their bank can provide the owner with a binding offer. A preliminary agreement is agreed on-site using Smart Contracts between the owner, bank and Francis and George.

Times are getting harder for banking advisers. Robo adviser services with the ability of natural language processing will handle easy to mid complex consulting jobs. With Augmented Reality the Robo adviser becomes a face and can accompany the customer everywhere. There is no need for an expensive well-trained banking consultant to explain how to open a depot or match a portfolio to a risk strategy. They will have to focus on more complex and non-schematic tasks. The technology already exists and is waiting for banks and banking clients to take them into production.

Core Banking Platforms have widened their focus towards an integration of different specialised products, using API layers. This gives FinTech companies the chance to integrate their innovative products into an existing ecosystem. Trends like Edge Computing are going in the same direction, by moving computational logic towards the user and customer, based on a consistent Cloud-based background. The risk of this development is the marginalisation of the core banking platforms. Not all involved parties see the value of consistent and centralised data management. But this data and its analysis will be central to successful financial institutes. Today, there is a lack of comprehensible data visualisation in many financial institutes. Using new ways like 3D or Virtual Reality will make the data more tangible. Due to these trends, secure and open interfaces as well as integration services will become more important.

Banking Products will change too. 2017 was the year of Bitcoin. It moved from a closed community to a broad audience and from a technological trend to a financial product. Nevertheless, these are not technological impacts. The impacts from the Blockchain technology are just starting. Smart Contracts especially will have a strong influence on financial services, and first applications already exist. Switzerland with its Crypto Valley has big stakes in this technological field, which will slowly come into place. 2018 will only be the beginning. The financial industry will do well if it prepares itself early for the change to its banking products. The time is close when loans will not only be given to individuals but also to machines.

User Story 2
Joanna is a financial advisor in Zurich. She is specialized in investment consulting. Today, she has an appointment with a client looking for long-term investments. He already provided all his information online through a Robo advisor service, which generated a risk profile and possible investment strategies. The appointment takes place over a secured Virtual Reality session. Both find themselves in a virtual meeting room. Joanna presents the results of the generated profiles. She can answer the client's questions directly by using her profound knowledge and the condensed information of actual movements at the financial market. Online translation helps bridging the language barrier between German and Arabic. All information will be recorded and an automatically generated protocol will be send to the client at the end of the meeting.

Thinking of all those upcoming changes, **Regulatory** will play an important role in this game. Too many and tight rules will expel the essential players. Too little control puts the investors at risk. The influence of disruptive technologies to the financial system necessitates innovative regulation. Who is responsible if a Robo adviser learns the wrong rules? What to do if a Smart Contract chooses not to respect the newest regulations? Finally, **Risk Management** and **Security** will gain an important role in financial institutes.

3.5. Hub Comparison

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

In last year's *IFZ FinTech Study 2017,* we created a FinTech hub ranking in order to compare the general conditions surrounding the Swiss FinTech sector to other commonly known FinTech centres. In this section, this ranking is updated.

3.5.1. Initial Situation

Despite its strong innovative capacity and its status as a globally leading financial centre, Switzerland has not been in the focus of most studies on FinTech ecosystems. For that reason, last year's study included a ranking framework which, in comparison to the majority of existing studies, was solely based on quantitative indicators. Zurich and Geneva, as the only two Swiss cities included in the evaluation, ranked on position two and three, respectively, only behind Singapore.

2017 has seen additional publications concerning the strengths and weaknesses of selected FinTech hubs. *Deloitte* (2017), for example, conducted a performance analysis among 44 global cities. The report derives a performance score for every in-scope city based on the three publicly available indexes *Global Financial Centre Index, Doing Business Index,* and *Global Innovation Index*. Zurich as the only Swiss city incorporated in the study, achieved the seventh best performance, behind Singapore, London, New York, Silicon Valley, Chicago, and Hong Kong. The total performance score of Switzerland was to a large extent pulled down by the comparably low performance in «doing business». When looking at the innovative power and the relevance as a global financial centre, Switzerland belongs to the leading centres. Besides the quantitative evaluation, the report also includes a self-evaluation of selected hub representatives in the key areas government support, innovation culture, proximity to expertise, proximity to customers, foreign start-ups, and regulation among the 44 in-scope cities. Based on the evaluation of the Swiss representative, i.e., the *Swiss Finance + Technology Association*, Switzerland enjoys excellent proximity to expertise. All other factors are assessed as good.

A further publication that underlines the strong position of Switzerland as a FinTech hub is the FinTech ranking by the *International Data Corporation* (IDC), which lists the top 100 FinTech companies on a global scale. Switzerland is represented by six companies, i.e., *Temenos, Avaloq, Luxsoft, Six Payment Services, Eri Bancaire,* and *Crealogix,* only lagging behind the US and India with 52 and 7 companies, respectively.

3.5.2. Ranking Framework

In order to provide comparability to the results of last year's study, the ranking methodology remains unchanged. Based on feedback from various sources however, this year's study includes three more cities, namely Vienna (Austria), Warsaw (Poland), and Luxembourg, as well as four more indicators, i.e., the level of corporate tax rates, the freedom of press, the adoption rate of FinTech, and the degree of cybersecurity. The ranking is again based on the PEST-approach described in section 2.2 and includes a total of 72 (updated) indicators, either on city- or country

Figure 3.7.: Classification of indicators

level, from publicly available sources[80]. For every indicator, a ranking of all 30 in-scope cities is derived. The ranking therefore ranges from 1 (worst performance) to 30 (best performance). Every indicator ranking is then categorized into one of the four dimensions, i.e., political/legal, economic, social, or technological, as shown in Figure 3.7 (bold factors are on city-level). For each in-scope city, a sub-ranking score on the PEST-dimensions level is created by averaging the underlying indicator rankings. Due to this proceeding, the PEST-dimension scores are again bound between 1 and 30.

The final ranking is then derived by aggregating the sub-ranking score for every city[81]. The city with the highest score over all PEST-dimensions ranks first, the one with the lowest score on the last position. This process leads to equal weights between the four PEST-dimensions in the final ranking.

[80] See Appendix B for a list of all indicator sources.
[81] For further information on the ranking methodology see Ankenbrand et al. (2017).

3.5.3. FinTech Hub Ranking

As revealed in Figure 3.8, Zurich and Geneva offer excellent general conditions for FinTech companies to thrive. As in last year's edition, the two Swiss cities are ranked at the second and third position, following Singapore. London is ranked at the fourth position, an improvement from the 8th place in last year's ranking. The strong increase in London's score may partially be based on the reduced uncertainty since the Brexit referendum from June 2016. This is underlined by the amount of venture capital invested in FinTech in the UK: In the first half of 2017, a total amount of $564 million was invested in FinTech, 37 percent more than in the same period in 2016 (Independent, online). The top five is completed by Amsterdam which jumped two ranks in comparison to last year. Amsterdam has increasingly built up a respectable reputation in the field of FinTech. Especially its excellent digital infrastructure and large talent pool has led to it becoming an important FinTech sector, with more than 350 companies employing over 15,000 people (I Amsterdam, online).

The top ten is completed by the cities Toronto, Stockholm, New York City, San Francisco, and Hong Kong. What is striking is the fact that all three North American cities lost two to three ranks in comparison to last year's ranking. For the US cities, this deterioration in the ranking may partially be due to the political uncertainty. Also, the regulatory environment in certain product areas interferes with the development of FinTech. One example hereof is the regulation in the

Rank	YOY	City / Country
1	-	Singapore
2	-	Zurich / Switzerland
3	-	Geneva / Switzerland
4	+4	London / UK
5	+2	Amsterdam / Netherlands
6	-2	Toronto / Canada
7	+3	Stockholm / Sweden
8	-3	New York City / US
9	-3	San Francisco / US
10	-1	Hong Kong (China)
11	+2	Frankfurt / Germany
12	+2	Berlin / Germany
13	-1	Sydney / Australia
14	+1	Oslo / Norway
15	NEW	Vienna / Austria
16	-5	Tokyo / Japan
17	-	Dublin / Ireland
18	-2	Paris / France
19	NEW	Luxembourg
20	-2	Tel Aviv / Israel
21	-2	Dubai / United Arab Emirates
22	-2	Milan / Italy
23	-2	Beijing / China
24	-2	Shanghai / China
25	NEW	Warsaw / Poland
26	-3	Moscow / Russian Federation
27	-3	Cape Town / South Africa
28	-3	Sao Paulo / Brazil
29	-2	Mumbai / India
30	-4	Buenos Aires / Argentina

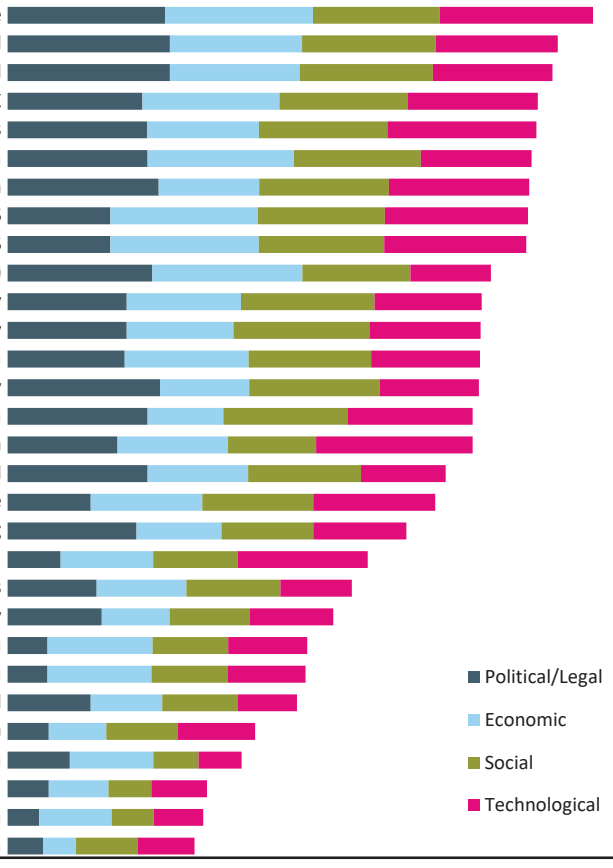


Figure 3.8.: FinTech Hub Ranking 2018

field of cryptocurrencies: Since digital coins can be considered securities, and therefore could be subject to federal securities laws, it is not straightforward for US companies to conduct an ICO, or for US residents to participate in such a token-generating event[82]. With the exception of the political and legal environment, both US cities rank between the second and the ninth position in the other three PEST-dimensions.

But one man's weakness is another man's strength: Zurich and Geneva base their leading position on the political stability and the progressive regulatory environment. This is underlined by Figure 3.9 which shows the ranking of the PEST-dimension scores for Zurich and Geneva. It reveals that in political and legal regard, Zurich and Geneva take the first place among all 30 in-scope cities. In last year's ranking, both cities ranked on the second place, preceded only by Singapore. Especially the high political stability, the low level of corruption, the high level of freedom of press, and moderate corporate tax rates are factors that strengthen the two Swiss cities' positions as some of the leading hubs in the mentioned dimension. Concerning visa restrictions, however, Switzerland still has some room for improvement, with Geneva and Zurich ranking on position 15. In the economic dimension, Zurich and Geneva retain their positions, ranking on positions seven and eight, respectively. Whereas both cities score well in terms of the size of their financial sector, the comparably high labour costs prevent better positioning. When looking at the social environment, Zurich and Geneva have lost one and two positions, respectively, in comparison to last year's ranking. This deterioration is partially founded on the inclusion of the costs of living indicator, in which both Swiss cities perform poorly, into the social dimension[83]. Another weakness of the social environment in Switzerland is the comparably low level of tertiary enrolment. In the technological dimension, Zurich and Geneva do not belong to the leading cities. Zurich ranks on the tenth position, thus stepping down one position in comparison to last year's ranking, Geneva ranks on position twelve, a loss of two ranks. One reason for the deterioration of the Swiss cities in the

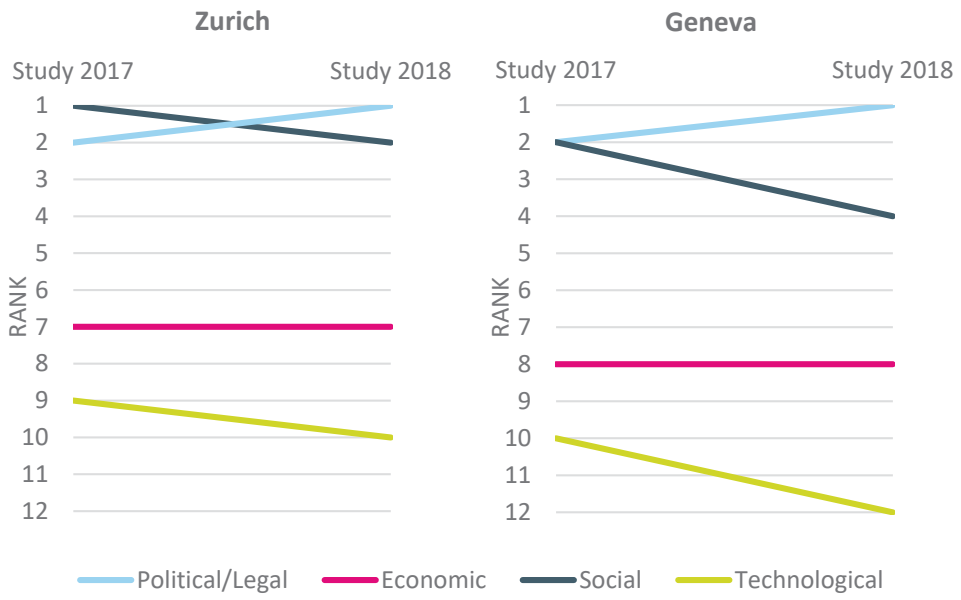


Figure 3.9.: Ranking of the PEST-dimension scores of Zurich and Geneva

[82] Note that this does not necessarily imply that the regulation is not reasonable.
[83] Note that in the last ranking, the indicator was attributed to the economic dimension.

technological dimension lies in the inclusion of the cybersecurity indicator. A further weakness includes the lack of online governmental services, which again leads to a low degree of e-participation by Swiss residents.

To summarize, Zurich and Geneva offer very good conditions for the FinTech sector, especially in regard to the political/legal and social environment, although the latter has witnessed a deterioration in comparison to last year's ranking. Concerning the economic and technological environment, the Swiss cities perform above average but still have room for improvement. This is particularly true for the technological dimension, in which both Zurich and Geneva performed worse than in the previous year.

4. Swiss FinTech Companies

Whereas chapter 3 focused on the description of the Swiss FinTech ecosystem's environment, this chapter aims to give an insight into domestic FinTech companies. The chapter starts with an overview of the Swiss FinTech sector and its companies' business models, followed by an evaluation of the most pressing challenges faced in the sector. Sections 4.3 to 4.8 deal with the six FinTech product areas, as defined in section 2.1, in more detail.

4.1. Overview of Swiss FinTech Companies

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

In this section, the Swiss FinTech sector is analysed based on our proprietary database which was constructed by gathering publicly available sources and by conducting a survey among the Swiss FinTech companies that qualify under this study's definition of FinTech (see section 2.1). The analysis is structured based on the taxonomy of FinTech shown in Figure 2.1 and the Business Model Canvas described in section 2.3.

The Swiss FinTech sector has been growing steadily in the past two years, as shown in Figure 4.1. In 2015, a total of 162 companies were active in the sector. This number increased by 28 to 190 companies in 2016. A similar growth of 30 companies was witnessed in 2017. By the end of 2017, a total of 220 incorporated companies were counted in the Swiss FinTech sector, implying a growth rate of 16 percent. The figure also reveals that some product areas have grown more than others. The number of companies in the product areas *Investment Management* and *Distributed Ledger Technology*, in particular, has significantly increased in the last year. Whereas the former accounts for 13 additional companies, the latter has grown by twelve. The number of companies in the remaining product areas has remained relatively stable ranging from an increase by three companies *(Deposit & Lending)* to a reduction by two *(Payment)*. In relative terms, the product area *Investment Management* accounts for roughly a quarter of the companies in the Swiss FinTech sector, followed by *Banking Infrastructure* (22%), *Deposit & Lending* and *Distributed Ledger Technology* (both 15%), and *Analytics* and *Payments* (both 12%).

Figure 4.2 illustrates that a total of 32 FinTech companies were founded in Switzerland in 2017, i.e., two more than the total increase in FinTech companies over the same period. The reason for this difference lies in the exclusion of companies founded prior to 2017 that have either shut down their businesses, merged,

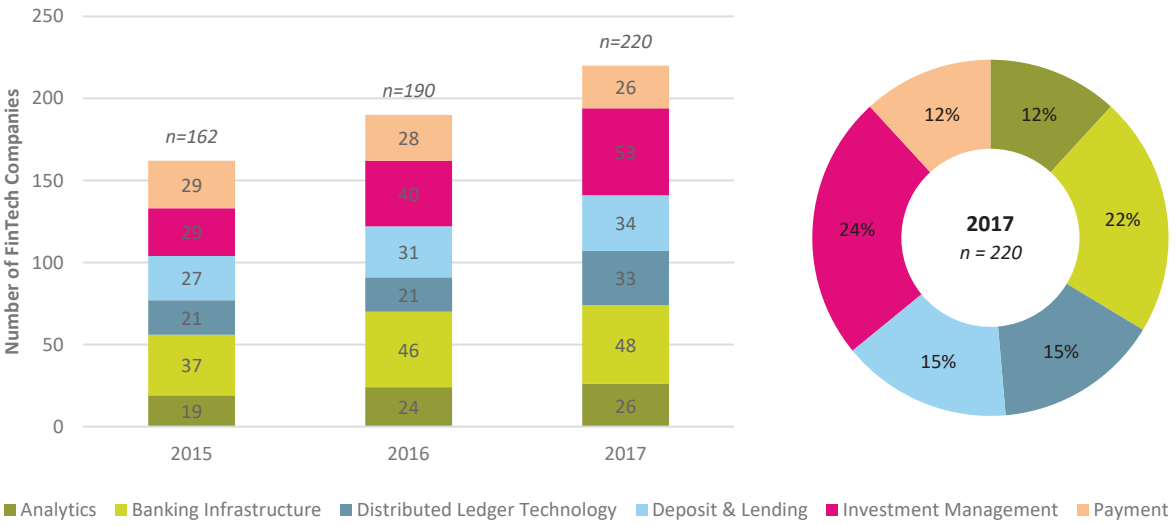


Figure 4.1.: Number of FinTech companies in Switzerland (n_{2015}=162, n_{2016}=190, n_{2017}=220)

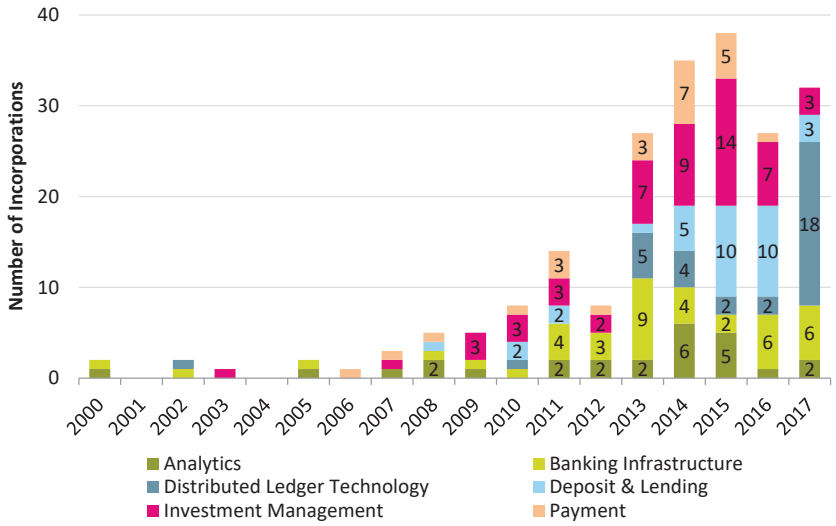


Figure 4.2.: Number of FinTech company incorporations per year (n=220)

or changed their business models away from FinTech. Hence the number of exclusions exceeds the number of inclusions of companies by two. The 32 foundations in the field of FinTech in 2017 constitutes an increase of five companies in comparison to the number of foundations in the year before. However, the figure is still smaller than in the years 2014 and 2015, which accounted for 35 and 38 foundations, respectively. The reason for this may, at least partially, lie in the evaluation method and in the fact that some newly incorporated companies operate in «stealth mode».

Figure 4.2 also reveals that the significant year-on-year increase of companies active in the area of *Investment Management* cannot simply be explained by the incorporation of new companies. From the total of 32 foundations, only three companies are active in said field. The large growth arises from two different causes. First, some FinTech companies have switched their business model away from other FinTech product areas towards providing investment management solutions. Second, companies that were not included in last year's study are included this year. The reason for this either arises from a switch of a non-FinTech business model to one in the field of *Investment Management*, or from stepping into the public eye, and hence into our database, from former «stealth mode» operations. In the field of *Distributed Ledger Technology*, 18 companies were founded in 2017, more than in all other FinTech product areas combined. The majority of these companies were founded in Zug, thereby supporting the emergence of the so-called Crypto Valley (see section 5.1). In comparison to last year's study, however, the total number of companies active in the area of *Distributed Ledger Technology* has only risen by 12, implying that there have been more exclusions than inclusions of companies founded prior to 2017.

The cantonal distribution of domestic FinTech companies is shown in Figure 4.3, along with changes compared to last year's study which are based on new incorporations, suspension of activity or relocations of FinTech companies. As in the previous two years, Zurich, home to 88 incorporated FinTech companies, is still the leading canton as measured by the number of resident FinTech companies, followed by Zug (45) and Geneva (22). Especially Zug has witnessed a significant growth in 2017, with a total of 16 new companies, mostly in the field of *Investment Management* and *Distributed Ledger Technology*, and hence strengthened its position as the second largest Swiss FinTech centre. Zurich and Geneva, by comparison, have achieved a year-on-year increase of four and three companies, respectively. The second largest growth in absolute terms was achieved by the canton

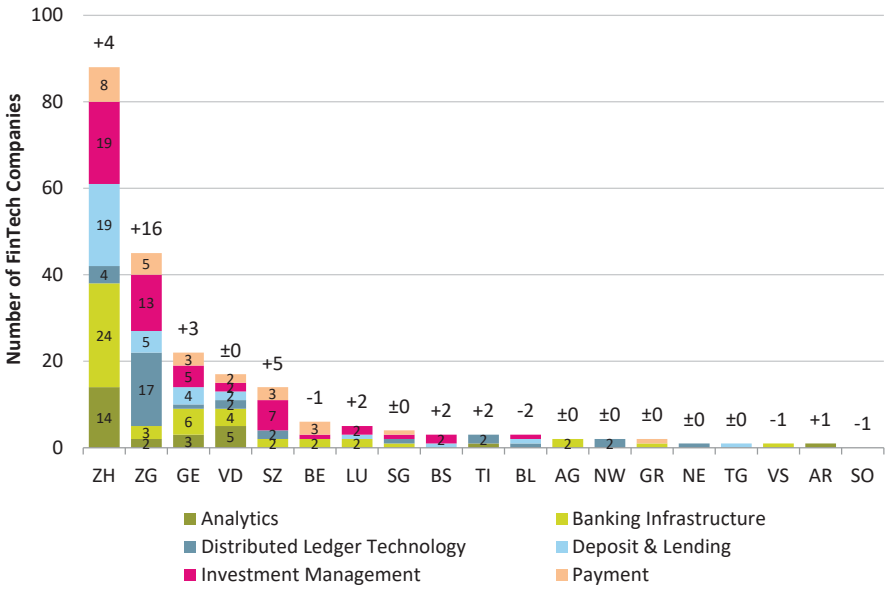


Figure 4.3.: Number of FinTech companies by region (n=220)

of Schwyz with an increase by five companies. The changes of the remaining cantons fluctuate between an increase and decrease by two companies compared to the end of 2016.

After having analysed the temporal development of the FinTech sector in terms of number of companies and foundations, as well as its geographical distribution, Figure 4.4 sheds light on the first key resource, i.e., the number of employees in the sector measured in full-time equivalents. It reveals that the average Swiss FinTech company has increased its work force over the past years. In 2015 and 2016, a little more than a third of the Swiss FinTech companies that took part in the respective year's surveys had a workforce of less than five employees. At 26 percent, this share is significantly lower in 2017. On the other hand, the share of companies with a workforce between five and 15 has increased significantly from 35 percent in 2016 to 42 percent in 2017. This development points towards a higher degree of maturity of the Swiss FinTech sector, analogous to the increase in the amount and average size of venture capital rounds in the last year. However, medium-sized to large FinTech companies are still comparably scarce, a fact that has not changed in the past three years. By the end of 2017, roughly one third of the Swiss FinTech companies employed over 15 full-time equivalents. At 30 percent, this share was only marginally lower in the preceding two years.

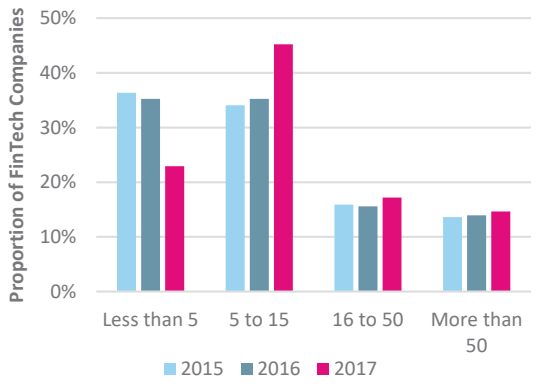


Figure 4.4.: Proportion of FinTech companies by employees (n_{2015}=88, n_{2016}=122, n_{2017}=156)

76 of the Swiss FinTech companies that revealed information on their total work force also revealed their share of employees located in Switzerland. Overall, 72 percent of the total work force employed by these

Swiss FinTech companies are located domestically, and only 28 percent abroad. The share of Swiss-based employees tends to decrease with the absolute number of full-time equivalents employed at a company. In other words, the larger the company, the more of its employees work abroad. When looking at the future growth of full-time equivalents, the vast majority of companies is optimistic, estimating moderate or large growth of its work force in the year 2018. One factor that could positively influence the number of full-time equivalents in the Swiss FinTech sector would be the emergence of co-working spaces, which, at the end of 2017, were still in short supply.

The temporal development of the second key resource of Swiss FinTech companies, i.e., amount of total funding, behaved in a manner similar to the one of the work force employed in the sector. Figure 4.5 reveals that the proportion of Swiss FinTech companies with total funding of less than CHF 500,000 has decreased in the past year. On the other hand, the proportion of companies with fundings between CHF 1 million and 5 million has increased. This shift can be explained by the increase in Series A and B financing rounds, as shown in section 3.2.1. The proportion of companies in the remaining capitalization intervals, i.e., from CHF 500,000 to CHF 1 million, from CHF 5 million to CHF 10 million, and above CHF 10 million, remained constant. Of the nine companies with total funding above CHF 10 million, four are active in the field of *Distributed Ledger Technology*, whereof three have conducted an ICO.

Despite the positive developments concerning the key resources of Swiss FinTech companies, their key activities have not changed significantly in the past year. By the end of 2017, around three quarters of the Swiss FinTech companies that provided information in this regard were either actively programming and engineering their solution (74%), conducting marketing and customer acquisition activities (74%), and/or running the operative business and serving clients (82%).

Besides key resources and key activities, key partners constitute the third factor on the production side of a business model. Analogous to last year's study, *PostFinance*, with a total of ten references, remains the most frequently mentioned partner by the 100 Swiss FinTech companies that revealed information in this regard. *PwC* ranked second with eight references, followed by *Swisscom* and the *SIX Group* with five each.

The distribution side of the Swiss FinTech business models reveals that over three quarters of the companies interact with (potential) clients by means of both digital and personal channels. This share has

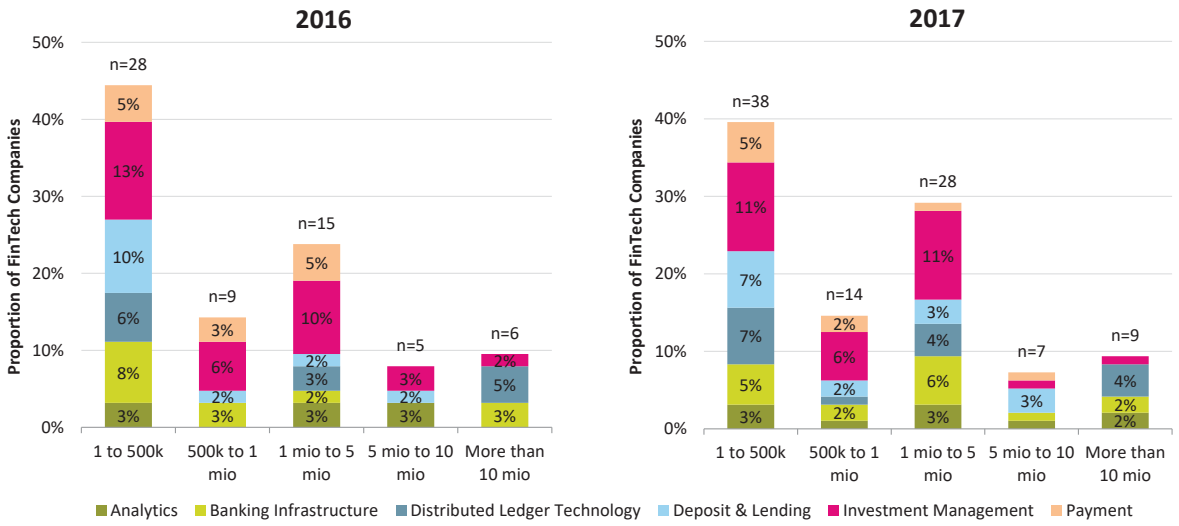


Figure 4.5.: Proportion of FinTech companies by total funding (n_{2016}=63, n_{2017}=96)

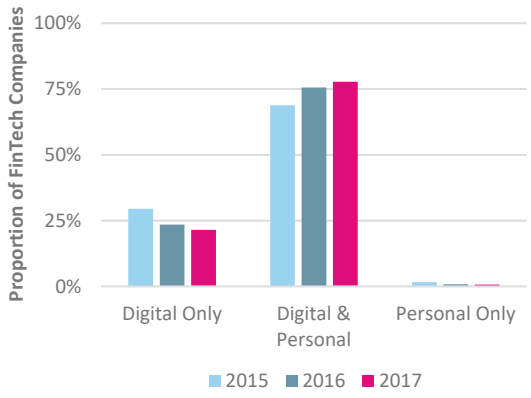


Figure 4.6.: Proportion of FinTech companies by channels (n_{2015}=61, n_{2016}=119, n_{2017}=135)

increased continuously over the past two years, as shown in Figure 4.6. Whereas hybrid communication strategies gained in relevance, pure digital strategies were implemented less frequently in the Swiss FinTech sector. By the end of 2017, only about 20 percent of the companies were interacting with their clients solely through digital channels. At 30 and 24 percent, this share was higher in 2015 and 2016, respectively.

The increased relevance of hybrid communication strategies indicates that the Swiss FinTech sector is responding to the customers' need for personal interaction. This is of particular relevance for FinTech companies targeting businesses, whose requirements related to FinTech solutions tend to be more customized than solutions for private individuals. 87 percent of the companies with an exclusive B2B business model interact through both digital and personal channels.

As shown in Figure 4.7, FinTech companies with an international orientation[84] and a focus on businesses, or both businesses and private clients, account for the largest share in the Swiss FinTech sector. Whereas the share of companies in the international B2B segment has remained constant at around 40 percent in the past year, the share of companies with an international B2B and B2C orientation has increased from 22 to 28 percent. This increase can be explained by the large amount of company foundations in the field of *Distributed Ledger Technology*, which typically serve both international businesses and private individuals. The majority of companies active in the product areas *Analytics*, *Banking Infrastructure*, *Investment Management* and *Payment* are also serving international markets. Business models which exclusively target private individuals internationally are relatively scarce, accounting for only seven percent of the Swiss

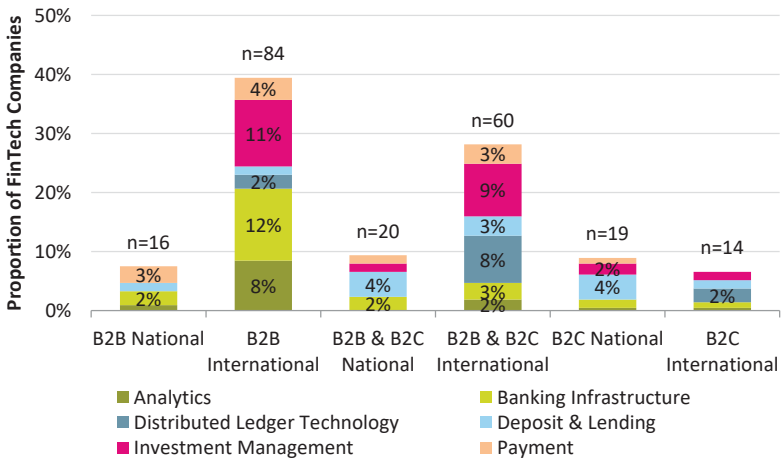


Figure 4.7.: Proportion of FinTech companies by markets served (n=213)

[84] Note that in this evaluation an international orientation also includes the Swiss market.

FinTech companies. A similar share is achieved by each of the three nationally oriented business models. In total, only a quarter of the Swiss FinTech companies serve either Swiss businesses, Swiss private individuals, or both. Many of these companies are providers of crowdfunding solutions, hence are active in the field of *Deposit & Lending*.

In 2016, the revenue models of Swiss FinTech companies shifted from the commission business typically sought by traditional banks towards models originating from the IT-industry. In combination with the low relevance of the interest and trading business, we concluded in last year's study that Swiss FinTech companies are to be understood as supplementary service providers to classical banking institutions rather than direct competitors. This statement is further confirmed when looking at the developments in the year 2017, as shown in Figure 4.8. Although the commission model is still the most frequent revenue model employed in the domestic FinTech sector, it has gradually decreased in relevance. By the end of 2017, the commission business accounted for 30 percent of the total revenue streams of Swiss FinTech companies. One and two years earlier, this proportion stood at 33 and 41 percent, respectively. Meanwhile, IT-driven revenue models have become more relevant. Revenue generation by charging licence fees has increased its proportion of the total revenue models employed by Swiss FinTech companies from 18 to 25 percent over the past two years. A similar growth can be observed for the Software-as-a-Service revenue model, increasing its proportion from 16 percent in 2015 to 26 percent at the end of 2017. The interest and trading business which, analogous to the commission business, are typically sought by traditional banks, have only little relevance for the Swiss FinTech sector. The same holds true for advertising, which has become less important over the past two years. Revenue generation by selling (analysed) data accounts for 10 percent of the total revenue models employed by Swiss FinTech companies, but has also lost relevance since the end of 2015.

To summarize, the Swiss FinTech sector has continuously grown over the past two years. At the end of 2017, a total of 220 companies were active in one of the six FinTech product areas. The average size in terms of both full-time equivalents and total funding of Swiss FinTech companies has also grown in the course of 2017, indicating a maturation of the sector. A glance at the communication strategies reveals that Swiss FinTech companies increasingly interact with customers by use of both digital and personal channels. They also do not seem to directly compete with traditional banks, since the revenue models in the Swiss FinTech sector have continuously shifted from the commission business towards IT-driven models, i.e., license fees and SaaS models, over the past two years.

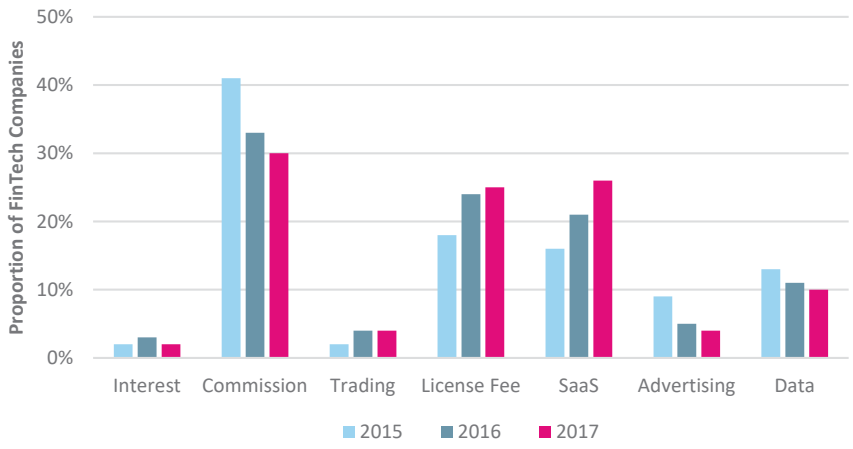


Figure 4.8.: Proportion of FinTech companies by revenue model (n_{2015}=162, n_{2016}=183, n_{2017}=210, multiple answers allowed)

4.2. Sentiment Analysis of Swiss FinTech Companies

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

In this section, the challenges faced by Swiss FinTech companies are evaluated. The analysis is congruent with the sentiment analysis among Swiss SMEs conducted by the *Institute of Financial Services Zug IFZ* on behalf of the *State Secretariat for Economic Affairs (SECO)*[85]. Figure 4.9 shows the results for both Swiss FinTech companies and Swiss SMEs.

With an average score of 6.8, the challenge of finding customers is the most pressing among Swiss FinTech companies. With a score of 7.5, this challenge seems to be of special significance for companies serving the Swiss B2C market. This finding coincides with our statement in last year's study that the Swiss market is too small for many business models targeting private individuals. In comparison, companies with an international market orientation evaluate the challenge of finding customers with a score of 6.7, which is still comparably high. This relative difficulty of acquiring a customer base may be one of the reasons for the increase of partnerships and cooperation between Swiss FinTech companies and established financial institutions. The second most pressing challenge of Swiss FinTech companies is the availability of skilled staff or experienced managers, with a score of 5.8. The reason for this may lie in the relative scarcity of intensive ICT users, as stated in a report by the *Swiss State Secretariat for Education, Research and Innovation*, and the comparably high visa restrictions for foreign workers. The challenges posed by expansion to international markets, costs of production or labour, and regulation are of medium relevance with scores of 5.5, 5.4 and 5.3, respectively, followed by pressure from competition (4.9). One reason for the relatively low pressure from competition may lie in the innovative, and in some degree unique, offering of FinTech companies, which, at the same time, could account for difficulties encountered in customer acquisition. With a score of 4.2, access to financial capital is the least pressing for Swiss FinTech companies. This finding coincides with our statement in last year's study, that there is enough venture capital available although the funding volume in the FinTech sector was relatively low in comparison to other sectors such as Biotech and ICT (excluding FinTech).

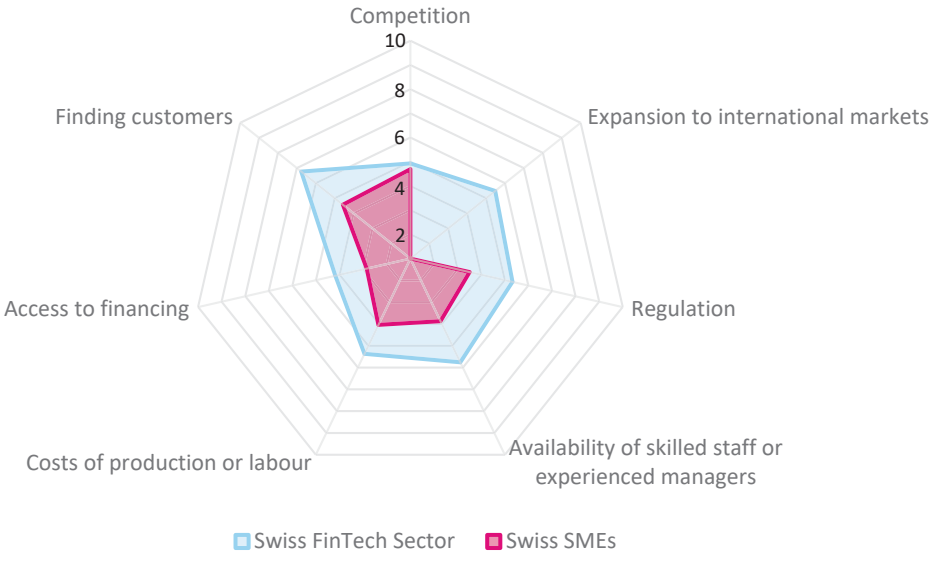


Figure 4.9.: Challenges of FinTech companies and SMEs ($n_{FinTech}$=104, n_{SME}=1922)

[85] See section 2.4 for more information on the sentiment analysis.

A comparison of the challenges evaluated by Swiss FinTech companies with those of Swiss SMEs in general reveals that the latter are subjectively less affected by the challenges. Swiss SMEs evaluate the challenges posed by competitors with the highest score of 4.7, followed by customer acquisition (4.6), which is the most pressing challenge among Swiss FinTech companies. Furthermore, Swiss SMEs feel less burdened by the costs of production or labour (4.0), availability of skilled staff or experienced managers (3.9), and regulation (3.5). Analogous to the Swiss FinTech sector, access to financial capital is the least pressing for Swiss SMEs, with the lowest score of of 2.9[86].

Figure 4.10 shows a breakdown of the seven challenges into the six FinTech product areas. Two of the challenges, i.e., cost of production or labour and expansion to international markets, are subject to relatively small fluctuations across the product areas. These two challenges thus tend to be of equal relevance for all Swiss FinTech companies. The pressure arising from competition and from finding customers reveals slightly higher variation across the six product areas. Whereas the former is more pressing for DLT-companies, the latter is of higher relevance for companies providing solutions in the field of *Analytics*.

Larger fluctuations can be observed when looking at the challenges regarding key resources, i.e., access to finance and availability of skilled staff or experienced managers, which tend to be negatively correlated. Companies in the field of *Deposit & Lending* and *Investment Management* tend to face higher barriers in accessing financial capital. The availability of skilled staff or experienced managers, on the other hand, tends to be comparably less pressing for them. The opposite holds true for Swiss FinTech companies in the remaining four product areas. Challenges regarding the regulatory framework reveal the highest variability in the FinTech sector. Especially companies in the field of *Distributed Ledger Technology* are subject to regulatory difficulties. This comes as no surprise, given the uncertainty concerning cryptocurrencies from a legal point of view. The recent foundation of a governmental working group focusing on DLT-related issues (see section 5.2) may help to reduce this uncertainty over the course of the year 2018. Further product areas that face above-average regulatory challenges include *Payment*, *Investment Management*, and *Deposit & Lending*. With a score of 3, Swiss FinTech companies providing analytics-based solutions show the lowest score among all challenges and product areas. Regulation hence does not seem to be a major issue in the field of *Analytics*.

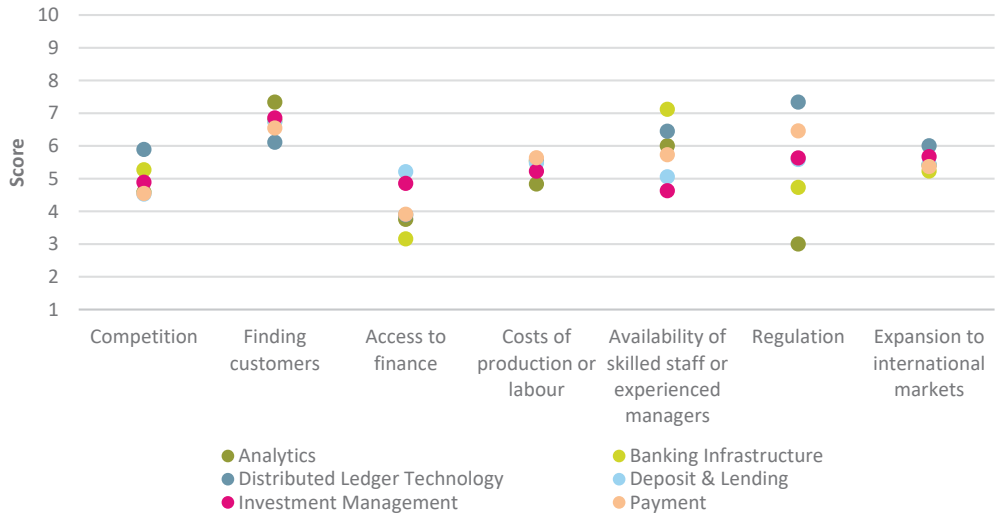


Figure 4.10.: Challenges faced by FinTech companies by product area (n=104)

[86] Note that the challenge «Expansion to international markets» has not been addressed to in the report of the *Institute of Financial Services Zug IFZ* and thus has not been evaluated by Swiss SMEs.

Summing up, acquiring customers is the most pressing challenge in the Swiss FinTech sector, followed by the search for skilled staff or experienced managers. On the other hand, access to financial capital does not pose a major problem to most FinTech companies. Comparing the assessment of the seven predefined challenges of the Swiss FinTech sector to Swiss SMEs reveals that the latter are consistently less affected by all challenges evaluated in this study.

4.3. Analytics

By Dr. Fabio Sigrist,
Institute of Financial Services Zug IFZ

In the following sections, we give an introduction to analytics, show current trends and developments, highlight some important success factors for applying analytics in practice, and present an outlook.

4.3.1. Description & Current Developments

In the recent years, financial companies in Switzerland have started to acknowledge that analytics can be used to add value to their businesses. One of the reasons why analytics and machine learning have recently gained a lot of attention is the combination of the availability of large amounts of data and the growing amount of inexpensive computational power. Companies have realized that data contains useful information for automating operations and for making better decisions. The amount of data is expected to grow further in the future with the share of unstructured data (text, image, and voice data) likely becoming larger. However, not all data will necessarily be relevant, and it will be a challenge to distinguish between potentially useful data and data that is redundant or simply unnecessary. This is essential, as to avoid drowning in a sea of information. In parallel with the growth of collected data, computational power has grown and become cheaper, which has

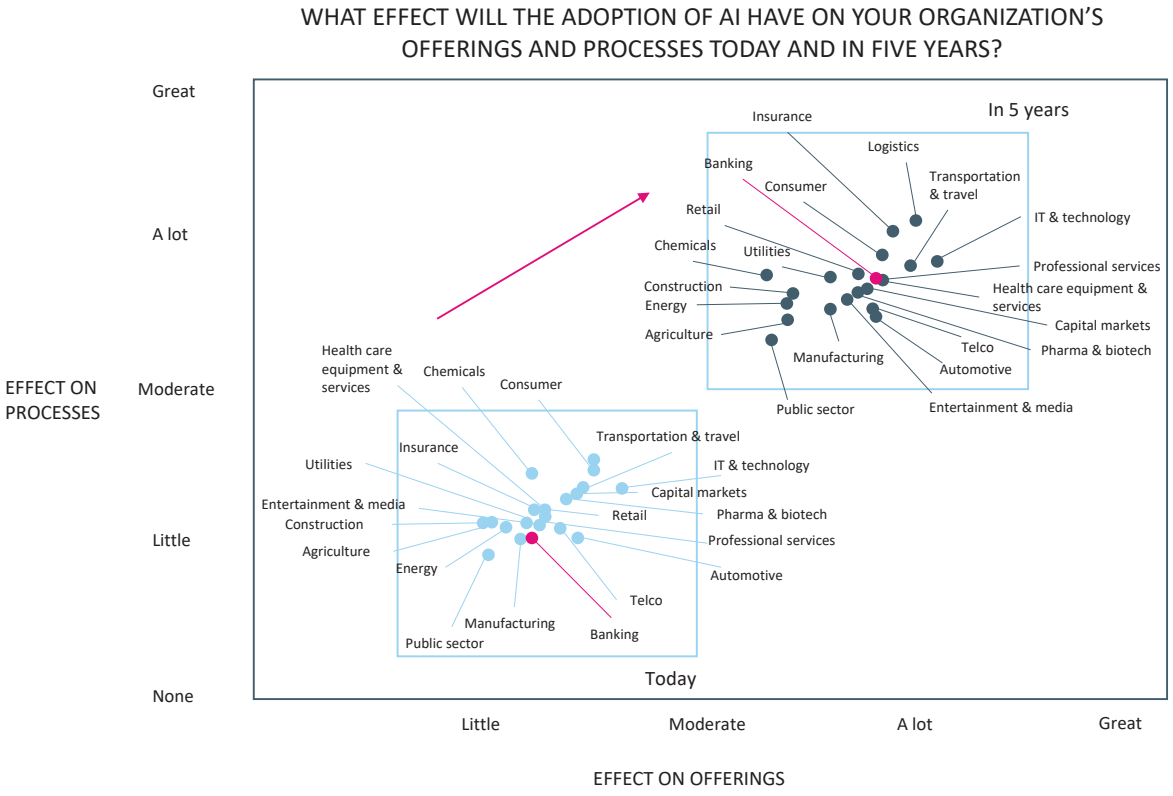


Figure 4.11.: Expectations of AI's effect of business across industries (Source: Ransbotham et al., 2017)

made it possible to apply algorithms on the scale of big data.

However, the gap between ambition and execution is still large for many companies. According to a recent report by *BCG* and *MIT Sloan Management Review* (Ransbotham et al., 2017), which was based on a global survey of more than 3,000 executives, only about one in five companies have incorporated Artificial Intelligence (AI) into their offerings or processes. On the other hand, the expectations concerning artificial intelligence are high across all industries. Figure 4.11 illustrates the current effect of artificial intelligence on processes and offerings for different industries and compares this with anticipated effects in five years. For the banking industry, the current effect is particularly low, whereas the expected effect in five years is high and above average compared to other industries.

What is Analytics? A Definition and Explanation of Some Commonly Used Terms

Analytics is the process of examining data in order to gather useful information, which can then be used to make better business decisions. One commonly used definition of analytics is the following one according to Davenport and Harris (2007): «Analytics is the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and add value.» As analytics is applied in many diverse industries, the following terms are often used almost interchangeably to denote analytics: data mining, data analytics, advanced analytics, business analytics, web or online analytics, or big data analytics.

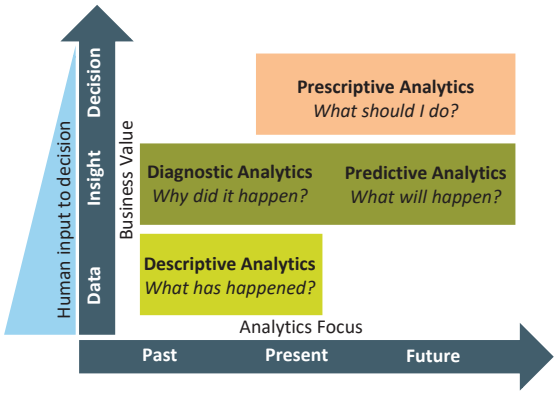


Figure 4.12.: Four types of data analytics (Source: IBM Corporation, 2015)

Data analytics can be categorized in various different ways. A frequently used categorization is the division into descriptive, predictive, diagnostic, and prescriptive analytics (see, e.g. Maydon, 2017). Table 4.1 as well as Figure 4.12 describe these different types of analytics.

What complicates communication in the area of analytics is the amount of different terms used by companies to denote similar things: machine learning, statistics, artificial intelligence, data science, and data mining, just to name a few (see Figure 4.13). While some of these terms denote precise scientific fields in academia, they are often used indiscriminately in practice for business applications. In the following, we give definitions of these terms and point out potential differences.

In business applications, data science is used almost interchangeably with data analytics. If there is a difference, then the term «data science» is used in situations where one wants to highlight a focus on complex methods, algorithms, and data structures. Both analytics and data science use techniques and methods from the fields of machine learning, statistics, and artificial intelligence.

Both machine learning and statistics have the goal to create algorithms and models that can learn from data in order to make data-driven predictions and decisions. Historically, the older field of statistics has its origins in mathematics, whereas its more recent sister field of machine learning was derived from computer science. Nowadays, both machine learning and statistics use almost the same methods and try to achieve very similar goals with the consequence that many experts argue that there is no major difference between the two fields. Machine learning has experienced major successes in recent years by using algorithms, such as deep learning (Goodfellow et al., 2016), which leverages the availability of both cheap computing and large amounts of data. Machine learning and statistics include techniques such as clustering, classifications, regression type models, dimension reduction, text mining and sentiment analysis, natural language processing, and network analysis.

Type	Description
Descriptive analytics	For descriptive analytics, the goal is to collect data and analyse *what happened* in the past. The main processes for descriptive analytics are data gathering, data visualization, and descriptive statistical analyses. This type of analytics is often also referred to as business intelligence (BI), and it can be done, e.g. with online analytical processing (OLAP) tools. **Typical use case:** Understand which customers are the most profitable ones.
Predictive analytics	For predictive analytics, the goal is to know *what will happen* in the future. Models are used to forecast behaviour or outcomes in the future. Examples for typical applications are the prediction of default risk or the probability of a customer to «churn». **Typical use case:** Identify customers that will cancel their customer relationship.
Diagnostic analytics	For diagnostic analytics, the goal is to understand *why something happens*. Here, the goal is not only to analyse data and find patterns or to predict certain events, but also to shed some light on the reasons why certain events happened or why one finds certain patterns in the data. **Typical use case:** Understand the reasons for the cancellation of, e.g. an insurance policy or a mortgage at a bank.
Prescriptive analytics	For prescriptive analytics, the goals is to understand *what one should do* in order to achieve a desired result. This includes experimental design to find causal relationships as well as optimization techniques. In many cases, a strong interaction between algorithms and humans is required: algorithmic tools can recognize patterns and people with expert knowledge are able to interpret these patterns. **Typical use case:** Decide which products should be recommended in order to achieve the maximal profit, in contrast to simply recommending products that are most likely to be bought buy a customer.

Table 4.1.: Four types of data analytics

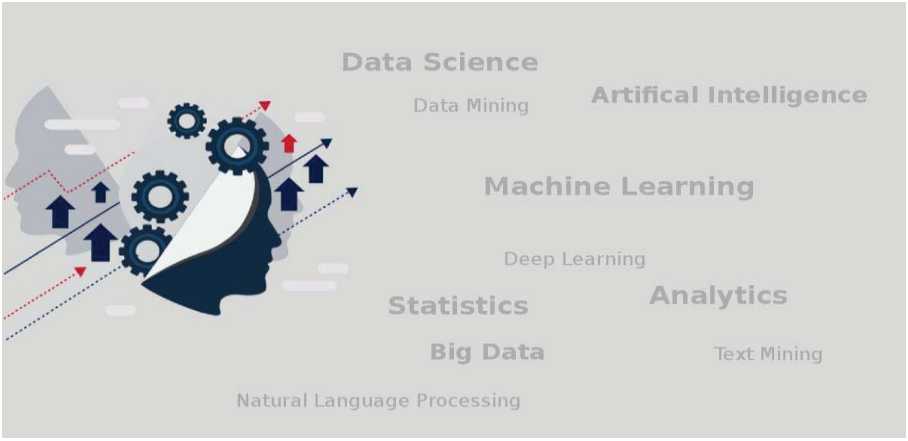


Figure 4.13.: Terms used in connection with analytics (own Figure adapted from an Illustration by GoodWorkLabs, online)

Artificial intelligence is a very general field that, technically, also encompasses machine learning. Broadly speaking, the goal of artificial intelligence is to create algorithms that are capable of intelligent behaviour. In contrast to the purely data-based approach of machine learning, artificial intelligence additionally relies on rule-based programs that are not necessarily trained by data.

The term big data is often used in combination with analytics. According to Schroeck et al. (2012), big data can be broken down into the four V-dimensions: volume (scale of data), velocity (speed of arrival of new data), variety (different forms of data), and veracity (different data quality). The latter is related to the relevance of data. Volume is often the most important dimension. Big data is conceptually the same as normal data, except that it cannot be handled and processed using standard data management tools and processes. This means that the challenges of big data often lie in setting up an adequate IT infrastructure and data management system that collects and stores data from various sources and uses computational power to process the data. A key difficulty when dealing with big data is to separate noise from signal. Unavoidably, big data contains a lot of data which is not relevant. This poses the danger of finding artefacts and drawing wrong conclusions based on fake and random results. Figure 4.14 graphically illustrates that the proportion of irrelevant data in relation to the relevant data is expected to grow in the future as more and more data is gathered.

In order to overcome current hurdles for successfully applying analytics in business, we highlight some key success factors in the following:

1. Understanding how to collect and integrate relevant data
2. Understanding how to build algorithms and models
3. Understanding how to evaluate algorithms and analytics solutions
4. Organization for analytics and innovation culture: vision and leadership, openness and the ability to change, long-term thinking, close alignment between business and technology strategy, and effective collaboration.
5. Intuitive understanding of analytics

First, an organization has to know which data it needs to collect or to buy from third-party vendors. Even if all potentially relevant data has been collected, an

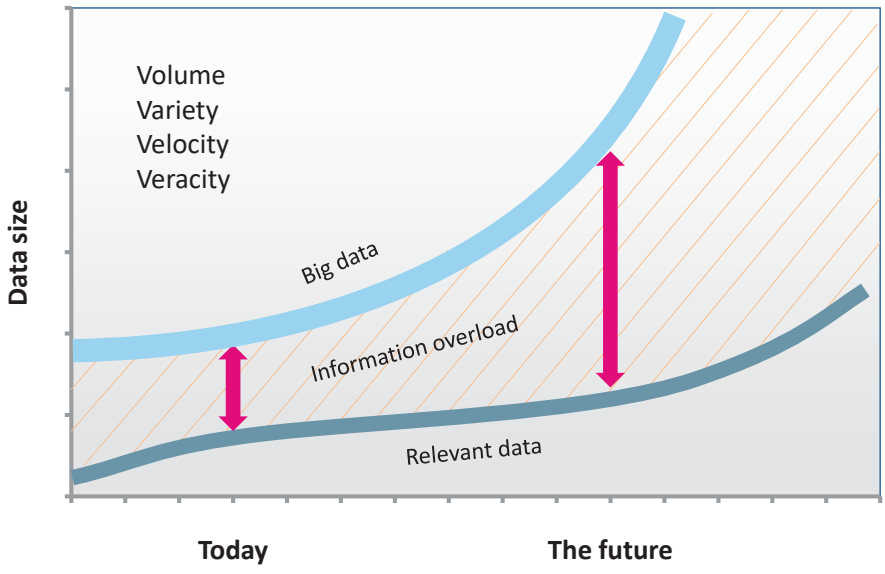


Figure 4.14.: Illustration of the use of big data (based on Sogeti, 2013)

ongoing challenge is to integrate data from different sources and multiple systems. These two issues should not be underestimated and necessary resources should be allocated to tackle them. Data collection and the subsequent preparation are often the most time-consuming activities when developing an analytics solution. Any successful analytics solution depends on the availability of relevant data. The best algorithm can be useless if there is insufficient data or data without any signal in it.

A second challenge is the necessary knowledge about algorithms and models which are to be employed. As analytics is a highly specialized field which requires a lot of training and education, the biggest hurdle here lies in hiring and developing talent.

The third challenge lies in the evaluation of algorithms and analytics solutions. Here one has to distinguish between the so called «offline» and «online» evaluation. Offline evaluation refers to the process of evaluating and comparing different solutions on the currently available data set. As with developing novel models and algorithms, this is a challenging process which requires subject specific statistical and machine learning skills. Offline evaluation is done before deploying a solution in practice. Online evaluation, on the other hand, refers to the process of deploying a developed solution or prototype and to then measure and compare its success. This should be done in a systematic and data-driven manner. The main process for doing this is often referred to as A-B testing. One starts by choosing two groups: a test group and a control group. Subjects (often customers) are then randomly assigned to the different groups. The new solution is run on the test group and the current or alternative solution is run on the control group. Before starting the experiment, one has to define a metric with which the results of the two groups can be compared systematically and scientifically.

A further challenge is to create an organizational environment that allows for analytics to be applied effectively. Analytics requires a certain innovation and research oriented culture. In contrast to traditional IT projects, the outcome of an analytics project is often much less predictable. While some projects might not deliver the desired outcome, others can have the potential to create a lot of value. Another important element is the cross-functional and interdisciplinary collaboration from the early stage in a project.

The final challenge is developing a certain analytics literacy and an intuitive understanding of analytics. This allows decision makers to quickly assess the potential success of future projects and allows for better collaboration with analytics specialists.

4.3.2. Market Participants in Switzerland

Companies that are active in the Swiss FinTech analytics market offer a very diverse palette of solutions ranging from the applications of machine learning techniques to data management systems. *NNAISENSE*, for instance, leverages the 25-year proven track record of one of the leading research teams in AI, to build large-scale neural network solutions for superhuman perception and intelligent automation, with the ultimate goal of marketing general-purpose Artificial Intelligence. *Inpher*, based in Switzerland and the Silicon Valley, offers solutions that allow for privacy-preserving machine learning technology. This enables search and advanced analytics on encrypted data without revealing the data. *Qumram's* solution enables users to record every digital interaction – web, social or mobile. This can be used, for instance, in digital audit, fraud detection, or customer relationship management. *Calfor Finance* offers automated sentiment based trading solutions as well as decision-making tools for financial analysts, wealth managers and traders. This is made possible by using large amounts of data and techniques from natural language processing, a sub-field of machine learning. *NetGuardians*, a Waadt-based company with international presence, offers fraud and risk assurance solutions by leveraging big data to correlate and analyse behaviour across the entire banking system.

In total, we counted 26 active participants in the Swiss market that operated in the analytics field by the end of 2017. These participants use analytics to provide the following services: automated trading or investment advice *(ACATIS Service, Calfor Finance, finhorizon, Edge Laboratories, Flink AI, Grydl Analytics, Sentifi, theScreener)*, risk assessment and management *(Ariadne Business Analytics, CFinancials, SwissMetrics, swissQuant)*, fraud detection *(NetGuardians)*, cash flow prediction for corporate finance *(Fractal Labs)*, automated accounting processing (*Run my Accounts*), algorithm-driven comparison of financial services providers (*moneyland.ch*) or impact ventures *(Ground Up Project)*, chat bots *(Enterprise Bot)*, customer relationship management *(atfinity, Qumram)*, privacy-preserving machine learning *(Inpher)*, deep learning

(NNAISENSE), data integration and data handling *(onedot, Squirro)* and data visualisation *(FinGraphs, veezoo)*.

The majority of the 26 Swiss FinTech companies in the field of *Analytics* operate in the B2B segment. Four of the analytics providers offer solutions in both the B2C and B2B segment. Only two companies are active solely in the B2C market. A large share of the 26 companies (23) operate in both the Swiss market and the international market. Most of the providers have been active in the market for several years already. Approximately one third of the companies were founded within the last three years.

4.3.3. Outlook

An aspect of analytics that will become more important in the future is the legal side. The European Union's new General Data Protection Regulation (GDPR), which will be implemented in 2018, will have an impact on the use of analytics solutions in practice. By strengthening and unifying data protection for all individuals within the European Union, the GDPR aims to give citizens back control over their personal data. It has been reported in some media outlets that the law will create a «right to explanation», whereby users can ask for an explanation of an algorithmic decision that was made about them. This could potentially severely restrict automated decision-making by machine learning algorithms, since many modern machine learning algorithms are black-boxes to some degree. Companies would then either have to think about clever ways to explain decisions or use less sophisticated algorithms. However, legal scholars are currently arguing that the existence of such a right to explanation is extremely vague, without judicial test and limited at best (Wachter et al., 2017).

4.4. Banking Infrastructure

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

The field *Banking Infrastructure* is closely related to the banking business and is therefore the product area which has been integrated into the banks the most. It is sometimes difficult to distinguish it from digital banking programs in general. For that reason, it is not surprising that Banking Infrastructure FinTech companies in the respective field and banks are often in close collaboration.

4.4.1. Description & Current Developments

The term «Banking infrastructure» comprises a wide span of product areas like open banking interfaces (APIs), identity and security management, information & transaction platforms, personal and business finance management systems, and financial compliance systems. The differentiation from the information technology of the traditional financial services industry is based on our definition of FinTech in section 2.1, which requires FinTech solutions to exhibit a certain degree of innovation. *Banking Infrastructure* is one of the largest product areas, which is explained by the importance of the digital transformation and the size of the established financial sector in Switzerland. FinTech companies in the field of *Banking Infrastructure* can therefore draw on a large pool of potential customers.

The pressure on banks has led to an acceleration of the digital transformation. The main drivers of this transformation are the challenge to meet customer expectations, followed by financial aspects in terms of revenue increases and reduction of operational costs. Challenges encountered during the process of implementation are the integration of legacy systems, security & privacy implications and a lack of internal expertise. A possible way to resolve these problems are Bank as a Platform (BaaP) solutions. BaaP is still at an early stage of development. Nonetheless, more than 60 percent of banks in Germany, Italy, Spain, the UK, the USA, Brazil, Mexico and Switzerland have started implementing or developing a BaaP strategy (GFT, 2017).

In addition, the IT infrastructure landscape itself is evolving rapidly as well. Relevant trends include (Elumalai et al., 2017):

- 'as-a-service' consumption for everything from software to hardware
- the mainstreaming of the public cloud
- increased use of open-source offerings
- persisting concerns regarding cybersecurity
- adoption of Internet of Things applications
- implementation of DevOps
- implementation of container architectures
- artificial intelligence and machine-learning-optimized stacks

The year 2017 generated many publications in the open banking area. The European Directive on Payment Services 2 (PSD2) forced the European banks to grant other companies access to their ledgers. Swiss banks are expected to follow, even though they are not required to do so by law. *Hypothekarbank Lenzburg*, for example, has already opened up their ledger system *Finstar* to the middleware API layer from *NDGIT*. This cooperation was subsequently honoured with the *Euro-Finance-Tech Award 2017*. *Hypothekarbank Lenzburg* has established further cooperation with other Swiss startup companies like *Qontis, Advanon, Finform, EdgeLab, CreditGate24, Payrexx* and *Datalizard* (Hypothekarbank Lenzenburg, 2017). This has allowed the bank to implement a family of «Hypi»-tools with *HypiStart* (online onboarding with *Finform*) or *HypiPay* (payment system with *Payrexx*), for example. Leading companies of the Swiss financial centre bundle their forces to develop a so-called common API specification for banking intended to facilitate harmonization and standardization in the finance industry (Swiss FinTech Innovations, online (b)). Another integration path has been established by *Numbrs* from *Centralway*. The *Numbrs*' mobile app allows financial institutions to offer their products in the *Numbrs* store. Various German institutions already use this new distribution channel (Numbrs, 2018).

The lack of verified digital identities limits the development and delivery of seamless, efficient and secure digital offerings (World Economic Forum, 2016a). The Federal Council is currently in the process of preparing the dispatch on the draft of the Federal Act on Recognised Electronic Means of Identification (E-ID Act). The draft plans to set up an ecosystem for digital identities with public and private actors. The publication of the draft is planned for summer 2018. The core elements of the E-ID Act include:

- the Swiss government renouncing the possibility of providing a federal E-ID
- private and public identity providers (IdP) offering E-ID systems
- the government certifying IdPs and allowing them to charge fees
- the government launching an unambiguous personal identifier
- establishing standards for the transmission of public identity attributes
- ensuring the compatibility between Switzerland and the European Union

In November 2017, *Swiss Post, SBB, Swisscom, UBS, Credit Suisse, Raiffeisen, Zürcher Kantonalbank, SIX* and *Schweizerische Mobiliar* signed a memorandum of understanding to establish a comprehensive national digital identity ecosystem. In order to do so, they founded the *SwissSign Group AG* in which *SwissID* was integrated as a digital identity provider (SwissSign, 2017). There are multiple other initiatives focusing on the Swiss digital identity market, some of which are based on Blockchain technology. Examples hereof are the digital identity solutions implemented in the city of Zug and Schaffhausen.

Based on a study conducted by *Ernst & Young* (2018), cybersecurity will be the most pressing topic for the Swiss financial industry in the next 6 to 12 months. A Swiss competitor in this market is *OneVisage*. The innovative 3D authentication security company has been internationally recognised and has been able to set up offices in Silicon Valley (OneVisage, 2018). Another example is *Futurae Technologies*. It recently won the *Venture Kick* final with its innovative authentication technology based on sound or noise recognition (Futurae, 2018).

The growth of personal finance management (PFM) systems accelerated in 2017. *Contovista* was able to win additional clients in Switzerland and to step into a strong partnership with the *Aduno Group* that acquired a majority share of *Contovista's* equity. This partnership allows for an international expansion strategy for *Contovista's* solutions and the development of a business finance management system for SMEs (Contovista, 2017).

RegTech can be viewed as a specialisation of FinTech. As elucidated in section 2.1, this study only covers Swiss-based companies that provide financial compliance systems to the financial industry. Since the seamless integration of compliance into booking, client and portfolio management systems generates many synergies, the merger announcement of *Swisscomply* and *Evolute* in March 2017 did not come as a surprise. The same holds true for the cooperation between the established company *BDO* and the Swiss startup *Addfin*.

4.4.2. Market Participants in Switzerland

As illustrated in Figure 4.1, the product area *Banking infrastructure* is the second largest among all FinTech areas. As per the end of 2017, 48 companies were ac-

tive in the respective field, an increase by two companies in comparison to the end of 2016. Half of the companies (24) are located in Zurich. This clustering may be caused by the important role of Zurich as a globally leading financial centre, thus presenting a large pool of (potential) customers for FinTech companies active in the area of *Banking Infrastructure*. Of the total of 48 companies, six were founded in 2017. They include *Apiax* (provider of digital compliance solutions), *Ledgy* (provider of a digital cap table tool), *Open Mineral* (trading platform for the metal market), *Oyoba* (developing a digital bank), and *Protagoras* (platform for risk profiling and country-specific tax functionality), and *TaxLevel* (SaaS solution for tax reporting). In addition, six companies which were founded prior to 2017 but were not included in the *Banking Infrastructure* product area in our last year's study, namely *Confinale* (IT-solutions for taxes, compliance and asset management), *Capnovum* (cognitive compliance management platform), *Integration Alpha* (regulatory reporting and data science services), *Investment Navigator* (web-based information platform for the financial sector), *Securosys* (security solutions for data and communications), and *Socrat Engineering* (wholesale platform for brokers), were included in this year's edition. On the other hand, ten companies were excluded from the *Banking Infrastructure* product area due to the closure of their business or a shift in business model away from *Banking Infrastructure* towards another (Non-) FinTech product area.

4.4.3. Outlook

To summarize, 2017 has seen further integration of innovative FinTech solutions with traditional financial service providers. This has led to a growth of the customer base, but also to a consolidation of different market participants. In 2018, we expect this integration of FinTech companies in the field of *Banking Infrastructure* with traditional providers to continue. Last year's developments have shown that the solutions in the respective field are mainly of evolutionary rather than revolutionary nature. However, there is a possibility that some game changers with completely new kinds of business models will emerge in the future. These business models are likely to be based on emerging technologies like Blockchain or Artificial Intelligence.

4.5. Distributed Ledger Technology

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

Distributed Ledger Technology (DLT) has increasingly found its way into the financial services industry. The following sections highlight DLT-related initiatives in the financial industry in 2017, list current FinTech market participants, and give an outlook on future developments in the respective field.

4.5.1. Description & Current Developments

Companies active in the field of DLT can be categorized into two main verticals. The first vertical comprises applications in the field of cryptocurrencies, such as issuance, storage, trading and investment solutions, whereas the second vertical delineates the application of DLT for the purpose of streamlining existing processes in the financial industry.

The emergence of hundreds of new cryptocurrencies along with large price increases of their leading representatives has led to a boom of FinTech companies focusing on solutions in the first vertical of DLT. In 2017, a total of 18 companies were founded in the DLT-segment, accounting for more than 50 percent of the total of newly incorporated Swiss FinTech companies. The canton of Zug, in particular, has positioned itself as a globally leading hub for Blockchain-technology and has therefore become known as the «Crypto Valley». Since the developments in the Crypto Valley constitute an integral part of the Swiss FinTech ecosystem in 2017, a specific chapter is devoted to this subject (see section 5.1). In addition to Zug, the city of Chiasso also aims to establish itself as a leading DLT and FinTech center worldwide, the so-called «Cryptopolis». For that purpose, the *Cryptopolis Association* was founded in 2017 (for more information on the association see section 3.3.4).

In the last year, various DLT-related initiatives were launched by established financial institutions, especially in the field of cryptocurrencies. After the introduction of a Bitcoin tracker certificate by *Vontobel* in 2016, further Swiss banks have started offering cryp-

Bank	Offering	Product
Cornerbank		Exchance traded note
Falcon Private Bank		Cryptocurrency
IG Bank		Contract for difference
Leonteq		Tracker certificate, Mini-futures
Swissquote		Cryptocurrency, AMC (Bitcoin)
Vontobel		Tracker certificate, Mini-futures

Table 4.2.: Cryptocurrency-related offerings from Swiss banks at the end of 2017

tocurrencies to their clients. An overview of cryptocurrency-related offerings from Swiss banks at the end of 2017 is shown in Table 4.2

In July 2017, *Swissquote* partnered with the cryptocurrency exchange *Bitstamp* in order to offer trading in Bitcoin pairs with EUR and USD on its platform. In the same month, *Falcon Private Bank* allowed its clients to store and trade bitcoins via their cash holdings with the bank. Both banks have extended their cryptocurrency-related offering since then: whereas *Falcon Private Bank* added Ether, Bitcoin Cash and Litecoin to its blockchain asset management services on August 22nd, *Swissquote* added Ether, Bitcoin Cash, Litecoin and Ripple to its offering and launched the first actively managed certificate (AMC) on Bitcoin listed on the Swiss exchange. In September 2017, *Cornerbank* launched the Bitcoin-related products *Bitcoin Tracker One* and *Bitcoin Tracker EURO*, two exchange traded notes (ETNs) which reflect the movement of Bitcoin against the US Dollar. One month later the bank extended its offering with the introduction of two analogous products on Ether. Since 2014, *IG Bank* has been offering its clients the opportunity to gain exposure to Bitcoin by trading contracts for difference (CFDs). In the second half of 2017, the bank introduced analogous products on Ether and Bitcoin Cash. *Leonteq*, a technology and service provider for investment solutions, was also active in the crypto space in 2017. After the introduction of a Bitcoin tracker certificate on October 2nd, the Swiss FinTech company and *Vontobel* launched separate mini-future certificates on Bitcoin, listed on the *SIX Exchange (Bloomberg, online)*. The rising number of cryptocurrency-related products offered by Swiss financial service providers shows that cryptocurrencies are increasingly accepted as an emerging asset class.

Aside from the variety of initiatives launched in the field of cryptocurrencies, the financial industry in Switzerland is increasingly concerned with the underlying Blockchain-technology. In the first half of 2017, a consortium consisting of *InCore Bank, Inventx, SIX, Swisscom, ti&m* and *Zürcher Kantonalbank*, which was led by the *Lucerne University of Applied Sciences and Arts*, successfully completed a Blockchain-based project to enhance the clearing and settlement of non-listed equities (OTC Swiss Blockchain, online). In August 2017, *Solidum Partners* issued catastrophe bonds which were subsequently acquired by the Swiss private bank *Lombard Odier* in the first bond transaction using Blockchain (Lombard Odier, online). Another player in the Swiss financial sector that has placed an increasing focus on DLT is *Partners Group*. The Swiss-based private markets investment management firm launched a DLT-based signing and verification service for its treasury management in order to streamline the exchange of business documents with third parties (Partners Group, online). A further example of the growing interest in DLT from the financial sector is the *SIX* funded *Swiss FinTech Innovations* initiative to create a DLT-based settlement system, whose minimum viable product was developed by *Nasdaq*, as a complement to *SIX's* productive bilateral trading platform *XBTR* (Swiss Fintech Innovations, online (a)). As shown in Figure 4.15, the adoption of Blockchain-technology in the Swiss financial sector is expected to further increase in the coming months. Whereas about one third of the companies in the financial services sector are not interested in DLT, two thirds are either getting interested in the technology, have started to work on concrete use cases, or are implementing proof of concepts in preparation for productive use. As per a report of *PwC*, three quarters of Swiss banks,

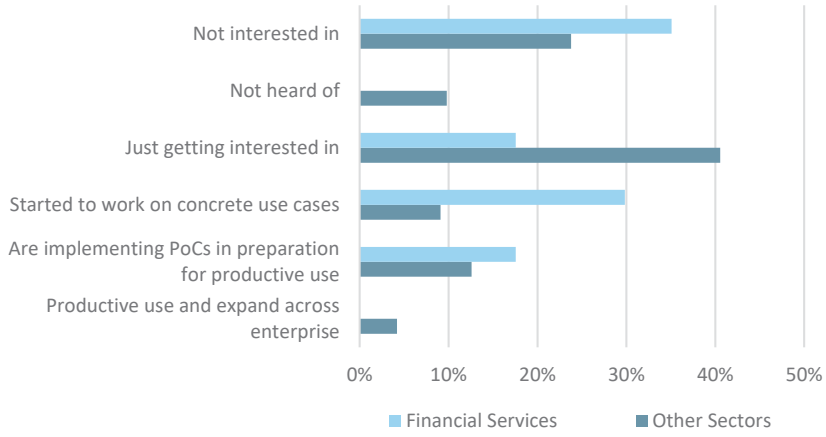


Figure 4.15.: Blockchain adoption in the Swiss financial services sector (based on IBM Corporation, 2017)

i.e., not the whole financial services sector, plan to adopt Blockchain in the next three years. On a global scale, this share is estimated to amount to 67 percent (PwC, 2017b).

4.5.2. Market Participants in Switzerland

As per the end of 2017, 33 FinTech-related DLT companies were active in Switzerland, representing an increase by 12 companies in comparison to the preceding year. 18 companies have been newly incorporated in 2017. As pointed out in section 4.5.1, the area of activity of these companies can be categorized into two main verticals of DLT. The first vertical focuses on applications in the field of cryptocurrencies. The companies that have been incorporated into this vertical in 2017 include *Bancor* (protocol for trading and pricing Ethereum-based ERC20 tokens using a web wallet), *Blockhaus* (institutional provider of smart contract tokenized ecosystems), *Bread, Eidoo* and *Monaco Technology* (providers of wallet solutions for digital assets), *Coinlab Capital* (provider of simple and safe exposure to digital assets to investors), *CoreLedger Labs* (platform allowing digitization of any good or service on a blockchain), *Crypto Finance* (provider of blockchain-related asset management, brokerage and storage services), *Diamond Digital* (diamond-based cryptocurrency implemented on the Ethereum Blockchain), *Pillar Project* (developing a user-centric cryptocurrency wallet), *Protos Cryptocurrency Asset Management* (asset manager for cryptocurrency investments), *Smart Valor* (marketplace for tokenized investments), *Swiss Crypto Exchange* (developer of Swiss-based cryptocurrency exchange) and *Swissborg Invest* (ecosystem for managing a portfolio of cryptographic assets).

Other newly incorporated DLT-related companies that do not primarily focus on the cryptocurrency market but aim at incorporating DLT into the financial sector are *Decentriq* and *Swisscom Blockchain*. A Blockchain-based crowdfunding platform was developed by *Bloomio*. *SMEx* provides a (fiat) currency marketplace for small and medium enterprises using DLT.

4.5.3. Outlook

In 2017, the cryptocurrency market offered high returns for investors (or speculators). As an example, a Laspeyres-type cryptocurrency index, consisting of the five largest cryptocurrencies as measured by market capitalization, grew by more than 2,400 percent in 2017 (see section 5.3 and Appendix C). Not only investors were able to profit from the cryptocurrency market. In addition, companies which used the market to raise funds by conducting ICOs benefited from the increasing attention on the cryptocurrency market. This is reflected in the total volume raised by ICOs of Swiss-based companies, not exclusively in the FinTech sector, which amounted to roughly $850 million in the past year (see section 5.2).

However, DLT can offer much more than serving as an (speculative) investment or a vehicle to raise money. Based on the characteristics of high-potential DLT use cases listed by the *World Economic Forum* (2016b), the six following potential use cases in the financial industry can be identified (Ankenbrand, 2017):

1. Cryptocurrencies
2. Fund raising
3. Payment systems
4. Asset registries
5. Clearing and settlement
6. Trade finance

In 2018, we expect to see growing interest in DLT-based solutions for payment, clearing and settlement systems, as well as for asset registries and trade finance processing. Based on the characteristics of DLT, the following advantages could be achieved by replacing established systems and processes with a DLT environment:

– higher efficiency and cost-effectiveness in transaction processing
– possibility of multiple writing accesses
– obsoleteness of trust in operators and notary's offices
– reduction in reconciliation activities, enabled by the consistent database used by all parties involved
– automation of compliance, enabled by the regulator's insight into the system's activity
– reduction in counterparty and liquidity risk

Different well-funded Swiss-based DLT startup companies are expected to improve their decentralized platform solutions in the course of 2018. We also expect international consortia like for example the *Hyperledger* project, with *Swisscom* as the first Swiss-based participant, to launch further solutions beyond proof of concept in the coming months.

4.6. Deposit & Lending

By Simon Amrein & Prof. Dr. Andreas Dietrich, Institute of Financial Services Zug IFZ

As a form of internet-based financial intermediation, crowdfunding is an integral part of financial technology. In comparison to a bank being the financial intermediary, such as in «traditional» channels of financial intermediation, an internet platform enables borrowers and lenders to interact directly. Crowdlending establishes a direct link between lenders and borrowers and therefore removes the traditional financial institution from the deposit and lending process. Although there are different types of crowdfunding, from a FinTech perspective only three categories are relevant: crowdlending, crowdinvesting (equity based crowdfunding) and invoice trading.

Within these three categories, CHF 111.3 million were invested in Switzerland in 2016. In 2015, the total volume invested was CHF 15.4 million (Dietrich & Amrein, 2017). Further rapid growth can be expected in 2017[87].

4.6.1. A FinTech View on Crowdfunding

Crowdfunding is a method of funding campaigns online, where many people often provide funds for cultural, social, or commercial purposes. Communication between investors and borrowers is established through the internet and the role of the intermediary is assumed by the crowdfunding platform. The intermediary receives a fee for its services. This referral commission is often defined as a percentage of the amount raised. The funders receive either a monetary or non-monetary compensation in return for their investment.

As shown in Figure 4.16, the compensation for providing capital vary from a share of the profits of a company (crowdinvesting), interest income (crowdlending) to buying an invoice at a discount (invoice trading). In the case of reward-based crowdfunding, compensation for funders may take the form of products or services. Besides that, funding can also be provided without any direct and measurable consideration for the investment (crowddonating).

From the perspective of our definition of FinTech (see section 2.1), not every category of crowdfunding can be classified as FinTech, as the definition specifically emphasises «financial products or services». For this reason, the focus is set on products and services that alter the financial intermediation process. In our case, this constitutes a potential transformation away from traditional lending from banks and lending and investing through the stock exchange, towards the internet-

[87] The new data for 2017 will be published in the Crowdfunding Monitoring 2018.

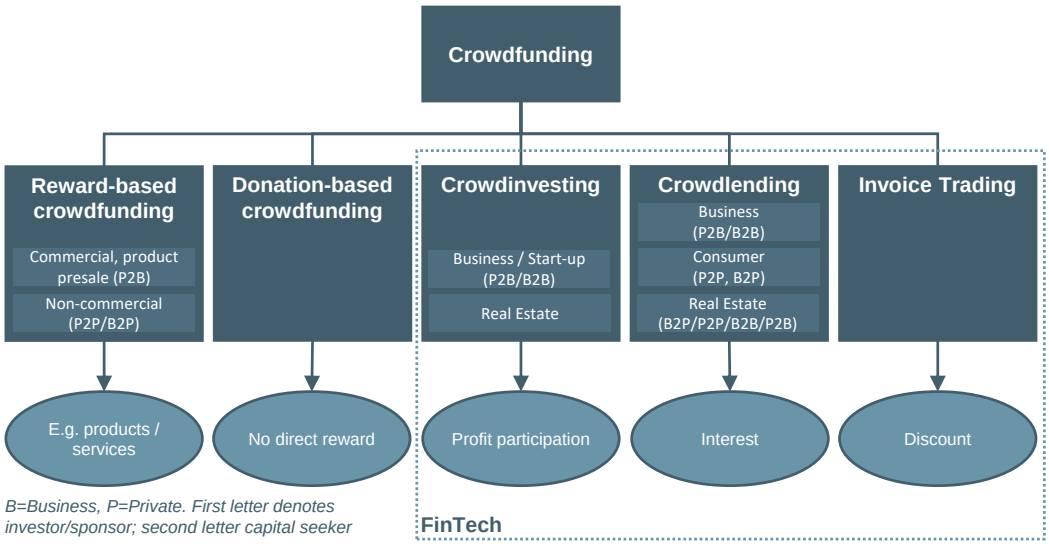


Figure 4.16.: Crowdfunding taxonomy

based model of crowdfunding. Reward-based crowdfunding and crowddonating do not match these criteria. Crowdinvesting, crowdlending, and invoice trading, however, embody such financial services or products.

Crowdinvesting (equity-based crowdfunding) and real estate crowdinvesting: The aim of crowdinvesting lies in acquiring a stake in a company via equity or mezzanine capital, as opposed to funding a project. These companies subject to investment are often in an early stage of their life cycle. Depending on the platform, crowdinvesting may also provide a possibility to invest small amounts and to support startups at an early stage of their life cycle. In return, these funders receive shares in the company, or a profit-linked compensation in the case of mezzanine funding. In order to guarantee more freedom and flexibility in the decision-making process of the management of a company, voting powers are often restricted for many types of investments. Apart from the investment in companies, a further form of crowdinvesting offers the opportunity to engage in real estate. In this case, the investor becomes a co-owner of the property and/or land. The return on investment depends on the rental income from which the costs, such as operating costs, financing costs, or management costs are subtracted. The advantage of real estate crowdinvesting is that investors can invest directly in (comparably small) shares of real estate. This was not possible before real estate crowdinvesting became available. Investors traditionally would have had to invest indirectly, buying shares of real estate developers or real estate funds.

Crowdlending: Capital intermediated through crowdlending platforms is considered debt capital and can be divided into three different categories depending on the type of borrower. Firstly, private persons might borrow money to fund weddings or trips, for example. Thus, this subcategory of crowdlending is comparable to consumer loans. Secondly, companies – usually small and medium enterprises (SME) – are also able to seek capital via crowdlending. Thirdly, professional real estate developers, as well as private persons, might finance the debt part of their real estate using crowdlending. In all of these cases, individuals or firms advertise their need for borrowing over their personal profiles on a crowdlending platform. Private and institutional investors can view and fund these business or consumer loans directly through the platform. By using crowdlending, investors are able to diversify their asset allocation with an additional fixed income asset class and have access to consumer loans

without having to go through the asset-backed security market or invest indirectly in financial institutions offering such services. Furthermore, crowdlending opens the abovementioned asset class to smaller investors and constitutes a disintermediation of consumer and business finance using an electronic platform as a marketplace. Crowdlending is also known as peer-to-peer lending (P2P) or marketplace lending. Whereas the first term emphasizes the involvement of a large number of mostly private investors, the definition of marketplace lending is broader, as it also includes institutional investors. Even though many markets have developed into marketplace lending, the terms crowdlending and P2P lending are still frequently used.

Invoice trading: Invoice trading via crowdfunding enables firms to receive immediate liquidity by prefinancing their accounts receivable. The invoices are sold to the investors at a discount, following which the business receives funds to their account as an advance of up to 90 percent of the invoice face value, usually within 24–48 hours.

4.6.2. Market Participants in Switzerland

The last three years marked a period of profound change in the FinTech-relevant crowdfunding market. Many new platforms went online and new forms of crowdfunding, such as real estate crowdinvesting and -lending, invoice trading, and business lending as a part of crowdlending, were introduced.

A variety of business models are present within crowdlending. *Cashare*, *CreditGate24* and *Crowd4Cash* provide loans for both private persons and companies. *Splendit*, as another example, focuses solely on student loans, whereas *Lend* and *Lendora* target a broader group of private persons. *Creditworld*, *swisspeers*, and *Lendico* (in cooperation with *PostFinance*) focus exclusively on SME-loans. *Lendity* provides access to platforms for institutional investors, allowing them to invest globally in SME and consumer loans. *Hyposcout* and *SwissLending* are active in the mortgage market, offering debt capital to people buying real estate.

As with crowdlending, the crowdinvesting category also presents major differences between the various business models. *Investiere*, for example, operates like a «business angels club», where investors are screened before being accepted for admittance. The other two crowdinvesting platforms, *Bee Invested* and *Raizers*, have no access restrictions for investors.

The first real estate crowdinvesting platform in Switzerland was launched by *Crowdhouse* in 2015, allowing investors to buy shares in real estate. The platforms *Crowdli*, *immoyou* and *Foxstone* were all established in 2016 and are also active in the real estate crowdinvesting sector.

4.6.3. Size of the Swiss Crowdfunding Market

In 2016, CHF 128.2 million were raised across all crowdfunding categories in Switzerland, compared to CHF 27.7 million in 2015. As shown in Figure 4.17, CHF 111.3 million were collected through crowdinvesting, crowdlending and invoice trading. The following market analysis builds on the annual *Crowdfunding Monitoring Switzerland* (Dietrich & Amrein, 2017), which is based on a survey conducted among all active platforms in 2017.

Crowdinvesting

Three platforms with campaigns based in Switzerland were servicing Switzerland's crowdinvesting market at the end of 2016. These platforms were used for 25 successful campaigns (previous year: 17). The funds raised rose sharply from CHF 7.1 million in 2015 to CHF 39.2 million in 2016. The growth was mostly driven by real estate crowdinvesting. This segment, which only emerged in Switzerland in 2015, had already reached CHF 32.4 million in funds raised by 2016. This figure relates to the portion of equity capital raised through crowdfunding. The platform *crowdhouse* was responsible for most of the funds raised through real estate crowdfunding in 2016. In the area of busi-

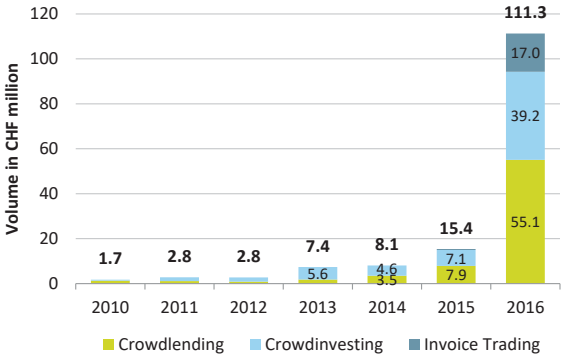


Figure 4.17.: Total volume of Crowdlending, Crowdinvesting and Invoice Trading, 2010–2016 (Data: Dietrich & Amrein, 2017)

ness crowdinvesting, startups received CHF 6.8 million in 2016, compared to CHF 7.1m in 2015. The investors backed a total of 13 startups. The year 2016 saw the platform *investiere* handle the lion's share of the funds raised.

Business crowdinvesting, in contrast to other crowdfunding areas, has only grown slowly since 2013 (2013: CHF 5.6m). In an attempt to explain this moderate development, one could imagine that nascent businesses remain only vaguely aware of these funding opportunities, or prefer not to open up their business models via this channel. Another possible explanation is that nascent businesses have better accessibility to capital from private sources or business angels and thus have no need to resort to the crowdfunding market. That said, there are many good reasons why crowdfunding could make sense for businesses seeking extra capital. Furthermore, institutional investors are becoming increasingly aware of the opportunities it presents, as a result of which we can expect to see larger transactions in the future. It is also worth mentioning the pioneering decision of the Swiss pension fund *Nest* to enter a partnership with *investiere*, aiming to invest systematically in startups. It is probable that crowdinvesting platforms will increasingly be used for later funding rounds, not just early-stage funding, as they are now.

The average amounts raised vary immensely. Whereas the figure for real estate crowdinvesting settles around CHF 2.7 million (equity capital portion of the funds), the average funding round in business crowdinvesting generates roughly half a million Swiss Francs. This average figure for business crowdinvesting has remained fairly stable in recent years. As for real estate crowdinvesting, it has not been in existence long enough for any meaningful conclusions to be drawn.

Crowdlending

The crowdlending market has experienced the strongest year-on-year growth of all the crowdfunding categories. The funds raised rose by almost 600 percent from CHF 7.9 million to CHF 55.1 million, while the number of successfully funded loans increased from 266 to 840. Of the CHF 55.1 million, CHF 28.1 million are accounted for by business crowdlending (loans for SMEs). Consumer crowdlending (loans for private individuals) raised CHF 24.1 million in 2016.

The largest growth in the crowdlending segment was generated by SMEs seeking loans. Besides the relatively large overall amounts, SME loans typically show higher average amounts compared to consumer related loans. Whereas the average transaction size in the case of SME loans was around CHF 171,000, a corresponding consumer related loan was significantly lower at CHF 36,000.

Investors of loans for SMEs invested an average of CHF 18,000 in 2016. The equivalent figure for consumer loans was CHF 4,000. These averages should be treated with caution however, as loans amounts can differ greatly. Alongside private investors, the growing activity and importance of institutional investors and family offices is worth noting. They are typically able to make considerably larger investments than private individuals in this new investment class.

Invoice trading

Advanon, the only platform offering invoice trading in Switzerland at the moment, has been online since 2015. The volume of invoice trading in Switzerland in 2016 was CHF 17.0 million. In 2016, *Advanon* announced partnerships with the *Hypothekarbank Lenzburg* and the *Basellandschaftliche Kantonalbank*.

4.6.4. Impact of New Regulation on Crowdfunding[88]

In 2017, crowdfunding was affected by major regulatory changes. The so-called FinTech regulation brought important amendments of the Banking Ordinance (Bankenverordnung). A first important change for crowdlending platforms is related to the number of lenders, which was limited to less than 20 so far. The new sandbox concept defined in the Banking Ordinance (art. 6) allows public deposits to be accepted without a banking licence up to a limit of CHF 1 million, provided that they are not invested and do not bear interest, even if such deposits originate from more than 20 depositors. Funds above CHF 1 million require a separate approval by FINMA. This rule is valid if they are intended to fund a mainly commercial or industrial activity. Thus, the «rule of 20» is still in place for loans to private persons.

Platforms active in business crowdlending (loans for SMEs) have shown a positive attitude towards this change in regulation, although it is too early to meas-

[88] Additional information on this matter can be found in section 3.1.

ure the impact of the volume in the past few months. First analyses show however, that many SME loans are now funded by more than 20 lenders. To give two examples: 84 lenders recently funded a CHF 500,000 loan, and a loan of CHF 400,000 that needed to be extended was funded by 39 investors, in comparison to the maximum of 19 lenders before. Overall, this amendment in the regulation lowers the minimum investment amount per lender and increases the effects of diversification for investors. Also, the new regulation lowers the dependence of crowdlending platforms on institutional investors.

The second amendment extends the time public funds can be held on settlement accounts. The Federal Council has extended the period for which deposits may be held in settlement accounts to 60 days. So far, funds could only be held on settlement accounts for seven days. This is mainly relevant for crowdfunding platforms that receive funds for projects. The feedback from the platform towards this new rule is very positive, as it facilitates the administrative processes and reduces the risks for the platforms. However, it is unlikely to have an impact on the market volume.

4.6.5. Outlook

The categories crowdlending, crowdinvesting, and invoice trading have been marked by an impressive acceleration of growth in the recent years, and managed to continue in the year 2017. Despite the remarkable expansion, however, the absolute volume of funds in all three categories remain relatively small. Nonetheless, the years 2016 and 2017 can be recorded as years of fundamental change for the Swiss market, with the business models of platforms becoming more diverse, especially in 2016. Furthermore, a large part of the volume of the crowdfunding market, notable 87 percent, are assigned to the categories of crowdlending, crowdinvesting and invoice trading. This distribution is comparable to the market structure in the United States, the United Kingdom and China, which are more mature crowdfunding markets.

In addition, the new FinTech regulation introduced in Switzerland in 2017 is likely to positively impact the growth rates. By allowing for more than 20 investors per loan, the crowdlending platforms will be given more flexibility in financing larger loans with a large number of funders. We see the new framework as a positive development and are convinced that it will support a sustainable evolution of the Swiss crowdfunding market and will accelerate its growth.

4.7. Investment Management

By Dr. Jürg Fausch,
Institute of Financial Services Zug IFZ

In recent years, the financial sector has undergone significant change. Advances in technology can be identified as one of the key drivers of this transformation. Particularly in investment management, the emergence of FinTech startups offering digital or online investment management services pose a significant challenge to established financial services providers. However, traditional financial advisory and asset management firms have started to enter this growing market and to provide digital investment advice and investment management services to retail investors. To date, there exists no universally accepted definition of online investment management. Dietrich et al. (2015) define digital investing as any form of financial investment, where the entire or parts of the investment process are proposed or implemented online. Investment guidance and portfolio management services are personalized and usually based on algorithms and models. Clients of digital investing platforms have immediate online access to their accounts on user-friendly smartphone applications and websites (Kaya, 2017).

A recent study published by *Swisscom* and the *Institute of Financial Services IFZ* shows that by international comparison the Swiss market for digital investment management is still at an early stage (Dietrich et al., 2015). In the United States, the two leading robo advisor platforms, operated by the FinTech startups *Wealthfront* and *Betterment*, now manage client assets of more than $7.5 billion and $10.0 billion, respectively. Incumbent asset management firms are also rapidly expanding their digital investing offerings. Currently, *Vanguard* with $47 billion assets under management (AuM) is the leading provider, followed by *Charles Schwab* with AuM of $10 billion and *Personal Capital* with AuM of USD 3.6 billion (Burnmark, 2017). In 2016, US providers of digital investment management solutions managed a total of $126 billion in assets (Statista, 2017). Different studies pre-

dict further growth in the market in the coming years, although estimates vary substantially from $0.82 trillion in global assets under management (Statista, 2017) in 2020 to $2.2 trillion (KPMG, 2016).

4.7.1. Business Models

In online investment management, four business models have emerged. These business models vary in their degree of sophistication, as well as degree of personalization and support. Dietrich et al. (2015) developed a two-dimensional grid to classify these four business models (see Figure 4.18).

The dimension «Personalization & Support» on the horizontal axis measures the degree of personalization of the investment proposal, the depth and breadth of the proposals, as well as the opportunity for personal advice. The dimension «Sophistication» on the vertical axis analyses the process of determining the risk profile, the user-friendliness and the information content, as well as the sophistication of the investment process. Table 4.3 provides a short description of each of the four business models.

Products and services in the area of digital investing are available for private individuals (B2C) and other businesses (B2B) such as banks and asset managers. Consequently, the following sections are not restricted to the four business models listed in Table 4.3, which typically target private individuals, but also include a broad range of additional products and services focusing on the investment management industry.

4.7.2. Client Demographics

In terms of client demographics, millennials between the ages of 24 and 35 are expected to constitute the customer base of online investment solutions, since they often adopt new technologies quickly and prefer self-service approaches. Furthermore, millennials very often have smaller amounts to invest, which in turn makes them unsuitable customers for traditional financial advisers (Fisch et al., 2017; Kaya, 2017). There is also evidence indicating that young people, particularly millennials, are very often not satisfied with the offerings provided by traditional financial services firms (Fisch et al., 2017). However, industry estimates imply a different reality. For example, US robo-advi-

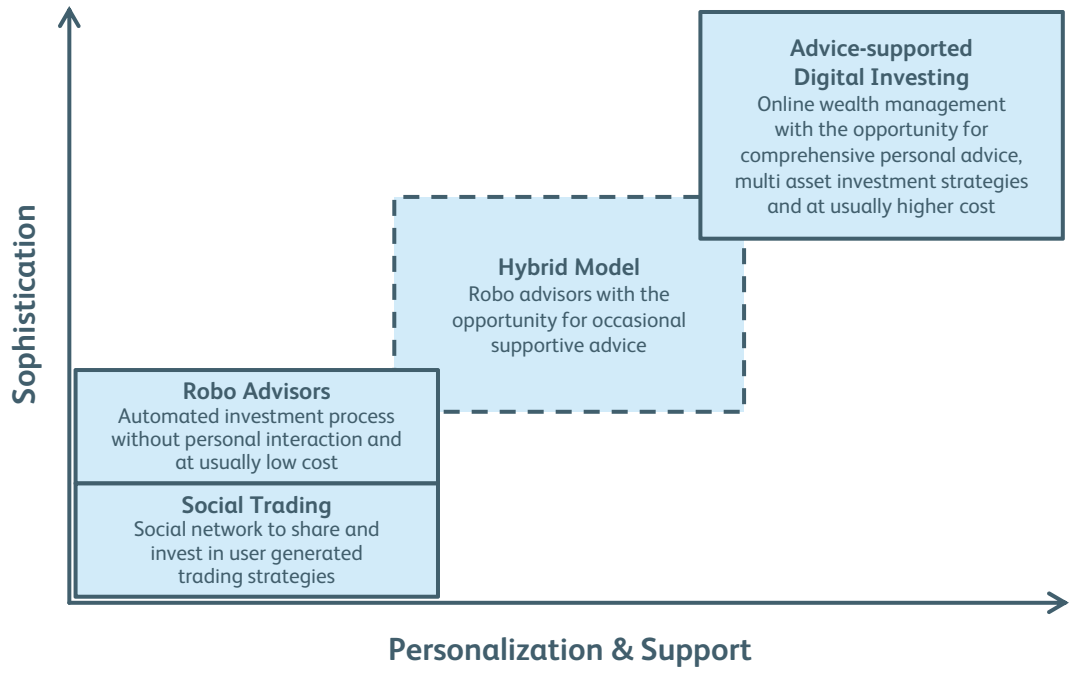


Figure 4.18.: Classification and definition of business models

Business Model	Description
Robo Advisor	Highly standardized, automated solutions that have a relatively low degree of sophistication. Robo advisors apply algorithm-based investment processes to generate client portfolios.
Social Trading	This business model relies on the principles of social networks. Users share their own trading ideas or invest in previously published trading strategies of other users.
Advice-supported Digital Investing	Highly sophisticated solutions that enable a high degree of personalization and offer the opportunity for comprehensive personal advice.
Hybrid Model	This business model includes aspects of both «Robo Advisors» and «Advice-supported Digital Investing». It combines the standardization of a robo advisor and the opportunity for occasional supportive advice.

Table 4.3.: Descriptions of business models

sory clients are on average in their mid-40s and have account balances that tend towards six-digit figures. Other demographic data for Germany and Italy show that higher educated clients use robo-advice more often than less educated investors. The same holds true for financial literacy (Kaya, 2017). Moreover, the 2017 *Legg Mason Global Investment Survey* reveals that a strong majority of investors, including the tech-savvy millennials, favor human interaction when seeking financial guidance for their investment decisions (Legg Mason, 2017a). These results also hold for Switzerland where in a representative sample of N = 900 respondents only 25 percent stated that online tools and apps replace the need to speak to a human advisor (Legg Mason, 2017b).

4.7.3. Market Entries in 2017

As stated in Figure 4.2, three companies were incorporated in the field of *Investment Management* in 2017. They include *GlaDIS*, providing a technology software to build robo advisory structures, *VIAC*, offering a digital pensions solution, and *vision&*, offering qualified investors the opportunity to allocate funds to crypto assets.

4.7.4. Market Participants in Switzerland

Besides these new market entries observed in 2017, there are multiple additional FinTech companies in the field of *Investment Management* that provide a broad range of solutions for both private individuals (B2C) and/or (financial) businesses (B2B). Companies that pursue a «Robo Advisor» or «Social Trading» business model, and are hence based on a relatively high degree of automatization and standardization of their products, are *Crowd Trading, crowdinvest.ch, Descartes Finance, DeinAnlageberater, Investory, Selma, Simplewealth True Wealth,* and *Werthstein*. *Fundbase* maintains an information platform for alternative investments such as hedge funds. *Dealmarket* (by *Drooms*) and *Firstpex* offer similar platforms for private equity, along with *Quotip* for structured products. *Advice Online, Adviscent, Interaction Partners, InvestGlass,* and *mydesq* develop onboarding and/or client/investor relationship software for advisory processes. *Addfin* and *WealthArc* offer solutions for financial data analysis, client interaction and relationship management. Related products complemented by portfolio management functions are provided by *finatris, KeeSystem, Nectar Financial, One PM* and *Tindeco*. *Dufour Capital* and *iquant* are specialized in rule-based investing and offer their products to private as well as institutional investors. *AlgoTrader*, and *Quantreex* develop trading systems for investment managers, while *Sanostro* provides financial data and risk management services. *Ask the Circle, B&B Analytics, Masttro,* and *WealthInitiative* offer wealth management solutions for family offices and other clients. *Move Digital* provides a modular platform to optimize value chain processes in wealth management, and *Planet of Finance* acts as a marketplace for wealth management executives. Other services related to investment management are provided by *Leonteq* in the area of structured investment products, while *greenmatch* offers an investment application for renewable energies. *Carbon Delta* offers solutions to analyze the impact of climate change on financial portfolios and *Swiss Fin Lab* has developed, among other services, a solution for personalized financial planning and investment advice. Another important field covered by Swiss FinTech startups are consulting and media services. *meetinvest* maintains a stock screening tools for investors and a robo advisory solution for financial institutions. Consulting and advisory services related to digital investment management are offered by *3rd-eyes, AAAccell, Clear Minds*

Investment, InCube, Investivity, Onfintur, Pure Value Metrics, SmartMoneyMatch and *Spectravest*. These companies complement their services by additional offerings, such as software, trading solutions or investment products.

4.7.5. Outlook

The Swiss market for digital investing is growing but still at an early stage. However, a shift from traditional asset managers to providers of digital investment solutions can be expected. In terms of AuM, the robo advisor startup with the longest market presence in Switzerland, *TrueWealth*, has approximately CHF 100 million in assets under management and 1,800 customers by the end of 2017. A year ago, the AuM were at CHF 50 million which implies a growth rate of 100 percent on a year-over year basis (TrueWealth, 2017). For example, among the established financial services providers, the robo advisor solution provided by *Swissquote* (ePrivate Banking) is managing around CHF 167 million (+86% year-over-year) for a client base of 1,652 customers as of June 2017. From a global perspective, projections show that the compounded annual growth rate (CAGR) will reach about 78 percent over the next 10 years (Deloitte, 2016). However, stand-alone robo advisor solutions require large economies of scale for establishing a profitable business in the long-run. This means client base and assets under management need to grow substantially. For example, a recent study by Wong (2015) for the US market estimates that a robo advisor would need approximately $16 billion to $40 billion in assets to become profitable. Since the market for digital investing solutions is expected to grow further in the future, more startups as well as established financial services providers enter the business. Through this increase in competition, the market is becoming a tough place for FinTech startups, as they do not yet have the large client networks which established asset management firms have (Kaya, 2017). An implication of this is that it is reasonable to assume that a market consolidation is going to take place in the near future. In such a scenario robo advisor startups are either acquired by established financial services providers or there will be a consolidation among robo advisor startups (Deloitte, 2016). As opposed to merger and acquisitions, another feasible option for startups to build a more sustainable business model is to enter a cooperation with established financial services firms. In Switzerland, one example of such a partnership is observed between *TrueWealth* and *Basellandschaftliche Kantonalbank (BLKB)*, where *TrueWealth* profits from *BLKB's* existing customer base and *BLKB* in turn is able to offer its clients a robo advisor solution. In the future, a hybrid approach where human interaction is complemented with computer algorithms might be the appropriate business model to choose. In the United States, this path has been adopted by major traditional asset management firms like *Vanguard* and *Schwab*. Recently *Betterment*, a stand-alone robo advisor, began offering a solution where clients have access to human advisers (Fisch et al., 2017).

4.8. Payment

By Simon Amrein & Prof. Dr. Andreas Dietrich, Institute of Financial Services Zug IFZ

The structure of Switzerland's payment market has changed remarkably during the last three decades. In 1990, 90 percent of all payments at the point of sale (POS) were made with cash. With debit- and credit cards becoming more popular, this share dropped to 54.4 percent in 2015 (Trütsch & Jäger, 2016). Whereas the use of cash, credit- and debit cards is well documented[89], little is known about the use of smartphones for payments. First attempts to establish smartphones as a tool for payments in Switzerland were already made in 2010. Since then, various mobile payment solutions have entered and left the market. Therefore, the following sections analyse how the market developed in the last couple of years. Moreover, based on data from the Swiss mobile payment provider *Twint*, the current usage of mobile payment will be presented and discussed.

4.8.1. Categorizing Mobile Payment

Mobile payment consists of payments and transfers with mobile devices. Such devices include not only mobile phones, but also tablets or smartwatches. Not included in the analysis are contactless cards, even though the technology can be identical on a technological level. Other forms of payment, such as in-app payments are also not in the focus of the following sections (e.g. a ticket purchase in the SBB app linked to a debit- or credit card). Figure 4.19 shows the three application areas of mobile payment.

[89] See statistics of SNB: https://data.snb.ch/ as well as Trütsch & Jaeger (2016).

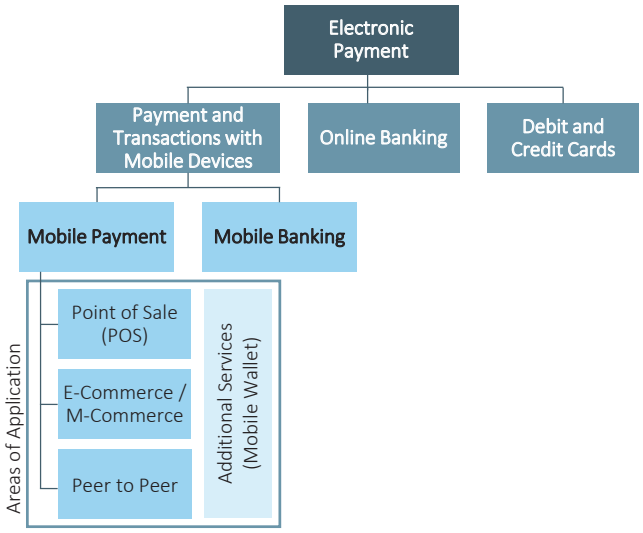


Figure 4.19.: Mobile Payment taxonomy

Mobile payment can be used at the POS, replacing either a debit card, credit card or cash. Technologically, the payment process is based on near field communication (NFC), Bluetooth, QR-codes, or magnetic secure transmission (MST). Another form of application is the use of mobile payment apps for online purchases (e-commerce, m-commerce). The payment process usually requires scanning a QR-code. A third form are so-called peer-to-peer transactions (P2P), which are electronic money transfers made from one person to another through an intermediary. Through the P2P payment application, everyone's account is linked to the user's bank accounts. When a transaction occurs, the account balance in the application records the transaction and either sends or withdraws money directly to the user's bank account or credit card.

4.8.2. Mobile Payment in Switzerland

Since the first market entry of a mobile payment app, the Swiss market has seen several market entries and a rapid consolidation process. Figure 4.20 shows the market entries and exits in the Swiss mobile payment market. The media group *Ringier* was first to experiment with mobile payment in Switzerland in 2010. Its technology is still in use under the name of the brand «Powerpay». In 2014, *Swisscom, Sunrise* and *Orange* (now *Salt*) launched a mobile wallet called *Tapit*. One year later, *UBS, Zürcher Kantonalbank* and *SIX* entered the market with *Paymit*. The payment app *Twint* was also launched in 2015 and was at the time fully owned by *PostFinance*. In the following years, these three major mobile payment projects, *Tapit, Paymit* and *Twint*, were merged. First, the *Tapit* project was terminated in favour of *Paymit*. In 2017, *Paymit* and *Twint* merged and relaunched the new *Twint* app, offering all three forms of mobile payment (POS, e-commerce payments, P2P payments). This concentration in the mobile payment market has to be seen in the light of *Apple Pay*'s market entry in 2016. With *Samsung*, another important mobile phone manufacturer launching a payment system in 2017. Apart from these mobile payment apps backed by banks or mobile phone manufacturers, there is a variety of other apps. *Paypal*, for example, offers a mobile app for P2P and e-commerce payments. The two credit card providers *MasterCard* and *Visa* also launched their own payment applications. *MasterCard*'s *Masterpass* can be used in e-commerce. *Visa* entered the Swiss market in cooperation with *Fitbit* in October 2017, allowing payments at the POS with the *Fitbit* watches. Also worth

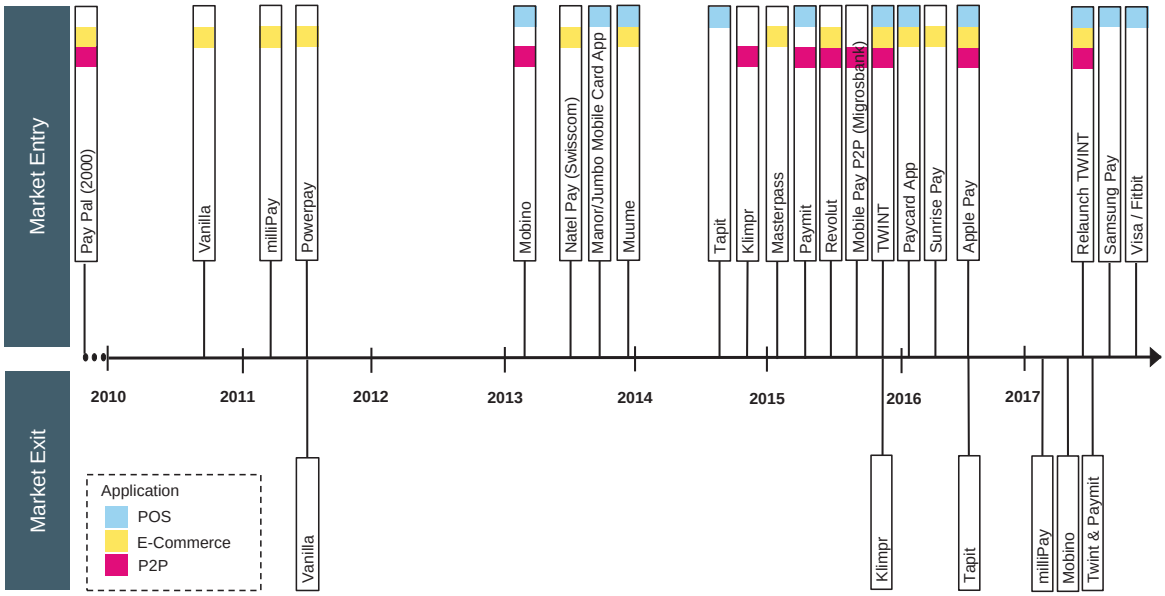


Figure 4.20.: Market entries into and market exits from the Swiss mobile payment market

mentioning is the FinTech startup *Revolut*. By the end of November 2017, *Revolut* reached a big milestone. The company now has over a million customers across Europe, just two and a half years after its launch. *Revolut* is active in 42 countries. If you break it down by country, over 500,000 customers are based in the U.K. 150,000 users live in France and 60,000 of their customers are in the Baltics. In Switzerland, *Revolut* has about 30,000 users.

The analysis above focused on B2C mobile payment applications that enable customers to use the app either at the POS, in E-Commerce or for P2P transactions. However, there are also various other providers active in Switzerland's payment market. In total, we count 26 FinTech companies active in the Swiss payment market. *Muume*, for example is a payment technology provider with an international scope. *Payrexx* offers an online payment platform for e-commerce shops. *Monito* maintains a website for price comparisons of cross-border payments. And *CashSentinel* acts as an online-custodian for car purchases. These FinTech companies are just a few examples, showing the broad range of services offered in the Swiss payment market (see chapter 7 for an overview of all companies participating in this study). While the market is still crowded, it also seems clear that some of the Swiss FinTech players will disappear. Even though some business models seem to be promising from the user perspective, it is still very challenging to establish a FinTech startup in this market. *millipay*, for example, a micropayment startup that won the *FinTech 2015 – Innovation in Finance* award and participated in the well-known *Startupbootcamp FinTech* in London 2014, decided to exit the market in 2017.

4.8.3. Users and Transactions

Based on data from *Twint*, it was possible to analyse the structure of mobile payment users for the first time. Proportionally, only about one third of the users are female, a typical pattern in technological innovations. Looking at the age composition of *Twint* users, it shows that mobile payment is popular not only among young users: 27 percent of the users are between 30 and 39 years old. A little less than a fourth range between 40 and 49. 7 percent of the users are older than 60 (see Figure 4.21).

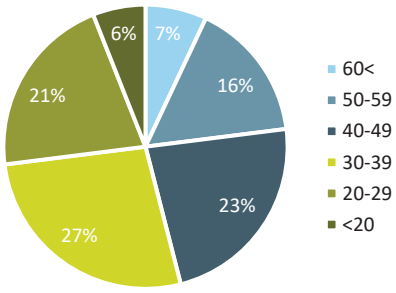


Figure 4.21.: Age structure of Twint users

Table 4.4 shows the number and volume of P2P transfers, e-commerce payments, and POS-payments as a percentage of the total number of transactions and the total volume. By transaction volume, the *Twint* app is currently mostly used for transfers between persons and payments at the POS. P2P payment accounts for 57 percent of the total transaction volume. This is mainly due to the average amount per transaction (CHF 77), which is substantially higher than that of POS payments (CHF 25). An analysis by *Twint* has shown that P2P-transfers are mostly done in order to split bills for drinks and food, gifts, or tickets (cinema, sports, concerts). By number of transactions, POS-payments are currently the most relevant use case for Swiss mobile payment users.

Given the easy and quick use of mobile payment for e-commerce applications, it might be surprising that these payments account for only 11 percent (in number of transactions) and 22 percent (in volume). The average amount per transaction, however, is higher than in the other two forms of mobile payment. Furthermore – as the number of POS transactions is still much higher than eCommerce and mCommerce transactions, the market share of mobile payment is higher in the eCommerce and mCommerce use case than in the case of POS. The market share of *Twint* on some eCommerce platforms is already between 4 and 6 percent.

The total number of monthly transactions on *Twint* is rising. In June 2017, *Twint* reported 270,000 transactions. In August 2017, the app facilitated about 335,000 transactions. As of December 2017, the app already reached almost 500,000 monthly transactions. Relative to the total number of transactions in the Swiss payment market, however, these figures can still be considered as low. We estimate that about 0.2 percent of all payment transactions are done through mobile payment applications such as *Twint*, *Apple Pay* and *Samsung Pay*.

4.8.4. The Potential of Mobile Payment

In order to assess the potential of mobile payment, we conducted a survey among (potential) users. Between April and May 2017, more than 300 people responded to the online survey.

Almost 20 percent of people have used mobile payment before. People who have not yet used mobile payment usually provided the following reasons: They questioned the security of such transactions, did not know the offer, or do not see the benefit of mobile payment. Nevertheless, 62 percent of the people not using mobile payment would be open to try mobile payment in the future.

The generally high interest in mobile payment apps among the Swiss public is also reflected in the figures of *Twint*: On average, *Twint* gains about 40,000 new customers per month. Per year, this would mean about half a million new mobile payment users, suggesting a rapid growth. By the end of October, *Twint* reported to have 500,000 registered customers. In addition, it has to be considered that many non-users of mobile payment systems may in some way already have been

	Share Number of Transactions	Share Transactions Volume	Average Amount per Transaction
P2P	41%	57%	CHF 77
e-Commerce	11%	22%	CHF 120
Point of Sale (POS)	48%	21%	CHF 25

Table 4.4.: Characteristics of payments (Source: Twint, internal data)

in touch with mobile payment in a broader sense. 55 percent of the people in our survey have made in-app payments linked to debit or credit cards. We consider the conversion of a large share of these customers from users of in-app payment to users of mobile payment apps as likely, leading to a large market potential.

Moreover, the aided awareness of mobile payment brands is already high. Presented with the names of the various mobile payment applications, 60 percent of the people in the survey knew *Twint*. *Apple Pay* was known by 51 percent. The highest awareness level was reached by *Paypal* (84%).

One way to assess the adoption rate of an innovation are comparisons to related technological innovations. Figure 4.22 shows the share of contactless payments from all credit card payments. Given the relatively slow adoption rate of contactless payment, it is not surprising that mobile payment is not disrupting the mobile payment market immediately. Rather, growth rates seem to be slow at the beginning and accelerate over time. If the growth rate of contactless payment is translated to mobile payment, we can estimate between 2.5 and 3.0 million mobile payment transactions in 2020. However, this would still mean that only about 1.5 to 2 percent of all payments would be conducted by mobile payment apps.

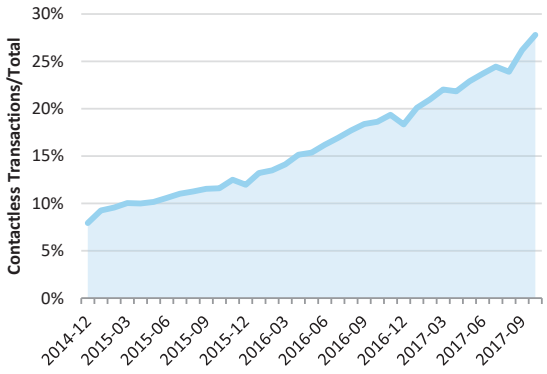


Figure 4.22.: Number of contactless credit card payments as a percentage of all credit card payments (Source: SNB, online)

4.8.5. Mobile Payment: Hype or Not?

Whereas some of the media has already belittled the evolution of mobile payment in Switzerland, others are overly optimistic. Our overall assessment of the Swiss mobile payment market is positive: The current transaction volume is still low. The adoption rate of comparable payment innovations, however, were always slow in the past. In this light, the low market shares of mobile payment are not surprising. The sometimes very critical media coverage of the subject can be mainly related to excessive expectations. Going forward, it will be crucial to convince users of the benefits of mobile payment as compared to traditional payment methods. Moreover, it will be important to launch new use cases in mobile payment (e.g. paying at the parking meter, paying the pizza courier, instant buy buttons in e-commerce). The quicker and better the evolution of mobile payment products, the faster the adoption rate of mobile payment will be.

5. The Emergence of Cryptocurrencies

Zug has developed into a globally recognized centre for Distributed Ledger Technology in the past years. Besides giving an overview on the ecosystem of the so-called «Crypto Valley», in the first section, this chapter investigates Swiss-based initial coin offerings (section 5.2) and sheds light on the cryptocurrency market from an investor's perspective (section 5.3).

5.1. Ecosystem

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

In the past few years, leading companies in the field of Distributed Ledger Technology (DLT) such as *Ethereum, Xapo, ShapeShift* or *Bancor* have moved to or were founded in the Crypto Valley, centred in Zug, Switzerland. By the end of 2017, more than half of Swiss-based companies in said field, or 17 in absolute terms, were located in Zug. This clustering of DLT companies, driven by factors such as high standards regarding privacy protection, friendly regulatory and taxation environment, leading educational institutions, and supportive governmental authorities, has led to the creation of a lively and self-enforcing ecosystem. The foundation of two new associations concerning Blockchain technology in 2017, i.e., the *Crypto Valley Association* and the *Multichain Asset Managers Association MAMA*, states an example hereof. Especially the former has been very active in the last few months. Besides bringing up multiple informal activities, the association has organized various events such as the monthly networking meetups, called «Crypto Valley Forums», in which Blockchain-related initiatives are presented. The *Crypto Valley Conference 2018* constitutes a further initiative by the *Crypto Valley Association*. The conference will take place from June 20th to 22nd, 2018, in Zug, and focuses on bringing together different stakeholders from the DLT ecosystem such as researchers, entrepreneurs, startups, and established companies. The aim is to discuss the current state of and further developments in the sector.

A similar goal is pursued by *Crypto Explorers*. In August 2017, the group organized the first *«Crypto Valley Trip»*, a quarterly three-day program in and around Zug including 15 discussions with businesses, entrepreneurs, and civic leaders from the Crypto Valley. A total of 35 participants from 15 different countries attended the program. Since then, two more trips have been organized, one in October 2017 and one in January 2018. A fourth trip has been announced for April 30th to May 2nd.

Two further events that took place in the Crypto Valley in 2017 were the *Thomson Reuters Hack The Valley 2017* hackathon (see section 3.2.2) and the *Blockchain Competition 2017*. The latter, which was supported by a broad range of industry, science and research partners, focused on the development of Blockchain-based applications in the field of insurance. On November 22nd, 2017, the team *ShieldIT* was announced the competition's winner and was granted a reward of CHF 100,000.

A further initiative which strengthens the Crypto Valley's status as a global centre for DLT was the announcement to launch the *Crypto Valley Labs* in late 2017. The hub, which is backed by *Lakeside Partners, Blockhaus* and *MME*, is conceived to provide a a coworking space and attached living facilities, but also marketing, legal and development support, for up to 30 DLT companies from all over the world. Not only startups but also established companies that are interested in connecting with the DLT sector are invited to join. In addition to the founding members *Singular DTV, Bancor, Etherisc* and *Melonport*, several local businesses have already joined the hub. The hub in Zug is meant to be the first of an international network, ultimately leading to a global decentralized ecosystem for DLT.

Besides the initiatives from the private industry, the government of Zug actively contributes to the development of the Crypto Valley. This is underlined by the acceptance of Bitcoin as a means of payment for governmental services up to CHF 200. A second project that attracted a lot of attention from the media was the introduction of a Blockchain-based digital identity system for residents of the canton of Zug in November 2017. The solution consists of three elements. The first of which is an app-based and biometrically or PIN-secured personal data safe. The second element is a cryptographic address on the Ethereum-Blockchain, which is connected to the personal data safe, and the third element is a certification portal on which the city of Zug plans to provide services such as e-voting or rental solutions (Stadt Zug, online). Also in November 2017, the cantonal commercial registry started to accept Bitcoin and Ether as a means of payment. Already in September, the commercial

registry was the first one in Switzerland to register a company with an in-kind contribution in Bitcoin (Kanton Zug, online).

There have also been some initiatives from the academia in the Crypto Valley. On October 3rd, 2017, for example, the *Lucerne University of Applied Sciences and Arts* announced the acceptance of Bitcoin as a means of payments for its services. In addition, the university organizes conferences, conducts research and offers education programs in the field of DLT.

5.2. Initial Coin Offerings

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

The growing reputation of the Crypto Valley and its favourable regulatory environment led to multiple initial coin offerings[90] in 2017. An initial coin offering (ICO) is a cryptocurrency crowd-sale, where a Blockchain-based project allows enthusiasts and supporters to invest in the project by purchasing part of its cryptocurrency tokens in advance (DinarDirham, 2016). When the project is successful, the investors profit from an increase in the token price and/or by participating at the project's profits. In 2017, a total of about $850 million were raised in ICOs of Swiss-based DLT projects. This significant share underlines the role of Switzerland as a globally leading ICO hub, along with the US and Singapore (ICORating, 2018). $276 million of the total amount invested in Swiss-based ICOs were raised in the FinTech sector, as shown in Figure 5.1. The FinTech sector therefore accounts for roughly one third of the total funds raised.

The pie chart on the right in Figure 5.1 reveals that more than half of the ICO funding in FinTech can be allocated to *Bancor* with $157 million. *Bread,* the second largest ICO raised $32 million, *Eidoo* $28 million, *Monaco* $27 million, the *Pillar Project* $21 million, *Lykke* $8 million (by conducting two ICOs in 2017), and *Melonport* $3million. *Swiss Borg* is another Swiss FinTech company that launched an ICO in 2017. However, since the ICO had not been finalized by the end of the year 2017, it is not included in this study. The temporal development of the market capitalization of the included projects is shown in Figure 5.2 along with the weekly average returns since its first listing on a cryptocurrency exchange[91], both in USD and in Bitcoin.

The figure shows that the total market capitalization in USD of Swiss FinTech companies having conducted an ICO amounted to over $750 million by the end of 2017. This large increase is mainly based on two factors: First, the conduct of new ICOs over the year and second, price increases, as measured in US Dollars, for

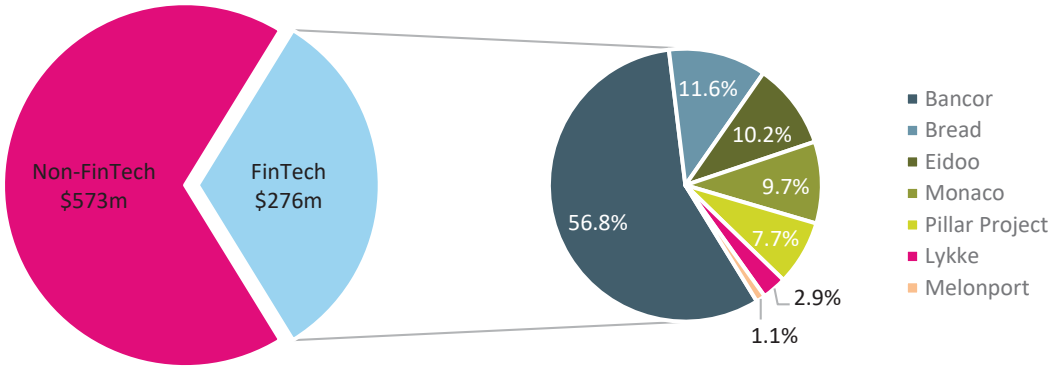
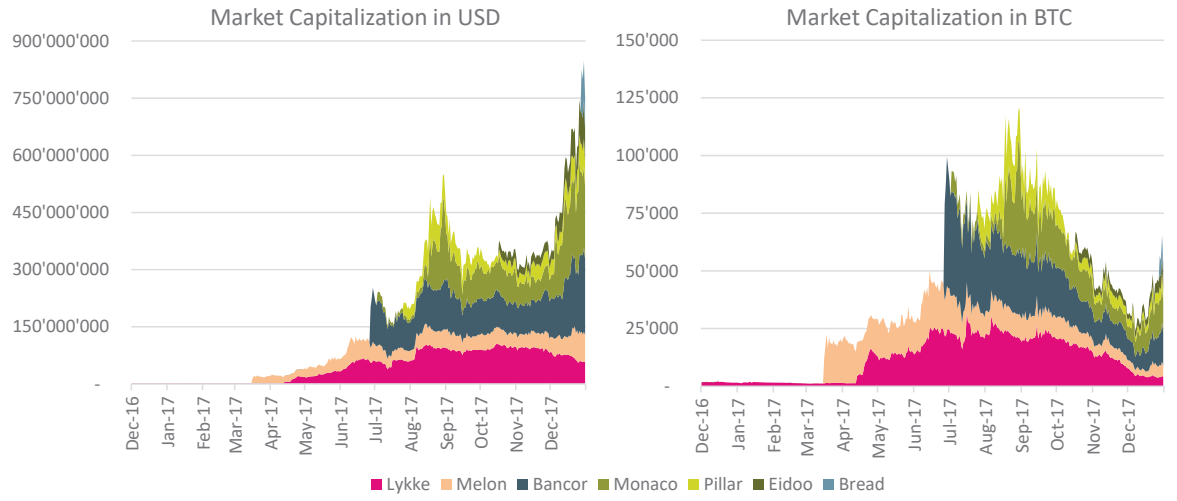


Figure 5.1.: Funds raised via ICOs in Switzerland

[90] For the sake of simplicity and due to the common parlance, the term «initial coin offering» (ICO) is used in this section, although the term «token-generation event» may be more precise in some situations.
[91] Since *Lykke* already conducted its first ICO in late 2016, the corresponding sample period starts before 2017.



Daily Average Returns	Bancor	Eidoo	Monaco	Pillar	Lykke	Melon
In USD	0.29%	0.60%	1.01%	0.94%	0.41%	0.38%
In BTC	-0.62%	-0.63%	0.06%	-0.09%	-0.33%	-0.43%

Figure 5.2.: Total market capitalization and geometric average returns of Swiss FinTech companies which conducted an ICO in 2017 (Data: Coinmarketcap)

most cryptocurrencies. The latter point is underlined in the table of Figure 5.2 which shows the daily average returns of six of the seven in-scope cryptocurrencies[92]. The largest average return was achieved by *Monaco*, amounting to 1.01 percent per day, followed by *Pillar* (0.94%), *Eidoo* (0.60%), *Lykke* (0.41%), *Melon* (0.38%), and *Bancor* (0.29%). When denominating market capitalization and prices of the five cryptocurrencies in Bitcoin instead of US Dollars the picture differs considerably. As shown in the right chart of Figure 5.2, for most cryptocurrencies the market capitalization measured in Bitcoin decreases over the course of time. In other words: Bitcoin outperformed the cryptocurrencies of the Swiss FinTech companies. This is affirmed in the table of Figure 5.2. The prices measured in Bitcoin of *Eidoo* (-0.63%), *Bancor* (-0.62%), *Melon* (-0.43%), *Lykke* (-0.33%)[93] and *Pillar* (-0.09%) generated negative average returns. Only the price of the *Monaco* token outperformed Bitcoin, achieving a daily average return of 0.06 percent.

Due to the emergence of ICOs in 2017, FINMA released a press release on September 29th, 2017, announcing its investigation into ICO procedures. The release states that ICOs may be subject to existing provisions concerning combating money laundering and terrorist financing, banking law, securities trading, or collective investment scheme legislation, depending on their actual structure. As of the date the statement was published, FINMA was looking into several ICOs conducted in Switzerland and announced to initiate enforcement procedures in cases that circumvent financial market law (FINMA, 2017). On January 18th, the State Secretariat for International Financial Matters (SIF) announced that it had established a working group to review the legal framework and to identify any need for action. The working group also involves the Federal Office of Justice (FOJ) and the Swiss Financial Market Supervisory Authority and aims to work in close consultation with the DTL-sector (SIF, 2018). Also in January 2018, the *Crypto Valley Associ-*

[92] Since the sample period for *Bread* is too short, the cryptocurrency is excluded from further analysis.
[93] The reason for *Lykke's* increase in market capitalization measured in Bitcoin, along with a negative average return in its price, also measured in Bitcoin, could be attributed to the increased free float of *Lykke* tokens due to the two ICOs in 2017.

ation published a code of conduct for initial coin offerings, intended to guide the conduct of ICOs by taking into account legal, moral and security obligations (Crypto Valley Association, online).

Section 3.2.1 revealed that a total of CHF 129.9 million of venture capital was invested in Swiss FinTech companies in 2017, a figure less than half the total ICO investment volume in the sector. However, when comparing the amount of funding rounds, it becomes clear that venture capital investments still account for nearly three times more rounds and are therefore still an important source of financing in Switzerland, especially for companies that are not active in the DLT-area.

In the next section, the focus shifts from the description of the Crypto Valley and Swiss-based initial coin offerings to the cryptocurrency market from an investor's point of view.

5.3. Cryptocurrencies from an Investor's Perspective

By Prof. Dr. Thomas Ankenbrand & Denis Bieri, Institute of Financial Services Zug IFZ

The cryptocurrency market has witnessed a significant growth in the past year. This is reflected in the rapid growth of the total market capitalization from roughly $18 billion at the beginning of 2017 to more than half a trillion by the end of the year (CoinMarketCap, online). The sharp increase in the prices of the leading cryptocurrencies in the first three quarters of 2017 has attracted a lot of attention from the media as well as from the investor side, which again has incentivized financial institutions to provide cryptocurrencies or cryptocurrency-based products to their clients. But despite all the attention, there is still a lack of research on the characteristics of cryptocurrencies from an investor's point of view. The following analysis aims to fill this lack of research by applying the concepts of modern portfolio theory, introduced by Harry M. Markowitz in 1952.

The investment universe of Swiss investors can typically be simplified by the classification into the three asset classes stocks, bonds and real estate, which show the highest volumes. Cryptocurrencies are still viewed with reservation, despite the fast growth rate and advancing maturity of the market and its ecosystem. However, the increased offering of cryptocurrency-related investment products facilitates the generation of exposure in cryptocurrencies, leading to an increasing need for a better understanding of their characteristics as an investment vehicle. In order to evaluate a potential inclusion of cryptocurrencies into the established asset portfolio, a proxy for the overall development of the cryptocurrency market is needed. For this purpose, a cryptocurrency index is calculated on a weekly basis, following the Laspeyres-approach by weighting the prices of the five largest cryptocurrencies with the corresponding share on their aggregated market capitalization at the given point in time[94]. The index' performance, ranging from April 23rd, 2013, to December 31st, 2017, is shown in Table 5.1, along with risk-return profiles of established asset

Investment Type[95]	Average Return	Standard Deciation	Sharpe-Ratio[96]
Cryptocurrencies	161.65%	94.56%	1.71
Bitcoin	138.78%	93.27%	1.49
Stocks	9.07%	14.07%	0.68
Real Estate	7.72%	10.98%	0.74
Bonds	1.74%	2.61%	0.84

Table 5.1.: Risk-return profiles of cryptocurrencies and established asset classes (Sources: CoinMarketCap and Bloomberg)

[94] See Appendix C for more information on the cryptocurrency index used in this section.
[95] The investment types are proxied by the following indices: Cryptocurrency Index (cryptocurrencies), Bitcoin (Bitcoin price from CoinmarketCap), Swiss Performance Index (stocks), SXI CH Real Estate® Shares TR Index (real estate), and Swiss Bond Index TR (bonds).
[96] The 1-year CHF Swiss Confederation bond is used as the risk-free asset in this analysis.

classes over the same sample period. All figures are set on an annual basis. The dataset for the cryptocurrency market was collected from CoinMarketCap, the those for the established asset classes from Bloomberg.

The table shows that cryptocurrencies have outperformed established asset classes by far over the sample period. The cryptocurrency index achieved an average return of over 160 percent on an annual basis, beating a single Bitcoin investment which generated roughly 140 percent. The established asset classes achieved lower average annual returns of 9.1% (stocks), 7.7% (real estate), and 1.7% (bonds). However, the outperformance of cryptocurrencies comes with high risks, as measured by the standard deviation[97]. Over the sample period, the cryptocurrency index was subject to the largest price fluctuations (standard deviation of 94.56%), followed by a single Bitcoin investment (93.27%). The standard deviation of established asset classes, i.e., the investments risk, were significantly lower, amounting to 14.07% (stocks), 10.98% (real estate), and 2.61% (bonds). In order to evaluate the performances of the different investment types on a risk-adjusted basis, the Sharpe-Ratio, a measurement of excess return per unit of risk taken, is shown in the last column of Table 5.1. It reveals that the cryptocurrency market has achieved the highest risk-adjusted performance, with a Sharpe-Ratio of 1.71, followed by a single Bitcoin investment (1.49), bonds (0.84), real estate (0.74) and stocks (0.68). An inclusion of cryptocurrencies into an investor's portfolio could therefore yield beneficial effects.

A key figure to evaluate the ability of an investment to increase the risk-adjusted performance of a portfolio is its return correlation to other asset classes. Table 5.2 reveals that cryptocurrencies are highly uncorrelated to other established asset classes, with correlation coefficients ranging from 0.02 (real estate) to 0.11 (bonds).

These results indicate a certain diversification potential and hence a potential increase in an investor's expected utility by including cryptocurrencies in a portfolio with a classical investment universe. The characteristic of expected utility refers to the ability of an investment to either increase a portfolio's expected return or to decrease its risk. The latter effect can be achieved by the low risk of the asset class itself or by the low correlation with other assets in the portfolio. To quantify this characteristic, two efficient frontiers, in other words, sets of optimal portfolios that offer the highest expected return for a given level of risk, are calculated and illustrated in Figure 5.3. The first one (dark blue curve) is based on a classical investment universe including stocks, bonds, and real estate, proxied by the Swiss Performance Index (stocks), the Swiss Bond Index TR (bonds) and the SXI CH Real Estate® Shares TR Index (real estate), respectively. The second one (light blue curve) includes, in addition, the cryptocurrency index.

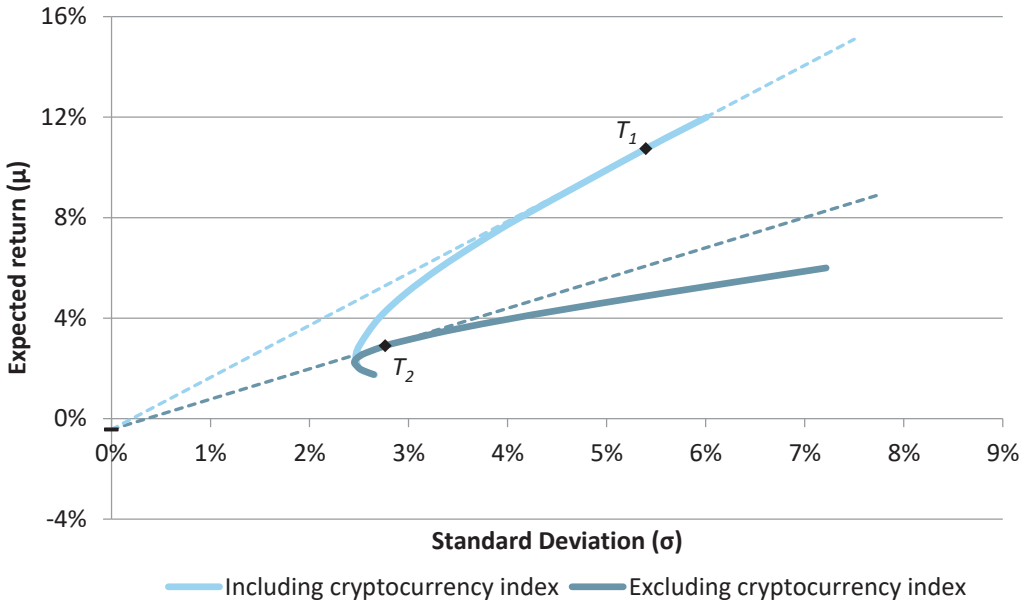
The two efficient frontiers underline that an inclusion of the cryptocurrency market into the asset universe enlarges the set of optimal portfolios[98]. For the same amount of risk, investors are able to achieve a larger average return by incorporating cryptocurrencies in their portfolio allocation. To take a more detailed look at the characteristics of the cryptocurrency market from an investor's point of view the table in figure 5.3 reveals the characteristics of the tangency portfolios

	Stocks	Bonds	Real Estate	Cryptocurrencies
Stocks	1.00			
Bonds	-0.21	1.00		
Real Estate	0.59	0.09	1.00	
Cryptocurrencies	0.05	0.11	0.02	1.00

Table 5.2.: Correlation matrix of weekly returns from April 2013 up to the end of December 2017

[97] Although not shown in Table 5.1 for the sake of simplicity, the comparison of the maximum drawdowns of the investment types shows a very similar picture.

[98] Note that this is not relevant for investors seeking the lowest possible risk of an investment beyond the risk-free asset, since both minimum variance portfolios do not include cryptocurrencies



	Average Return	Standard Deciation	Sharpe-Ratio
Including cryptocurrencies	10.7%	5.4%	2.1
Excluding cryptocurrencies	2.9%	2.8%	1.2

(T_1 and T_2 in Figure 5.3), i.e., those that maximize the Sharpe-Ratio for a given asset universe. It confirms that an inclusion of cryptocurrencies into the asset universe increases the risk-adjusted average excess return of the optimal investment[99]. The tangency portfolio including cryptocurrencies achieves a larger Sharpe-Ratio of 2.1 in comparison to 1.2 of the reduced asset universe.

Nevertheless, it will be important to closely monitor the future development of the market, since the financial performance, and thus our evaluation, is largely driven by the sharp rise in prices in the first three quarters of 2017. At this point, the authors want to clarify that the results above have to be considered with caution, as our sample is rather small and covers a period with mainly bullish market conditions. Hence, the results published in this section are not to be construed as investment advice.

[99] Note that transaction and hedging costs as well as potential costs/profits arising from slippage are neglected in this analysis.

6. Conclusion & Outlook

With this study, we aimed to give an overview of the current state and the developments in the Swiss FinTech ecosystem. Based on our findings, we conclude with the following four statements/hypotheses:

Switzerland is a leading FinTech hub. Switzerland offers very good conditions for the FinTech sector, especially in regard to the political/legal and social environment. Concerning the economic and technological environment, the Swiss cities perform above average, but still have room for improvement. One of the main findings of the *IFZ FinTech Study 2016* was that the Swiss FinTech ecosystem is bigger and better than generally perceived. Entering 2017, one of the hypotheses was that Switzerland offers very good conditions for the FinTech sector. However, up to that point, Switzerland had not been able to unleash its full potential in terms of the number of companies, jobs, venture capital and valuations. The growth story of the Crypto Valley in 2017 was thus not coincidental. The combination of the good conditions in Switzerland and the clustering of innovative entrepreneurs, a business-friendly administration and the presence of leading research institutes in and around Zug, resulted in a lively and self-enforcing ecosystem. This in turn allows Switzerland to profit from the global ICO boom, as it is one of the leading places globally in terms of capital raised through this alternative form of financing. Besides the large growth in the ICO volume, the traditional venture capital volume invested in the Swiss FinTech sector also increased significantly in 2017, amounting to a total of CHF 130 million.

FinTech companies are growing and maturing. The Swiss FinTech sector has continuously grown over the past two years. At the end of 2017, a total of 220 companies were active in one of the six FinTech product areas. The average size in terms of both full-time equivalents and capitalization of Swiss FinTech companies has also grown over the course of 2017, indicating a maturation of the sector. In 2015, the Swiss FinTech sector woke up. In 2016, it exhibited further growth and established structures. In 2017, it matured.

FinTech: From hype to reality. During 2015, the hype around FinTech as the answer to all kinds of questions around the financial services industry reached fever pitch. In the years 2016 and 2017, we saw the evolution of more sensible and more sophisticated approaches to assessing the potential of technology in banking, resulting in growing attention towards the impact of FinTech on the financial industry. In the meantime, FinTech companies have penetrated the financial system on different levels. The hypothesis of the previous year, which claimed that FinTech companies do not attack the business of banks, was confirmed in 2017. Established banks do not – or no longer – regard FinTech companies as competitors but rather seek collaboration with them. In addition, FinTech is widely acknowledged as an important innovation driver of the financial market, and has therefore been widely accepted and supported by the political and regulatory sphere in Switzerland. The technological adaption of the banking infrastructure, for example by introducing common APIs, has also fostered the integration of FinTech companies into the financial sector.

Global innovation is the driver. FinTech is global. In order to be successful, FinTech companies need to find their innovation niche. Most of the Swiss FinTech companies adapt to this challenge with an international strategy. The highest growth rate in number of companies and funding was observed in the product area of *Distributed Ledger Technology* which arguably is the most innovative and disruptive FinTech category. DLT is decentralized on a global scale, not only in relation to its technical architecture, but also in terms of its operating model. The weakness of Switzerland in the technological dimension, as shown in our FinTech hub ranking, has increasingly come into the focus of different stakeholders, which consequently have undertaken corresponding action.

2017 was another successful year for the Swiss FinTech ecosystem. According to the sentiment analysis of the FinTech companies, the bottleneck or pain point on the path to further growth is the challenge of acquiring customers. However, we are optimistic that the growth story of the Swiss FinTech sector will continue in 2018. We also expect the maturity level to further increase in the coming months, leading to higher company valuations and additional jobs in the sector, but also to a consolidation in some FinTech product areas. In addition, the entire financial service sector is expected to further profit from the growth of the FinTech sector and its penchant for technological innovation. These synergies seem to be recognized by the established banks, as shown by their eagerness to collaborate with and invest in FinTech companies. They accept and use FinTech as an innovative spearhead to push the digitalization of banking ahead.

7. Factsheets of Swiss FinTech Companies

This final chapter contains the factsheets of all the Swiss FinTech companies that participated in our survey. The factsheets are based on the Business Model Canvas from Osterwalder and Pigneur (2010), described in section 2.3. They were created with the help of publicly accessible sources such as a company's website, the commercial register and further information platforms. For the purposes of verification, correction and completion, these draft versions were then passed on to the respective companies. Note that only the companies that returned the factsheets appear in the following pages. However, all the companies that received a factsheet were included in the database. At this point, we would like to take the opportunity to thank all the companies that took part in our survey.

Companies

3circlefunding GmbH **www.3circlefunding.ch**

Founded in 2015 *Category* Deposit & Lending
Location Zurich *Valuation*

Multi-product Crowdfinancing 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 - together with Crowdfunding Campaigns that all look to secure capital. Crowdlending, Crowdfactoring and Crowdfunding.

Board Members	Management Team
Anthony McCarthy	Anthony McCarthy

Key Partners	Key Resources		Key Activities
Postfinance, Bisnode, Creditreform & CRIF	Employees in 2017	4	Programming & Engineering
	… of which in CH	4	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

3rd eyes AG **www.3rd-eyes.com**

Founded in 2015 *Category* Investment Management
Location Zurich *Valuation*

3rd-eyes redefines financial planning and digital investment advice. Our system provides a holistic assessment of the client's wealth, optimises his asset allocation using Monte-Carlo Simulation and recommends a set of financial products for execution.

Board Members	Management Team
Cécile Biccari-Churet, Stephanie Feigt, Rodrigo Amandi, Marc Mettler	Stephanie Feigt, Rodrigo Amandi, Michael Koschinsky

Key Partners	Key Resources		Key Activities
	Employees in 2017	12	Programming & Engineering
	… of which in CH	6	Marketing / Finding Clients
	Total Funding (CHF)	1'700'000 EUR	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

AAAccell AG **www.aaaccell.ch**

Founded in 2012 *Category* Investment Management
Location Zurich *Valuation*

We are at the forefront of setting standards in the areas of asset- and risk management. We are a spin-off company of the University of Zurich.

Board Members	Management Team
Walter Farkas, Marc Paolella, Karl Schmedders, Sandro Schmid, Christoph Streib	Sandro Schmid, Boris Wälchli, Pawel Polak, Marc Paolella

Key Partners	Key Resources		Key Activities
Merantix, RISE, BhFS, Frankfurt School of Business, Prof. Dr. Radu Tunaru	Employees in 2017	20	Programming & Engineering
	… of which in CH	19	Marketing / Finding Clients
	Total Funding (CHF)	0	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Accounto AG **www.accounto.io**

Founded in 2016 *Category* Banking Infrastructure
Location Lucerne *Valuation*

Accounto represents a paradigm shift in bookkeeping for sme by removing the actual booking and administrative work from the clients premise. Incoming invoices and statements are processed automatically by the Accounto machine learning platform and provided through an intuitive web interface.

Board Members	Management Team
Hansruedi Schöpfer, Alessandro Micera, Alain Veuve	Alessandro Micera, Alain Veuve

Key Partners	Key Resources		Key Activities
WIR-Bank	Employees in 2017	16	Programming & Engineering
	… of which in CH	15	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

ADDFIN AG **www.addfin.com**

Founded in 2014 *Category* Investment Management
Location Zug *Valuation*

ADDFIN is the one-stop-solution provider of choice for independent asset managers in the area of digitalization, standardization and automatization of all tasks related to wealth management. Each aspect of decision making is taken into account on its own and as part of the overall process. Stages are supported proactively through workflows, digital information and recommendation channels.

Board Members	Management Team
Peter J. Hegglin, Rob Prior, Christian Bodmer, Jürg Koller	Peter J. Hegglin (CEO), Rob Prior, Reto Niedermann, Jan Diethelm

Key Partners	Key Resources		Key Activities
BDO, SIX Financial Services, Fundinfo, Investment Navigator, BRP/ Indigita, IR&M, Künzi/MacNab, Research Pool, Sentifi	Employees in 2017	5	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

additiv AG **www.additiv.ch**

Founded in 1998 *Category* Banking Infrastructure, Investment Management, Deposit & Lending, Analytics
Location Zurich *Valuation*

additiv is a leading catalyst for change in the financial services industry applying the new possibilities of digitalization offered along two businesses: Applied Innovation develops and implements new business models and tailor made digital innovations. The Digital Finance-as-a-Service offering configurable and compliant products for wealth & asset management and financing for customers, client facing staff and experts.

Board Members	Management Team
Adriano B. Lucatelli, Roger Steiner, Tobias Pogorevc	Michael Stemmle, Amer Ridani, Thomas Achhorner

Key Partners	Key Resources		Key Activities
Among others: Orange, Deloitte, pwc, synpulse, Infosys, Fehr Advice, Microsoft, unblu, Intrum Justitia, IDnow.	Employees in 2017	120	Programming & Engineering
	… of which in CH	50	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

AdNovum Informatik AG **www.adnovum.ch**

Founded in 1988 *Category* Banking Infrastructure
Location Zurich *Valuation*

AdNovum Informatik AG engages in the development, implementation, and integration of customized business applications and security software.

Board Members	Management Team
Gratian Anda, Adrian Robert Bult, Adrian René Koch, Daniel Wälchli	Chris Tanner, Kornel Wassmer, Tom Sprenger, Stephan Schweizer, Peter Gassmann, Roger Bösch, Daniel Gahlinger

Key Partners	Key Resources		Key Activities
	Employees in 2017	600	Programming & Engineering
	… of which in CH	370	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Advanon AG **www.advanon.ch**

Founded in 2015 *Category* Deposit & Lending
Location Zurich *Valuation*

Online platform that allows SME's to sell their open invoices directly to investors. By that they have access to liquidity and investors on the other hand can invest in a new type of asset class.

Board Members	Management Team
Beat Bühlmann, Daniel Gutenberg, Stijn Pieper	Phil Lojacono, Stijn Pieper, Daniel Abebe

Key Partners	Key Resources		Key Activities
AXA, BLKB, HBL, DB	Employees in 2017	30	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Advice Online AG **www.adviceonline.ch**

Founded in 2013 *Category* Investment Management
Location St. Gallen *Valuation* 18'500'000

IT Software for wealth managers (Banks, EAM's, Family Offices etc.). Advisory Suite Software including risk-profiling, CRM, complete advisory process digitalized, high quality reporting, product risk classification, investment controlling etc. New Software for IKS (Internes Kontrollsystem).

Board Members	Management Team
Christian Neff, Raphael Jaeger, Tihomir Katulic	Christian Neff, Raphael Jaeger, Tihomir Katulic, Robin Bolli

Key Partners	Key Resources		Key Activities
Esprit network, banks, independent asset managers	Employees in 2017	6 - 10	Programming & Engineering
	… of which in CH	4	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

AlgoTrader GmbH **www.algotrader.com**

Founded in 2014 *Category* Investment Management
Location Schwyz *Valuation* 10'000'000

Algorithmic trading software for trading companies such as hedge funds, proprietary trading and crypto currency trading firms.

Board Members	Management Team
Christian Janson, Martin Trepp, Luzius Meisser, Simon Moolman, Andy Flury	Andy Flury, Rodney Greenwald

Key Partners	Key Resources		Key Activities
Espertech Inc.	Employees in 2017	12	Programming & Engineering
	… of which in CH	4	Marketing / Finding Clients
	Total Funding (CHF)	1'500'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Amnis Treasury Services AG **www.amnistreasury.ch**

Founded in 2014 *Category* Payment
Location Zurich *Valuation*

"We change the way SME manage their cash flows" – we strongly believe SME should have the same possibilities as large corporation when it comes to financial management. We provide efficient digital processes for currency & cash flow management which help SME to save money.

Board Members	Management Team
Robert Bloch, Michael Wuest, Philippe Christen	Robert Bloch, Michael Wuest, Philippe Christen

Key Partners	Key Resources		Key Activities
VQF, Swiss Mechanic, swisspeers, swiss made software, Swiss Finance Startups, Run my Accounts, KMU Ratgeber	Employees in 2017	3	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)	No external funding	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Apiax AG **www.apiax.com**

Founded in 2017 *Category* Banking Infrastructure
Location Zurich *Valuation*

Apiax is a Swiss RegTech start-up, transforming complex financial regulations into digital compliance rules, which are constantly up-to-date and verified. The rules are consumable via an App or can be integrated directly into banking processes through an easy-to-use API. Its cutting-edge technology provides legal and compliance teams with full visibility and control over their digital rule sets and empowers client advisors to serve their clients more efficiently and in a fully compliant manner.

Board Members	Management Team
Jürg Christian Steiger, Ralph Marco Mogicato, Nicolas Blanchard, Philip Schoch	Philip Schoch, Nicolas Blanchard, Ralf Huber, Thomas Suter

Key Partners	Key Resources		Key Activities
Swisscom, EY, PwC	Employees in 2017	10	Programming & Engineering
	… of which in CH	7	Marketing / Finding Clients
	Total Funding (CHF)	1'500'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Ariadne Business Analytics AG **www.ariadne.swiss**

Founded in 2015 *Category* Analytics
Location Zug *Valuation*

Smart data-driven financial simulation solution for ALM & risk management, parallel accounting and transaction-processing.

Board Members	Management Team
Daniel Imfeld-Binzegger, Willi Brammertz	Willi Brammertz, Jefferson Braswell, Daniel Imfeld

Key Partners	Key Resources		Key Activities
Actus, Blockhaus, Oxial, Finelis, Brammertz Consulting, RFM Dr. Imfeld, zhaw	Employees in 2017	5	Programming & Engineering
	… of which in CH	4	Marketing / Finding Clients
	Total Funding (CHF)	1'000'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

atfinity GmbH **www.atfinity.io**

Founded in 2016 *Category* Analytics
Location Zurich *Valuation*

atfinity delivers evolutionary digitalisation solutions to financial institutions. Focussing on key challenges like compliance, regulations and client analytics, atfinity employs modern technology and builds on artificial intelligence to generate actionable insights.

Board Members	Management Team
Francesco Adiliberti, Miklos Vidak	Alexander Balzer, Thorben Bochenek, Silvan Nowak

Key Partners	Key Resources		Key Activities
Business Consultants, Implementation Consultants	Employees in 2017	14	Programming & Engineering
	… of which in CH	14	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Avaloq Group AG **www.avaloq.com**

Founded in 1996 *Category* Banking Infrastructure
Location Schwyz *Valuation* >1'000'000'000

Avaloq is a leader in digital and core banking software and a provider of Software as a Service (SaaS) and Business Process as a Service (BPaaS) solutions for banks and wealth managers. Avaloq helps its customers to go digital, boost efficiency, be agile, and ensure compliance.

Board Members	Management Team
Francisco Fernandez (CoB), Didier Sangiorgio, Philipp E. Achermann, Peter Schoepfer, Adarsh Sarma, Daniel Zilberman	Jürg Hunziker, Thomas Beck, Dean Gluyas, Pascal Föhn, Markus Gröninger, Tobias Unger, Chris Beukers, Brian Hurdis

Key Partners	Key Resources		Key Activities
90 + software partnerships, 30 + implementation partners, major shareholder and partner - Warburg Pincus	Employees in 2017	>2'000	Programming & Engineering
	… of which in CH	>1'300	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS (and BPaaS)	Commission	Trading	License Fee
Interest	Advertising	Data	

B&B Analytics AG **www.bbanalytics.biz**

Founded in 2014 *Category* Investment Management
Location Zug *Valuation*

B&B Analytics (BBA) is a strategic advisor for performance and risk management of total wealth. BBA equips family offices, asset managers and investment experts with better understanding of their client's entire wealth while simultaneously helping them achieve superior portfolio stability and control.

Board Members	Management Team
Guido Buehler, Andreas-Walter Mattig, Philipp Baretta, Sébastien Mérillat	Guido Buehler, Philipp Baretta, Rohan Misra, Mauro Cappiello, Madison Lin

Key Partners	Key Resources		Key Activities
Tend, Investglass, WealthMosaic, Statpro, Expersoft, Softdotcom	Employees in 2017	15	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	6'000'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Bancor - Bprotocol Stiftung **www.bancor.network**

Founded in 2017 *Category* Distributed Ledger Technology
Location Zug *Valuation*

The Bancor Protocol enables built-in convertibility for tokens on smart contract blockchains, using algorithmic pricing to form a decentralized and autonomous liquidity network. The Bancor Protocol aims to democratize access to value creation by allowing the long-tail of user-generated tokens to thrive.

Board Members	Management Team
Guido Cyrill Schmitz-Krummacher, Guy Ben Artzi, Eyal Hertzog, Bernard Lietaer, Stephen Narayoff	

Key Partners	Key Resources		Key Activities
Ethereum Foundation, Qoin	Employees in 2017		Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	200'000 ETH	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Bexio AG **www.bexio.com**

Founded in 2013 *Category* Banking Infrastructure
Location St. Gallen *Valuation*

bexio is Switzerland's leading provider of cloud based business- and accounting software for small businesses. By connecting accounting firms, banks, lenders and other key suppliers to small businesses, our team is building a platform to help small business succeed.

Board Members	Management Team
Daniel Aegerter, Peter Niederhauser, Martin Altorfer, Peter Schüpbach, Markus Leibundgut, Jeremias Meier	Christopher Jarke, Jeremias Meier, Marcel Lenz, Harald Raetzsch, Rouven Mayer, Joel Ben Hamida, Michael Loos

Key Partners	Key Resources		Key Activities
UBS, Swiss Life	Employees in 2017	70	Programming & Engineering
	… of which in CH	60	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

CB Financial Services AG **www.c-b-f-s.com**

Founded in 2010 *Category* Payment
Location Grisons *Valuation*

Client identification, client onboarding, document signing services, global secure payment services.

Board Members	Management Team
Marcel Komminoth	Marcel Komminoth, Roland Rütimann, Markus Hug

Key Partners	Key Resources		Key Activities
Braingroup AG, Inventx AG, QuoVadis	Employees in 2017	10	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

c-crowd AG **www.c-crowd.com**

Founded in 2010 *Category* Deposit & Lending
Location Zurich *Valuation*

Together with Raizers, our strategic partner and European crowdfunding platform, c-crowd brings together innovative entrepreneurs and investors. We give you the opportunity, already with modest investment amounts, to become shareholder of a startup and begin building your own portfolio of participations.

Board Members	Management Team
Christoph Laib, Philipp Steinberger, Manuel Nappo	Christoph Laib, Dominic Lüthi, Philipp Steinberger

Key Partners	Key Resources		Key Activities
Raizers	Employees in 2017	0	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Clear Minds Investment AG **www.clearminds.ch**

Founded in 2016 *Category* Investment Management
Location Basel *Valuation* 2'000'000 – 2'500'000

B2B2C: Regulatory compliant digital ADVISORY process, fully integrating partners' proprietaty investment & communication processes to serve end client with in-house investment solutions. B2C: Independent, fully personalised open architecture ADVISORY solution at low cost for private investors.

Board Members	Management Team
Jan Schatzmann, Alexa Ipen-Providoli, Alexander Raviol, Stephan Schmid, Adrian Schatzmann	Jürg Christian Steiger, Nils Patrik Ludvig Hansson, Adrian Schatzmann

Key Partners	Key Resources		Key Activities
PwC, TPS, Futurea, Djangostars, Swissquote	Employees in 2017	6	Programming & Engineering
	… of which in CH	4	Marketing / Finding Clients
	Total Funding (CHF)	330'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Confinale AG **www.confinale.ch**

Founded in 2012 *Category* Banking Infrastructure
Location Zug *Valuation*

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. Confinale finds solutions for current and future challenges either by implementing new functionalities in existing core banking systems, or by developing new applications.

Board Members	Management Team
Thomas Twerenbold, Roland Staub, Jonas Misteli	Roland Staub, Jonas Misteli, Andreas Egli, Florian Schrag

Key Partners	Key Resources		Key Activities
SIX, PwC, Avaloq, Investment Navigator, Edorasware	Employees in 2017	>45	Programming & Engineering
	… of which in CH	All	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Contovista AG **www.contovista.com**

Founded in 2013 *Category* Banking Infrastructure
Location Zurich *Valuation*

Contovista is specialised on data analytics, business intelligence and visualisation over financial data. Contovista's software automatically categorises all bank transactions and visualises aggregations with easy to understand charts. The PFM engine creates a basis for further analytics applications.

Board Members	Management Team
Gian Reto à Porta, Nicolas Cepeda, Roland Zwyssig, Martin Huldi, Daniel Anders	Gian Reto à Porta, Nicolas Cepeda, Fabio Bernasconi

Key Partners	Key Resources		Key Activities
Aduno Group, Finnova, Avaloq, Netcetera, TI&M	Employees in 2017	25	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

CoreLedger Labs GmbH **www.coreledger.net**

Founded in 2017 *Category* Distributed Ledger Technology
Location Zug *Valuation* 50'000'000 (group level)

CoreLedger merges the real and virtual world and makes Blockchain-enabled smart contracts easy and simple to use. Our intention is to reinvent global and direct trade by allowing the easy digitization on a blockchain of any good or service. Anyone can easily integrate CoreLedger's innovative technologies and attract new markets through transformation of their own business models – or create new ones.

Board Members	Management Team
Richard Zbinden	Johannes Schweifer

Key Partners	Key Resources		Key Activities
To be announced later, Bitcoin Suisse AG	Employees in 2017	8 (at group level)	Programming & Engineering
	… of which in CH	2	Marketing / Finding Clients
	Total Funding (CHF)	250'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Crealogix AG **www.crealogix.com**

Founded in 1996 *Category* Banking Infrastructure
Location Zurich *Valuation* 150’000’000

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. CREALOGIX develops and implements innovative fintech solutions for the digital bank of tomorrow. The focus is placed on changed customer needs for mobility, security, personalised advice and education within a comprehensive user experience.

Board Members	Management Team
Bruno Richle, Richard Dratva, Christoph Schmid, Ralph Mogicato, Jean-Claude Philipona	Thomas F. J. Avedik, Richard Dratva, Philippe Wirth, Volker Weimer, Marc Stähli

Key Partners	Key Resources		Key Activities
CGi, Cognizant, DXC, HPE, Oracle, redhat, Inventx, Meniga, unblu, Entersekt, Silverlake, Adesso, Sofgen, Promon, Syngenio, Zeb, Qumram, Qontis, Vasco and more.	Employees in 2017	420	Programming & Engineering
	… of which in CH	200	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Creditfolio AG **www.creditfolio.ch**

Founded in 2017 *Category* Deposit & Lending
Location Basel *Valuation*

Creditfolio is a crowdlending platform with a focus on consumer loans.

Board Members	Management Team
Alex Hediger, Tobias Winkelmann	Alex Hediger, Tobias Winkelmann

Key Partners	Key Resources		Key Activities
	Employees in 2017		Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	87’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest (partial interest)	Advertising	Data	

creditworld AG **www.creditworld.ch**

Founded in 2015 *Category* Deposit & Lending
Location Zug *Valuation*

The online marketplace for SME financing in Switzerland.

Board Members	Management Team
	Philipp Schnyder, Philipp Schneider, Kai Ren

Key Partners	Key Resources		Key Activities
Euler Hermes, Wenger & Vieli	Employees in 2017	10	Programming & Engineering
	… of which in CH	8	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Crowd4Cash - Crowd Solutions AG **www.crowd4cash.ch**

Founded in 2016 *Category* Deposit & Lending
Location Zug *Valuation* 2'800'000

We are an innovative FinTech Company, specialized in crowd lending. We bring investors and borrowers together – 100% online. We enable lower interest rates to borrower and attractive returns to investors.

Board Members	Management Team
Dai Meghji, Doris Bossard-Studer	Roger Bossard, Frank Meierhofer

Key Partners	Key Resources		Key Activities
Several financial advisors, other FinTech Companies	Employees in 2017	4	Programming & Engineering
	… of which in CH	2	Marketing / Finding Clients
	Total Funding (CHF)	300'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Crowdli AG **www.crowdli.ch**

Founded in 2016 *Category* Deposit & Lending
Location Thurgau *Valuation* 120’000

Property crowdfunding platform.

Board Members	Management Team
Felix Helling, Roger Bigger	Felix Helling, Naoussa Schaffer, Raphael Hagspiel, Reto Fierz, Roger Bigger, Reinhard Stäuble, Werner Fritsche

Key Partners	Key Resources		Key Activities
PwC, Schoch Auer Rechtsanwälte, Raiffeisenbank	Employees in 2017	7	Programming & Engineering
	… of which in CH	7	Marketing / Finding Clients
	Total Funding (CHF)	600’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Crypto Finance AG **www.cryptofinance.ch**

Founded in 2017 *Category* Distributed Ledger Technology
Location Zug *Valuation*

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. The aim of Crypto Finance AG is to facilitate the implementation of blockchain technology in the global economy through a range of high quality financial services.

Board Members	Management Team
Jan Brzezek, Tobias Reichmuth, Raymond J. Bär, Pascal Forster, Marc P. Bernegger, Philipp Cottier	Jan Brzezek, Mathias Maurer, Simon Tobler

Key Partners	Key Resources		Key Activities
	Employees in 2017	26	Programming & Engineering
	… of which in CH	26	Marketing / Finding Clients
	Total Funding (CHF)	16’000’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

customweb

customweb GmbH **www.customweb.com**

Founded in 2008 *Category* Payment
Location Zurich *Valuation*

Being an innovative Swiss development and web company, we offer you comprehensive consulting services as well as professional solutions in the area of electronic payments.

Board Members	Management Team
Sascha Krüsi, Thomas Hunziker	Sascha Krüsi, Thomas Hunziker

Key Partners	Key Resources		Key Activities
PostFinance, SIX Payment Services, Barclaycard, FirstData, Worldline, BNP Parbias, Societé Générale, Concardis	Employees in 2017	18	Programming & Engineering
	… of which in CH	18	Marketing / Finding Clients
	Total Funding (CHF)	0	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

DESCARTES FINANCE

Descartes Finance AG **www.descartes-finance.com**

Founded in 2015 *Category* Investment Management
Location Zug *Valuation*

Descartes is a leading digital Swiss wealth manager bringing together the latest insights in financial theory, leading technology, and successful investment specialists.

Board Members	Management Team
Adriano B. Lucatelli, Rino Borini	Adriano B. Lucatelli, Marc Sauter, Roger M. Levola

Key Partners	Key Resources		Key Activities
Blackrock iShares, OLZ & Partners, Swiss Rock, Lakefield Partners, UBS, Vontobel, Deutsche Asset Management	Employees in 2017	4	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	230'000 Equity	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Devisenwerk AG **www.devisenwerk.ch**

Founded in 2015 *Category* Payment
Location Schwyz *Valuation* 2'000'000

The Schwyz-based fintech company Devisenwerk AG offers foreign currency exchanges for 90 per cent less than conventional banks in Switzerland.

Board Members	Management Team
Ivo Krämer, Matthäus Jamroz	Robin Luckau

Key Partners	Key Resources		Key Activities
	Employees in 2017	10	Programming & Engineering
	… of which in CH	10	Marketing / Finding Clients
	Total Funding (CHF)	600'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Diamond Digital AG **www.dmcoin.net**

Founded in 2017 *Category* Distributed Ledger Technology
Location Schwyz *Valuation*

Creator of SwissDiamondCoin™ - The diamond-based cryptocurrency implemented on Ethereum Blockchain.

Board Members	Management Team
Mathias Bucher	Mathias Bucher

Key Partners	Key Resources		Key Activities
	Employees in 2017		Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Digital Bitbox - Shift Devices AG **www.digitalbitbox.com**

Founded in	2015	*Category*	Distributed Ledger Technology
Location	Basel-Country	*Valuation*	

The key to digital assets. Shift Devices builds physical keys for the digital world. Secure, authenticate, and unlock your digital assets, simply and safely.

Board Members	Management Team
	Douglas Bakkum, Jonas Schnelli

Key Partners	Key Resources		Key Activities
	Employees in 2017	7	Programming & Engineering
	… of which in CH	7	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Dufour Capital AG **www.dufour-capital.ch**

Founded in	2011	*Category*	Investment Management
Location	Zurich	*Valuation*	

A significant part of investment decisions will be digital and rule-based in the future. DC's value proposition is to provide investors access to attractive rule-based investment solutions and necessary IT-systems in a lean and cost-efficient way.

Board Members	Management Team
Ryan Held, Sascha Freimüller, Roman Timm, Werner Erismann, Marc Weber	Ryan Held, Sascha Freimüller

Key Partners	Key Resources		Key Activities
VZ, ti&m	Employees in 2017	3	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	500'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

eCollect AG **www.ecollect.ch**

Founded in 2014 *Category* Payment
Location Schwyz *Valuation*

eCollect is a financial SaaS provided with RESTful API and a full featured web app to automate and optimise the full accounts payable and collection cycle.

Board Members	Management Team
Thimo Seidel	Rossitza Radieva, Björn Leineweber

Key Partners	Key Resources		Key Activities
eCollect Bulgaria EOOD	Employees in 2017		Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	400'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

eGTSA SA **www.egtsa.com**

Founded in 2011 *Category* Banking Infrastructure
Location Geneva *Valuation*

eGTSA offers a unique solution on behalf of major trading banks destined for Commodity Trading companies to correspond and dialogue with their Banks & Partners involved in Trade Finance. The solution is offered on a subscription basis using a web based browser dashboard accessible from any internet connection.

Board Members	Management Team
Stéphane Graber, Christophe Cantala, Alexandre Vassiltchikov	Stéphane Graber, Guy de Pourtalès, Robin Dunou

Key Partners	Key Resources		Key Activities
Bolero, jemmic	Employees in 2017	3	Programming & Engineering
	… of which in CH	2	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Enterprise Bot GmbH **www.enterprisebot.org**

Founded in 2017 *Category* Analytics
Location Zug *Valuation*

Enterprise Bot is an Artificial Intelligence company that provides white-labeled cognitive solutions.

Board Members	Management Team
Pranay Jain, Ravina Mutha, Penny Schiffer	Pranay Jain, Ravina Mutha

Key Partners	Key Resources		Key Activities
PWC, Deloitte, SIX	Employees in 2017	17	Programming & Engineering
	… of which in CH	4	Marketing / Finding Clients
	Total Funding (CHF)	120'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Evolute AG **www.evolute.com**

Founded in 2016 *Category* Banking Infrastructure
Location Zurich *Valuation* 28'000'000

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.

Board Members	Management Team
Michael Hartweg, Kathleen De Rose, Peter Blum	Kaspar Wohnlich (CEO), Markus Bührer, Heinz G. Perren, Pascal P. Lemann, Andreas Ruflin, Mark Gustafson

Key Partners	Key Resources		Key Activities
Northfield Information Services, Reuters, CDDS, UnaVista	Employees in 2017	54	Programming & Engineering
	… of which in CH	28	Marketing / Finding Clients
	Total Funding (CHF)	6'000'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

FinForm AG **www.finform.ch**

Founded in 2016 *Category* Banking Infrastructure
Location Berne *Valuation*

Finform standardizes, industrializes and digitalizes compliance formalities. We offer a complete digital customer onboarding & KYC formalities approving, for standard and complexe cases.

Board Members	Management Team
Peter Lacher (CoB), Peter Delfosse, Patrick Graf, Renato Stalder	René Oppliger (CEO), Michael Rumpf, Mirco Calzolari

Key Partners	Key Resources		Key Activities
Axon Ivy, PostFinance, Post CH, Peax, Crif, Deloitte, Soranus	Employees in 2017	29	Programming & Engineering
	… of which in CH	9	Marketing / Finding Clients
	Total Funding (CHF)	>3'000'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

FinGraphs - Management Joint Trust SA **www.fingraphs.com**

Founded in 2012 *Category* Analytics
Location Geneva *Valuation*

Technical Analysis: Simple, continuously updated decision helping charts for all investors & traders, B2B2C distribution through the widgetization of the whole platform.

Board Members	Management Team
Edouard Owczarczak	Jean-François Owczarczak (CEO), André Owczarczak

Key Partners	Key Resources		Key Activities
White label website for Oanda (www.fg4o.com), Interactive Brokers as distribution partner	Employees in 2017	4	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

finnova AG Bankware **www.finnova.com**

Founded in 1974 *Category* Banking Infrastructure
Location Aargau *Valuation*

Finnova is a leading provider of end-to-end banking software in the Swiss financial centre. We help banks and outsourcing providers to realise growth in the banking sector, thanks to efficient and innovative IT solutions compliant with regulatory requirements.

Board Members	Management Team
Hans Zehetmaier, Stephan Frohnhoff, Walter Knabenhans, Charlie Matter, Hanspeter Rhyner, Marcel Walker	Charlie Matter (CEO), Daniel Bernasconi, Jörg Steinemann, Simon Kauth, Hendrik Lang, Markus Metzger

Key Partners	Key Resources		Key Activities
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.	Employees in 2017	400	Programming & Engineering
	… of which in CH	400	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Flink AI GmbH

Founded in 2017 *Category* Analytics
Location Zurich *Valuation* 1’000’000

Flink AI uses advanced and novel proprietary AI technologies based on Deep Learning to construct investment portfolios, asset allocations and trading strategies from data. Massive compute power is applied to mine information at real time from large amount of data. Target customers are hedge funds, asset management firms, banks and robo advisory platforms. The solution is provide as an end-to end SaaS or as licensed on premise software solution.

Board Members	Management Team
Daniel Egloff	Daniel Egloff

Key Partners	Key Resources		Key Activities
NVIDIA	Employees in 2017	4	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Foxstone SA **www.foxstone.ch**

Founded in 2016 *Category* Deposit & Lending
Location Geneva *Valuation*

Foxstone democratizes real estate investment by offering intitutional quality opportunities to High Net Worth Individuals, Family Offices, Private Banks and Institutional Investors by increasing transparency, lowering the minimum investment amount and reducing the fees. You choose the deal you want to invest in, we take care off all the rest thanks to our technology that digitalize the whole acquisition process.

Board Members	Management Team
Dan Amar	Dan Amar

Key Partners	Key Resources		Key Activities
Fintech FUSION and undisclosed partners	Employees in 2017	10	Programming & Engineering
	… of which in CH	5	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Fractal Labs AG **www.fractal-labs.com**

Founded in 2014 *Category* Analytics
Location Zurich *Valuation* 10’053’600

Fractal is a financial communication product connecting small-medium-enterprises and their financial partners.

Board Members	Management Team
Andreas Signer, Fatou Diagne, Stéphanie Galantine	Nicholas Heller (CEO), Andreas Signer

Key Partners	Key Resources		Key Activities
Banks, accountants, advisors	Employees in 2017	6	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	1’000’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Futurae Technologies AG **www.futurae.com**

Founded in 2016 *Category* Banking Infrastructure
Location Zurich *Valuation*

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. The suite consists of a range of authentication methods that offer companies full flexibility (e.g. push-based, mobile-only or sound-based; the innovative autonomous 'SoundProof' product).

Board Members	Management Team
	Sandra Tobler, Claudio Marforio, Nikolaos Karapanos, Samuel Berger, Gaetano Mecenero

Key Partners	Key Resources		Key Activities
	Employees in 2017	7	Programming & Engineering
	… of which in CH	7	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

GlaDIS AG **www.gladis.ch**

Founded in 2017 *Category* Investment Management
Location Zug *Valuation* 5'000'000

GlaDIS: Robo Advisory – algorithmic investment structures – AI applications. GlaDIS has developed a nucleus software technology servicing as a core technology to built any kind of state of the art Robo Advisory structure. Our edge was that our development was driven from our previous multi decade real world trading and fundmanagement experience which we developed into a most advanced digital platform technology.

Board Members	Management Team
Franz W. Schmadl	Franz W. Schmadl, Peter Troxler

Key Partners	Key Resources		Key Activities
	Employees in 2017	6	Programming & Engineering
	… of which in CH	2	Marketing / Finding Clients
	Total Funding (CHF)	1'000'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

GO BEYOND EARLY STAGE INVESTING

Go Beyond Investing AG **www.go-beyond.biz**

Founded in 2013 *Category* Deposit & Lending
Location Zurich *Valuation* 10’000’000

Early stage investing by Investors, for Investors. GBI is a leading pan European angel platform and the only one with a published track record of successful results.

Board Members	Management Team
Brigitte Baumann, Bethann Kassman, Francoise Birnholz	Brigitte Baumann, Christopher Rolfe, Bethann Kassman, Jean Paul Barthet, Maria Carolilna Romero, Adrian Galea

Key Partners	Key Resources		Key Activities
beangels, ASHOKA, eban, Angel Capital Association, EBAN, Rising Tide, BAE	Employees in 2017	10	Programming & Engineering
	… of which in CH	2	Marketing / Finding Clients
	Total Funding (CHF)	2’000’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

green[::]match

greenmatch AG **www.greenmatch.ch**

Founded in 2013 *Category* Investment Management
Location Basel-Country *Valuation*

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.

Board Members	Management Team
Matthias Stettler, Moris Isik, Andres Huber, Harald Zenke, Jan Lüchinger	Moris Isik, Tobias Bitterli, Jan Von Rickenbach, Andreas Socin

Key Partners	Key Resources		Key Activities
All market participants in the renewable energy sector.	Employees in 2017	12	Programming & Engineering
	… of which in CH	12	Marketing / Finding Clients
	Total Funding (CHF)	4’000’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Hyposcout AG **www.hypo-scout.ch**

Founded in 2016 *Category* Deposit & Lending
Location Zurich *Valuation*

Hyposcout is a national company that has made it its purpose to connect investor and capital lendor in the area of mortgage.

Board Members	Management Team
Robert Simmen, Oliver Scheuerer	Jean-Pierre Pfenninger

Key Partners	Key Resources		Key Activities
	Employees in 2017	20	Programming & Engineering
	… of which in CH	20	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Hypotheko GmbH **www.hypotheko.ch**

Founded in 2017 *Category* Deposit & Lending
Location Basel-Country *Valuation*

We are a Swiss startup focussed on brokering homeloans. With our matching system we provide home owners and buyers better terms and access to finance their properties.

Board Members	Management Team
Stephan Locher, Philipp Nüesch	Stephan Locher

Key Partners	Key Resources		Key Activities
Basler Versicherungen, Basler Kantonalbank, Credit Suisse, Helvetiai	Employees in 2017	2	Programming & Engineering
	… of which in CH	1	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

InCube Group AG **www.incubegroup.com**

Founded in 2009 *Category* Investment Management
Location Zug *Valuation* >10’000’000

InCube provides digital web-based B2B solutions for asset management and private banking. Further, the company provides high-quality consulting and software engineering services for the financial services industry in the area of investment and risk management, compliance, modelling and analytics, optimization and forecasting.

Board Members	Management Team
Lorenz Arnet, Erich Felder, Daniel Lenz, André-Pierre Müller, Boris Rankov	Andreas Felber, Erich Felder, Daniel Lenz, Boris Rankov

Key Partners	Key Resources		Key Activities
	Employees in 2017	30	Programming & Engineering
	… of which in CH	25	Marketing / Finding Clients
	Total Funding (CHF)	600’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Integration Alpha GmbH **www.integrationalpha.com**

Founded in 2014 *Category* Banking Infrastructure
Location Zug *Valuation*

We are a RegTech/FinTech company and turn your regulatory burden with data science into an asset. We are building your new eco-systems and reinvent your todays business model into a digitized one. We help and develop you to become data-centric company and make you cost efficient and leading edge at the same time just by using data efficiently/effectively.

Board Members	Management Team
Tom Debus, Marco Selva, Frank Kaminsky	Tom Debus, Marco Selva, Frank Kaminsky, Antonio Ferrante

Key Partners	Key Resources		Key Activities
Market Leader in Regulatory Reporting (disclosed) / several StartUps esp. in the Blockchain environment / Regulators	Employees in 2017	70	Programming & Engineering
	… of which in CH	40	Marketing / Finding Clients
	Total Funding (CHF)	0 (self-funded)	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Inventx AG **www.inventx.ch**

Founded in 2010 *Category* Banking Infrastructure
Location Grisons *Valuation*

Inventx is the Swiss IT partner for leading banks and financial institutions. The basis for our business activities are our values: innovation, interaction and Swissness.

Board Members	Management Team
Gregor Stücheli, Hans Nagel, Ivo Furrer, Urs Saxer, Manuel Thiemann	Gregor Stücheli, Hans Nagel, Marco Camenisch, Roman Flütsch, Patrick Hagen, Peter Schnürer, Romano Seglias, Christoph Züger

Key Partners	Key Resources		Key Activities
	Employees in 2017	220	Programming & Engineering
	… of which in CH	220	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Investiere.ch - Verve Capital Partners AG **www.investiere.ch**

Founded in 2010 *Category* Deposit & Lending
Location Zug *Valuation*

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. investiere.ch is one of the leading startup investors in Switzerland and is one of the most internationally renowned Swiss fintech companies.

Board Members	Management Team
Peter Quadri, Michel Kaufmann, Daniela Bosshard-Hendgartner, Ralph Zurkinden, Lukas Weber	Steffen Wagner, Mike Hobmeier, Julien Pache, Lukas Weber, Richard Lockyer

Key Partners	Key Resources		Key Activities
Zürcher Kantonalbank, nest, Die Post, Corraterie Gestion	Employees in 2017	21	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Investment Navigator AG **www.investmentnavigator.com**

INVESTMENT NAVIGATOR

Founded in 2014 *Category* Banking Infrastructure
Location Zurich *Valuation*

Investment Navigator is the go-to address for suitability. We enhance the investment and advisory value chain from research to distribution with suitability assessments. Solving the cross-border distribution, product and tax suitability issues from banks, independent wealth managers and the broader financial community.

Board Members	Management Team
Julian Köhler, Alberto Rama, Maurus Fries, Philipp Portmann, Jochen Gutbrod	Julian Köhler, Alberto Rama, Maurus Fries

Key Partners	Key Resources		Key Activities
Multiple strategic and fund premium partners.	Employees in 2017	15	Programming & Engineering
	… of which in CH	14	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

INVESTORY AG **www.investory.ch**

INVESTORY

Founded in 2011 *Category* Investment Management
Location Zurich *Valuation*

Digitizes and trades with the signals of investment strategies from financial experts across banks. Plattform that allows to compare different investment strategies and invest directly, simultaneous across different custodians without securitazion, just direct on the investors account.

Board Members	Management Team
	Roger Fromm

Key Partners	Key Resources		Key Activities
Saxo Bank (Schweiz) AG, Strateo, bank zweiplus, Zuger KB, Leonteq, crowdhouse, United Signals GmbH	Employees in 2017	1	Programming & Engineering
	… of which in CH	1	Marketing / Finding Clients
	Total Funding (CHF)	525’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

iprotus GmbH **www.iprotus.com**

Founded in 2015 *Category* Distributed Ledger Technology
Location Zug *Valuation*

Building solutions with Blockchain technology for the global supply chain, ICO advisory services.

Board Members	Management Team
	Søren Fog

Key Partners	Key Resources		Key Activities
abbi, TE-Food, Belay, TokenBooster, Wenger&Vieli, BLC	Employees in 2017	3	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)	250'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

lend.ch - Switzerlend AG **www.lend.ch**

Founded in 2015 *Category* Deposit & Lending
Location Zurich *Valuation*

Lend.ch is a Swiss peer-to-peer lending platform that aims to modernize the consumer lending market by allowing investors and borrowers to meet directly and ditch banks as intermediaries.

Board Members	Management Team
	Florian Kübler, Michel Lalive

Key Partners	Key Resources		Key Activities
intrum justitia	Employees in 2017	8	Programming & Engineering
	… of which in CH	8	Marketing / Finding Clients
	Total Funding (CHF)	5'350'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Lendico Schweiz AG **www.lendico.ch**

Founded in 2016 *Category* Deposit & Lending
Location Zurich *Valuation*

Lendico Schweiz AG is a joint venture between the Lendico group and PostFinance. They set out to create a new financing option for small and medium-sized enterprises in Switzerland.

Board Members	Management Team
Simon Baldus, Felicia Kölliker	Myriam Reinle

Key Partners	Key Resources		Key Activities
Lendico-Gruppe, Postfinance	Employees in 2017	4	Programming & Engineering
	… of which in CH	4	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Lendora SA **www.lendora.ch**

Founded in 2016 *Category* Deposit & Lending
Location Vaud *Valuation*

Lendora is a Swiss crowdlending platform that connects borrowers and investors online to make credit more accessible and investing more rewarding.

Board Members	Management Team
Simon Pelletier, Jonathan Bory	Simon Pelletier

Key Partners	Key Resources		Key Activities
Swissquote	Employees in 2017	3	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

loanboox - Swiss FinTech AG **www.loanboox.ch**

Founded in 2016 *Category* Deposit & Lending
Location Zurich *Valuation*

Loanboox is the Swiss money and capital market platform for cantons, cities, communities and institutional lenders. We revolutionize the B2B lending of credits, in which no innovation has taken place in the past 50 years, by making it simple, transparent, inexpensive and secure.

Board Members	Management Team
Stefan Mühlemann, Andi Burri, Dario Zogg	Stefan Mühlemann, Andi Burri, Dario Zogg, Ivo Francioni, Christian Klumpe, Martina Bühler

Key Partners	Key Resources		Key Activities
I-CV (Independent Credit View) AG, FINMA certified swiss datacenter	Employees in 2017	30	Programming & Engineering
	… of which in CH	20	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Lykke Corp AG **www.lykke.com**

Founded in 2013 *Category* Distributed Ledger Technology
Location Zug *Valuation* 450’000’000

Lykke is a movement to build a global marketplace for all assets and instruments. Our marketplace will use the distributed ledger technology pioneered by Bitcoin to offer immediate settlement and direct ownership.

Board Members	Management Team
Richard Olsen (CoB), Ralph Zurkinden, Heinrich Zetlmayer, Michael Hobmeier	Richard Olsen (CEO)

Key Partners	Key Resources		Key Activities
	Employees in 2017	15 / > 100 Contractors	Programming & Engineering
	… of which in CH	15	Marketing / Finding Clients
	Total Funding (CHF)	4’000’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

meetinvest AG **www.meetinvest.com**

Founded in 2014 *Category* Investment Management
Location Zug *Valuation*

Sharing investment knowledge to empower everyone and providing world class digital investment solutions to wealth mangement financial institutions.

Board Members	Management Team
Michel Jacquemai, Maria Jacquemai	Michel Jacquemai, Maria Jacquemai

Key Partners	Key Resources		Key Activities
Integrated in the Temenos T24 core banking system (sandbox and Marketplace)	Employees in 2017	7	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)	2'500'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Melonport AG **www.melonport.com**

Founded in 2016 *Category* Distributed Ledger Technology
Location Zug *Valuation* Around 47 million USD

Melonport AG is building the Melon protocol, a fully decentralized tool for people to set up and manage an investment fund in digital assets. The melon protocol replaces large parts of fund administration and custody with blockchain software making it much cheaper, more efficient/reliable and less prone to human error. We have no revenue, the protocol that we are building is free to use, we take no fees, do not sell any products or offer services. It is intended as a public good, like the internet.

Board Members	Management Team
Reto Trinkler, Mona El Isa	Mona El Isa, Reto Trinkler

Key Partners	Key Resources		Key Activities
	Employees in 2017	9	Programming & Engineering
	… of which in CH	6	Marketing / Finding Clients
	Total Funding (CHF)	2'500'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

moneyland.ch AG **www.moneyland.ch**

Founded in 2013 *Category* Analytics
Location Zurich *Valuation*

Comparison website for banks, insurance products and financial services.

Board Members	Management Team
Samuel Manz, Benjamin Manz	Benjamin Manz

Key Partners	Key Resources		Key Activities
	Employees in 2017	10	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

MoneyPark AG **www.moneypark.ch**

Founded in 2011 *Category* Banking Infrastructure
Location Schwyz *Valuation* 153’000’000

MoneyPark offers independent advice on mortgage, retirement and pension planning as well as investments and combines it with an open architecture product shelf and the largest product selection in the country.

Board Members	Management Team
Ralph-Thomas Honegger, Reto Keller, Stefan Heitmann, Samuel Hügli, Ralph Alex Jeitzinger, Uwe Bartsch	Christophe Alcina, Christian Crain, Michael Hartmann, Benjamin Tacquet, Stefan Heitmann, Shahram Shad, Stéphan Mischler

Key Partners	Key Resources		Key Activities
More than 90 banks and insurances in Switzerland	Employees in 2017	130	Programming & Engineering
	… of which in CH	130	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

moribono AG **www.moribono.ch**

Founded in 2012 *Category* Banking Infrastructure
Location Lucerne *Valuation*

Management of heritage.

Board Members	Management Team
Urs Schmidig, Nicole Strausak	Nicole Strausak

Key Partners	Key Resources		Key Activities
	Employees in 2017		Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

MUUME AG **www.muume.com**

Founded in 2013 *Category* Payment
Location Zug *Valuation* 40’000’000

MUUME is a platform for digital services for daily consumption that consumers can use to take care of their purchases and orders on their smartphones effortlessly and in a customized manner. MUUME is an expert in creating digital consumer purchasing experience and digital payment.

Board Members	Management Team
Marcel Dietrich (CoB), Marco Samek, Peter Sami	Marco Samek (CEO), Daniel Gradenegger, Patrick Urban, Jochen Leidig, Andrei Postaru, Diana Tofan

Key Partners	Key Resources		Key Activities
Deutscher Sportausweis, BSC Young Boys, Swisscom, ingenico Payment Services, InterCard	Employees in 2017	80	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	8’200’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Nectar Financial AG **www.nectarfinancial.com**

Founded in 2010 *Category* Investment Management
Location Schwyz *Valuation*

Nectar's mission is to accelerate wealth management's transition to sustainable practices for its clients. We are driven by the perspective to enhance professionals, investment results and client experience through technology and more.

Board Members	Management Team
Internal: Pius Stucki and Michael Appenzeller; External: Rasoul Jalali and Nicolas de Skowronski	Michael Appenzeller, Niloo Verma Bruppacher, Martin Schwizer, Neil Stiefel, Pius Stucki, Stefan Demuth

Key Partners	Key Resources		Key Activities
Fundbase, Bank Julius Baer, Custody Banks, Compliance Outsourcing Providers	Employees in 2017	62	Programming & Engineering
	… of which in CH	20	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

NetGuardians SA **www.netguardians.ch**

Founded in 2007 *Category* Analytics
Location Vaud *Valuation*

NetGuardians is a leading FinTech company recognized for its unique approach to fraud and risk assurance solutions. Their software leverages Big Data to correlate and analyze behaviors across the entire bank system – not just at the transaction level. With pre-defined controls, NetGuardians enables banks to address specific anti-fraud or regulatory requirements. A controls update service ensures financial institutions benefit from ongoing protection in the face of the continually evolving risk challenges of a border-free world.

Board Members	Management Team
Olivier Berthon (CoB), Olivier Trancart, Victor Orlovski, Olivier Schneider, Orin Sauvageot	Joel Winteregg (CEO), Raffael Maio

Key Partners	Key Resources		Key Activities
Temenos, Swisscom, Adnovum, Orbium	Employees in 2017	58	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	14'500'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Onedot AG **www.onedot.com**

Founded in 2014 *Category* Analytics
Location Zurich *Valuation*

We are the leading provider of AI-powered data preparation technology.

Board Members	Management Team
Dorian Selz, Urs Ehrismann, Bernhard Bicher, Tobias Widmer	Bernhard Bicher (CEO), Tobias Widmer

Key Partners	Key Resources		Key Activities
SAP + several software vendors in commerce space	Employees in 2017	<15	Programming & Engineering
	… of which in CH	All	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Onfintur GmbH **www.onfintur.com**

Founded in 2014 *Category* Investment Management
Location Basel-City *Valuation*

Onfintur.com is supporting asset and pension fund managers (B2B) investing in stocks employing proven and innovative strategies. Using sophisticated algorithms, the investor can generate a stock portfolio exhibiting a promising risk/return profile with just a few clicks.

Board Members	Management Team
	Christian Stern, Matthias Thorn

Key Partners	Key Resources		Key Activities
Midix, Oxitec, Xignite	Employees in 2017	3	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Open Mineral AG **www.openmineral.com**

Founded in 2017 *Category* Banking Infrastructure
Location Zug *Valuation*

Open Mineral is a cloud-based solution that makes it easy to competitively tender commodities and ensure efficient trade execution. Platform offers access to services supporting trade execution, including freight, surveying, financing, and insurance.

Board Members	Management Team
Boris Eykher, Ilya Chernilovskiy, Igor Kim	Boris Eykher, Ilya Chernilovskiy, Diego Molina, David Gomez, Gary Livshin

Key Partners	Key Resources		Key Activities
	Employees in 2017	25	Programming & Engineering
	… of which in CH	5	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Payment 21.com - Moving Media GmbH **www.payment21.com**

Founded in 2002 *Category* Distributed Ledger Technology
Location St. Gallen *Valuation*

The award-winning Bitcoin cashier system of the company provides collection and exchange services to e-commerce merchants, multinational corporations, and financial intermediaries around the globe.

Board Members	Management Team
	Bernhard Kaufmann

Key Partners	Key Resources		Key Activities
ACI Worldwide	Employees in 2017		Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Payrexx AG **www.payrexx.com**

Founded in 2014 *Category* Payment
Location Berne *Valuation* 10’000’000

Provider of the e-commerce tools that allow businesses and private customers to accept payments within a few minutes. Users do not need any programming skills to use Payrexx and can accept payments with Payrexx through online and offline channels.

Board Members	Management Team
Jürg Schwarzenbach, Ivan Schmid, Willy Bischofberger, Manuel Frick, Floris Alders, Reto Teutschmann	Ivan Schmid, Ueli Kramer, Andrea Glauser, Ivan Bujanovic

Key Partners	Key Resources		Key Activities
PostFinance, Concardis, Stripe, Hypothekarbank Lenzburg	Employees in 2017	15	Programming & Engineering
	… of which in CH	15	Marketing / Finding Clients
	Total Funding (CHF)	1’000’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Pure Value Metrics AG **www.purevaluemetrics.com**

Founded in 2014 *Category* Investment Management
Location Schwyz *Valuation* 120’000

PvM provides value based Investment Portfolios; specializing in Global Healthcare/Medical and Technology sectors with low debt and dividends supported by a clearly defined structure and process.

Board Members	Management Team
Richard-Mark Dodds, Stéphane Collet	Richard-Mark Dodds, Stephane Collet, Richard Appleyard

Key Partners	Key Resources		Key Activities
SAXO Bank	Employees in 2017	3	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)	120’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Qontis AG **www.qontis.ch**

Founded in 2013 *Category* Banking Infrastructure
Location Zurich *Valuation*

Software products of Qontis provide a powerful range of functions covering all aspects of personal finance. This also allows for tailor-made offers based on customer segments. The simplicity of the money management, the user-friendliness and the added value for the customers is always at the center of the products.

Board Members	Management Team
Attilio Capella, Richard Dratva, Walter Meister	Stephan Hauser, Christian Bieri

Key Partners	Key Resources		Key Activities
Crealogix AG, our existing customer base (retail banks)	Employees in 2017	10	Programming & Engineering
	… of which in CH	9	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Quotip - DmanD GmbH **www.quotip.com**

Founded in 2015 *Category* Investment Management
Location Zurich *Valuation*

Quotip is a management tool for structured investments and provides wealth managers turnkey access to a holistic array of services in three key areas: product idea generation, request-for-quote, audit/life-cycle-management.

Board Members	Management Team
	David Buehlmann, Rob Varga

Key Partners	Key Resources		Key Activities
	Employees in 2017	3	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Raizers SA **www.raizers.com**

Founded in 2014 *Category* Deposit & Lending
Location Vaud *Valuation*

Raizers offers companies to raise funds through internet users, via its online platform, without going through traditional financing channels.

Board Members	Management Team
Maxime Pallain, Grégoire Linder, Alexandre Bernardi, Gabrielle Guirriec, Mansour Khalife, Edouard Burrus	Maxime Pallain, Gregoire Linder, Gabrielle Guirriec

Key Partners	Key Resources		Key Activities
Piguet Galland	Employees in 2017	11	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	1'600'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Run my Accounts AG **www.runmyaccounts.ch**

Founded in 2008 *Category* Analytics
Location Zurich *Valuation*

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. Our clients benefit from reliable, up-to-date financial information, with a minimum of administrative work.

Board Members	Management Team
Peter Quadri, Martin Schlatter, Christian Zenker, Jean-Jacques Suter	Thomas Brändle, Mattia Kienast, Andreina Konic, Nils Samuelsson

Key Partners	Key Resources		Key Activities
	Employees in 2017	50	Programming & Engineering
	… of which in CH	45	Marketing / Finding Clients
	Total Funding (CHF)	800'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Sanostro AG **www.sanostro.com**

Founded in 2013 *Category* Investment Management
Location Zurich *Valuation*

Sanostro offers unique market timing intelligence from leading systematic investment managers to build innovative solutions. Sanostro's clients are institutional investors, who seek to capture returns or manage risks more efficiently. Sanostro's approach is purely systematic and highly automated.

Board Members	Management Team
	Wolfgang Batt, Johannes Roth, Godefroy Schrago

Key Partners	Key Resources		Key Activities
	Employees in 2017	11	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

SecurionPay - Online Payments Group AG **www.securionpay.com**

Founded in 2014 *Category* Payment
Location Schwyz *Valuation*

The most innovative and flexible payment platform for European businesses that helps merchants process transactions across the world. Thanks to versatile APIs, merchants can easily integrate payment solution, based on their setup, programming language, etc. They have full control over the entire payment process and can customize the solution and create any payment scenario to fulfil their business needs.

Board Members	Management Team
Daniel Ronzani	Lucas Jankowiak

Key Partners	Key Resources		Key Activities
European acquiring banks (5)	Employees in 2017	22	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Selma Finance AG **www.selmafinance.ch**

Founded in 2016 *Category* Investment Management
Location Schwyz *Valuation*

Selma is a Swiss alternative to investing through a bank. Investing is one of the hardest, wickedly priced, boring and at the same time extremely useful things you can do. We at Selma believe that investing money for a rainy day (or any other reason) should not be frustrating or scary.

Board Members	Management Team
Patrik Schär, Stefan Jaecklin, Kevin Linser	Patrick Schär, Kevin Linser, Mikael Roos, Valeria Gasik

Key Partners	Key Resources		Key Activities
Saxo Bank (Schweiz) AG	Employees in 2017	6	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Signatys Sarl **www.signatys.com**

Founded in 2011 *Category* Banking Infrastructure
Location Geneva *Valuation*

At Signatys, we are building the unique standard of trust for datas and documents exchanges. We make exchanges and signatures of critical decisions as secure as making payments. Our company provides digital trusted signatures solutions dedicated to private banks via our SignMit product.

Board Members	Management Team
	Olivier Adler, Francois Rochat

Key Partners	Key Resources		Key Activities
SwissSign	Employees in 2017	3	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)	325’728	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Simplewealth AG **www.simplewealth.ch**

Founded in 2015 *Category* Investment Management
Location Zurich *Valuation*

Simplewealth makes investment easy, with secure online banking services and tailored plans, to make money for your future while you live in the moment.

Board Members	Management Team
Jérémy Cohen	Jérémy Cohen (CEO)

Key Partners	Key Resources		Key Activities
UBS, Blackrock, Deutsche Bank, Lyxor, Interactive Brokers	Employees in 2017	4	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)	100'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

SIX Group AG **www.six-group.com**

Founded in 2008 *Category* Banking Infrastructure
Location Zurich *Valuation*

SIX provides a comprehensive range of services in the areas of securities trading, settlement of securities transactions, financial information processing, and payment transactions.

Board Members	Management Team
Romeo Lacher (CoB)	Jos Dijsselhoff (CEO)

Key Partners	Key Resources		Key Activities
	Employees in 2017	3'807	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

SmartMoneyMatch - 4Finance AG **www.smartmoneymatch.com**

Founded in	2015	*Category*	Investment Management
Location	Zug	*Valuation*	50'000'000

SmartMoneyMatch connects the global investment community. It offers a platform for investment products (matching search & find), due diligence exchange, RFPs, jobs, events, social networrk activities for the asset management industry.

Board Members	Management Team
Martin Signer	Martin Signer

Key Partners	Key Resources		Key Activities
See website	Employees in 2017	4	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Sonect AG **www.sonect.net**

Founded in	2016	*Category*	Banking Infrastructure
Location	Zurich	*Valuation*	

SONECT converts any shop or individual into a "Virtual ATM" reducing the high "cost of cash" via a location based on-demand service that allows its users to withdraw cash using smartphone everywhere. It is a location based match making platform that connects those who want to withdraw cash with those who want to deposit cash - typically, a shop owner. This way, the shop owner not only reduces his cash management efforts but also earns money and increases footfall, consumers can withdraw cash at the click of a button wherever they are, and banks can save up to 50% in running their ATMs while generating new revenue.

Board Members	Management Team
Sandipan Chakraborty, Fritz Klein	Sandipan Chakraborty, Rik Krieger, Arindam Bajpayee

Key Partners	Key Resources		Key Activities
PostFinance AG, Raiffeisen Bank International	Employees in 2017	9	Programming & Engineering
	… of which in CH	5	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Spectravest - Quantex AG **www.spectravest.ch**

Founded in 2003 *Category* Investment Management
Location Berne *Valuation*

Spectravest is an open-end investment fund incorporated in Switzerland. The Fund's objective is to achieve long-term growth.

Board Members	Management Team
Benoit Bitschnau, Pascal Horn, Marcel Brülhart, Kurt Lambert	Pascal Horn, Peter Zeier

Key Partners	Key Resources		Key Activities
Quantex, Lienhardt & Partner, Arillo	Employees in 2017	10	Programming & Engineering
	… of which in CH	10	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Squirro - Nektoon AG **www.squirro.com**

Founded in 2013 *Category* Analytics
Location Zurich *Valuation*

Squirro is a cognitive insights engine that enables companies to turn meaningless data into actionable insights.

Board Members	Management Team
Radboud Vlaar, Patrice Neff, Ariel Lüdi, Dorian Selz, Alex Ott	Dorian Selz, Toni Birrer, Patrice Neff, Tania Thiebach, Geraldine Teboul, Harry Fuecks, Michael Hubrich

Key Partners	Key Resources		Key Activities
Synpulse, AdNovum, Arvato Systems, Salesforce, ServiceNow	Employees in 2017	40	Programming & Engineering
	… of which in CH	20	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

SweePay AG **www.sweepay.ch**

Founded in 2014 *Category* Payment
Location Zug *Valuation*

We design, deliver and operate payment and distribution services for the digital and physical world.

Board Members	Management Team
Heinz Mühlethaler	Rodolphe Texier

Key Partners	Key Resources		Key Activities
SBB, Cornercard, Paysafecard	Employees in 2017		Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Swiss Fin Lab GmbH **www.swissfinlab.com**

Founded in 2016 *Category* Investment Management
Location Zurich *Valuation*

We believe that the successful company of the future will have access to customer data, the ability to analyse it and use it for intuitive applications. We at SWISS FIN LAB can help you with exactly that. We are really good at investments, managing and analysing data and making beautiful and intuitive applications.

Board Members	Management Team
	Bernhard Obenhuber, Mark Andersen, Nicolas Camenzind, Axel Swoboda, Patrick Kranzlmüller

Key Partners	Key Resources		Key Activities
	Employees in 2017	6	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

SwissLending SA **www.swisslending.com**

Founded in 2015 *Category* Deposit & Lending
Location Geneva *Valuation*

The Swiss real estate crowdfunding specialist. SwissLending is the first crowdfunding platform in Switzerland specializing in loans for real estate professionals. Real estate crowdlending is an innovative financing alternative, and an interesting source of profitability for developers and investors.

Board Members	Management Team
Dominique Goy, Christophe Capelli	Dominique Goy

Key Partners	Key Resources		Key Activities
Groupe Capelli	Employees in 2017	1	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

swisspeers AG **www.swisspeers.ch**

Founded in 2015 *Category* Deposit & Lending
Location Zurich *Valuation*

Swisspeers is an independent online platform that allows companies to source loans directly from investors without intermediaries such as financial institutes.

Board Members	Management Team
Christoph Ammann, Urs Hofer, Jürg Hunziker, Karin Rhomberg, Peter Sami	Alwin Meyer, Andreas Hug, Stefan Nägeli

Key Partners	Key Resources		Key Activities
Bank Linth, Amnis Treasury	Employees in 2017	8	Programming & Engineering
	… of which in CH	8	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Swissquote Group Holding SA **www.swissquote.ch**

Founded in 2000 *Category* Banking Infrastructure
Location Vaud *Valuation* 533’000’000

Swissquote Group is the Swiss leader in online banking.

Board Members	Management Team
Mario Fontana, Markus Dennler, Martin Naville, Jean-Christophe Pernollet, Beat Oberlin	Marc Bürki, Paolo Buzzi, Michael Ploog, Morgan Lavanchy, Gilles Chantrier

Key Partners	Key Resources		Key Activities
Postfinance	Employees in 2017	594	Programming & Engineering
	… of which in CH	525	Marketing / Finding Clients
	Total Funding (CHF)	289’000’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

TaxLevel AG **www.taxlevel.ch**

Founded in 2017 *Category* Banking Infrastructure
Location Zurich *Valuation* 1’500’000

The TaxLevel services are focusing on the international Client Tax Statement Production for financial services providers, intermediaries and their demanding clientele. Our offer is based on the SaaS model, together with our web platform, we are offering a state-of-the-art interface for the order and order processing. Furthermore, there is the possibility to grant the end user access to his data and to directly involve him and his advisors in this process – in the sense of the self-service, on-demand idea.

Board Members	Management Team
Wolfgang Millat, Peter Strittmatter, Reinhard Stary, Manfred Köhl	Wolfgang Millat (CEO), Peter Strittmatter

Key Partners	Key Resources		Key Activities
	Employees in 2017	4	Programming & Engineering
	… of which in CH	4	Marketing / Finding Clients
	Total Funding (CHF)	100’000 (self-funded)	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

theScreener.com SA **www.thescreener.com**

Founded in 2000 *Category* Analytics
Location Vaud *Valuation*

We assist leading financial institutions to optimise advice and performance.

Board Members	Management Team
Alain Farwagi, Christian Grandjean, Martin Velasco	Farwagi Alain (Co-CEO), Andreas Lusser(Co-CEO), Ernst Roth

Key Partners	Key Resources		Key Activities
Thomson Reuters, Factset, Morningstar, SIX, vwd, sungard, various IT suppliers.	Employees in 2017	30	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

ti&m AG **www.ti8m.ch**

Founded in 2005 *Category* Banking Infrastructure
Location Zurich *Valuation*

ti&m is a Swiss leader in digitization, security, as well as innovation projects and products.

Board Members	Management Team
Thomas Wüst, Felix Aeschlimann, Urs Buner, Markus Nigg	Thomas Wüst (CEO), Markus Nigg, Nico Meier, Rene Konrad, Daniel Walther, Samuel Scheidegger

Key Partners	Key Resources		Key Activities
Microsoft, Jive, IBM, Software AG, Liferay, Magnolia, Red Hat, USP, HPI Hasso-Plattner-Institute, Ergon, SIX	Employees in 2017	295	Programming & Engineering
	… of which in CH	290	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Tilbago AG **www.tilbago.ch**

Founded in 2016 *Category* Deposit & Lending
Location Lucerne *Valuation*

The founders of Tilbago AG enable companies to process debt collection proceedings online in an independent, easy and safe way. Tilbago AG pursues the objective to enable an easy, effective and efficient online processing of debt collections for creditors by innovative use of modern technologies.

Board Members	Management Team
Harley Krohmer (CoB), David Fuss, Reto Schneider, Mathias Strazza, Oliver Wolf	David Fuss

Key Partners	Key Resources		Key Activities
PostFinance	Employees in 2017	3	Programming & Engineering
	… of which in CH	3	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

True Wealth AG **www.truewealth.ch**

Founded in 2013 *Category* Investment Management
Location Zurich *Valuation*

True Wealth is a Zurich based fintech company successfully operating a digital wealth management solution (robo advisor) in Switzerland.

Board Members	Management Team
Felix Niederer, Martin Spirig, Herbert Kumbartzki	Felix Niederer, Silvio Böhler, Daniel Gilomen

Key Partners	Key Resources		Key Activities
BLKB	Employees in 2017	11	Programming & Engineering
	… of which in CH	11	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

TWINT AG **www.twint.ch**

Founded in 2014 *Category* Payment
Location Berne *Valuation*

TWINT is Switzerlands first real digital wallet, an extensive solution for mobile shopping and payment in all kinds of stores, restaurants or online shops, including P2P money transfers It connects the physical and digital worlds, creating a new shopping experience for customers and giving vendors an innovative tool for mobile marketing.

Board Members	Management Team
Jürg Weber, Michael Auer, Sylvie Meyer, Andreas Kubli, Daniel Previdoli, Florence Schnydrig Moser, José F. Sierdo	Thierry Kneissler (CEO), Alessandro Rausa, Michael Hügli, Pedro Desserano, Stefan Hediger

Key Partners	Key Resources		Key Activities
Owners : SIX, BCV, Credit Suisse, PostFinance, Raiffeisen, UBS, ZKB. Further key partners: Coop, Migros, Aduno, Concardis, Swisscom, AdNovum.	Employees in 2017	52	Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Veezoo AG **www.veezoo.com**

Founded in 2015 *Category* Analytics
Location Zurich *Valuation*

The first Conversational Artificial Intelligence to analyze and visualize company data in seconds.

Board Members	Management Team
	Marcos Monteiro, Joao Pedro Monteiro, Till Haug

Key Partners	Key Resources		Key Activities
	Employees in 2017	7	Programming & Engineering
	… of which in CH	7	Marketing / Finding Clients
	Total Funding (CHF)	50’000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

visionand AG **www.visionand.ch**

Founded in 2017 *Category* Investment Management
Location Zug *Valuation*

vision& is a Swiss based asset manager giving qualified investors the opportunity to allocate funds to the new crypto asset class with the ease of traditional investing.

Board Members	Management Team
Christian Schüpbach, Lidia Bolla	Christian Schüpbach, Lidia Bolla

Key Partners	Key Resources		Key Activities
	Employees in 2017	5	Programming & Engineering
	… of which in CH	5	Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

WealthArc GmbH **www.wealtharc.com**

Founded in 2015 *Category* Investment Management
Location Zurich *Valuation*

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. WealthArc solution aggregates client information in one place through automated data feeds to help with new regulatory challenges - MIFID2, FIDLEG.

Board Members	Management Team
	Chris Gogol (CEO), Radomir Mastalerz, Edward Maeder

Key Partners	Key Resources		Key Activities
Thomson Reuters, Microsoft, Swisscom	Employees in 2017	21	Programming & Engineering
	… of which in CH	7	Marketing / Finding Clients
	Total Funding (CHF)	2'000'000	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

WERTHSTEIN

Werthstein AG **www.werthstein.com**

Founded in 2016 *Category* Investment Management
Location Zurich *Valuation*

"The Economist with a trading button" - we make investing easy and intellectually stimulating and "spotify finance" with a disruptive subscription based pricing model.

Board Members	Management Team
Giles Keating, Felix Röscheisen, Bastian Lossen, Michael Stemmle	Giles Keating, Felix Röscheisen, Bastian Lossen

Key Partners	Key Resources		Key Activities
	Employees in 2017		Programming & Engineering
	… of which in CH		Marketing / Finding Clients
	Total Funding (CHF)		Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Z-RECHNUNG
Rechnungsaustausch Automatisiert

Z-Rechnung - 8gears AG **www.z-rechnung.com**

Founded in 2015 *Category* Payment
Location Zurich *Valuation* 7'125'300

Z-INVOICE helps to automate the inbound and outbound invoice processing. Together with our partners we provide our clients value-adding services in context to the underlying documents and business processes such as payment, currency transfer, factoring, freight insurance, dunning, compliance, tax services.

Board Members	Management Team
Vadim Bauer	

Key Partners	Key Resources		Key Activities
	Employees in 2017	5	Programming & Engineering
	… of which in CH	2	Marketing / Finding Clients
	Total Funding (CHF)	101'790	Operative Business / Serving Clients

Customer Segments		Channels	
B2B National	B2B International	Digital Only	Digital & Personal
B2C National	B2C International	Personal Only	

Revenue Models			
SaaS	Commission	Trading	License Fee
Interest	Advertising	Data	

Authors

Guest Authors

Daniel Haeberli, LL.M.
Attorney-at-Law
Partner
Homburger

Dr. Benedikt Maurenbrecher, MBA
Attorney-at-Law
Partner,
Head of the Financial Services practice team
Homburger

Dr. Urs Meier, LL.M.
Attorney-at-Law
Associate
Homburger

Prof. Dr. Tim Weingärtner
Vice Dean of Lucerne School of Information Technology

Institute of Financial Services Zug IFZ

Simon Amrein
Senior Research Associate

Prof. Dr. Thomas Ankenbrand
Head of the Competence Centre for Investments

Denis Bieri
Research Associate

Prof. Dr. Andreas Dietrich
Lecturer,
Head of the Institute of Financial Services Zug IFZ

Dr. Jürg Fausch
Lecturer

Dr. Fabio Sigrist
Lecturer

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Appendix A

Additional information on the structure of the database based on the Business Model Canvas of Osterwalder & Pigneur (2010):

Key Resource	Description
Capital	Indicates how much financial capital the company has raised until now.
Number of Employees	Indicates how many human resources are currently deployed to develop, maintain and/or distribute the company's products and services. Additionally, the expected number of FTE by the end of 2017 is evaluated.

Key Activity	Description
Programming & Engineering	The company is currently focussing on setting up its website, platform, or app.
Marketing/ Finding Clients	The company is currently focussing on finding customers.
Operative Business/ Serving Clients	The company is currently focussing on running its daily business and serving the already established customer base.

Customer Relationship/ Channel	Description
Digital Only	A client does not need to personally communicate with the company to use its services or products. Communication happens via the company's platform, website, app, or other digital communication tools.
Personal Only	The company's service requires personal communication and does not include any online tools.
Digital & Personal	A part of the company's services or products are conveyed digitally, but other aspects require personal communication via e-mail, telephone, face-to-face, or other channels. Hence, the company pursues a hybrid communication strategy.

Customer Segment		Description
Customer Type	**B2C *(Business-to-Customer)***	The company's main customers are private individuals.
	B2B *(Business-to-Business)*	The company's main customers are other businesses.
Geography	**Switzerland**	The company focuses on serving customers in Switzerland.
	International	The company focuses on serving international customers (Switzerland included).

Revenue Model	Description
Interest	The company earns interest rate income.
Commission	The company receives commissions for services or products delivered.
Trading	The company actively trades in financial markets.
Licensing Fees	The company licenses products or software and receives licensing fees.
SaaS *(Software as a Service)*	The company offers centralised hosting of business applications.
Advertising	The company sells advertising space.
Data	The company gathers vast amounts of data and sells or analyses the data itself.

Appendix B

Indicator sources of the FinTech hub ranking:

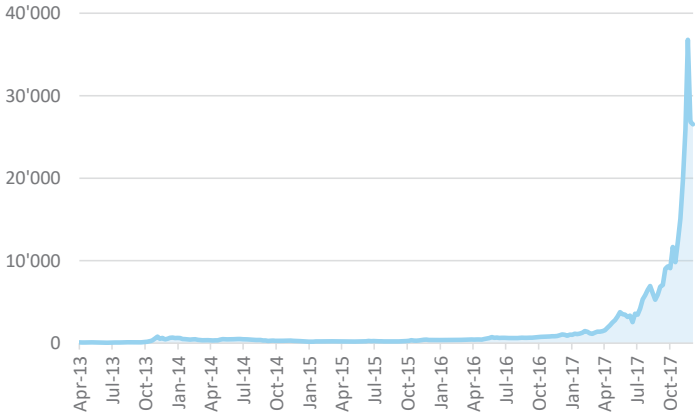
Publisher	Factor	Source	Dimension
2think now	Innovation Cities	Innovation Cities Index 2015	Technological
Economist Intelligence Unit	Global Cities Competitiveness	Hot spots - Benchmarking global city competitiveness	Economic
Ernst & Young	FinTech Adoption	EY FinTech Adoption Index	Economic
Hays	Global Skills	Hays Global Skills Index	Social
Heidrick & Struggles and Economist Intelligence Unit	Compulsory education quality	Heidrick & Struggles database	Social
	Demographics	Heidrick & Struggles database	Social
	Openness	Heidrick & Struggles database	Social
	Proclivity to attracting talent	Heidrick & Struggles database	Social
	Quality of labor force	Heidrick & Struggles database	Social
	Talent environment	Heidrick & Struggles database	Social
	University Education	Heidrick & Struggles database	Social
Henley & Partners	Visa Restriction	Visa Restrictions Index	Political/Legal
IMD	World Talent	World Talent Report	Social
University of Sydney, the Economist	Global Peace Index	Global Peace Index	Political/Legal
International Labour Organization	Employment in knowledge-intense services	ILOSTAT Database of Labour Statistics	Social
	Female Employ. Advanced Degree	ILOSTAT Annual Indicators	Social
International Monetary Fund	Domestic Credit to Private Sector	International Financial Statistics and data files and World Bank and OECD GDP estimates	Economic
	Domestic Market Scale	International Monetary Fund Database	Economic
	Foreign Direct Investment Net Inflows	International Financial Statistics and data files and World Bank and OECD GDP estimates	Economic
International Telecommunication Union	ICT Access	Measuring the Information Society	Technological
	ICT Use	Measuring the Information Society	Technological
	Cybersecurity	Global Cybersecurity Index (GCI)	Technological
InterNations	Expat Ranking	Expat Insider	Social
Knight Frank	Global Cities	Global Cities Report	Social
KPMG	Corporate Tax Rates	Corporate tax rates table	Political/Legal
Numbeo	Cost of Living City	Numbeo database	Social
	Local Purchasing Power Index	Numbeo database	Economic
	Quality of Life City	Numbeo database	Social
OECD	PISA Ranking	Programme for International Student Assessment (PISA)	Social
QS Quacquarelli Symonds Ltd	QS university ranking average score of top 3 universities	QS World University Ranking	Social
Reporters without Borders	Press Freedom	World Press Freedom Index	Political/Legal
Tax Justice Network Limited	Financial Secrecy	Financial Secrecy Index	Economic

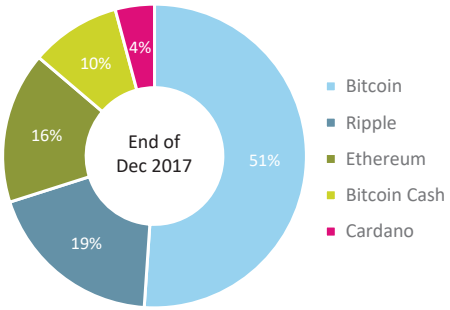
The Global Entrepreneurship and Development Institute	Global Entrepreneurship Index	The Global Entrepreneurship and Development Institute website	Economic
The World Bank	Applied Tariff Rates	World Bank World Development Indicators database	Economic
	Cost of Redundancy Dismissal	Ease of Doing Business Index	Political/Legal
	Ease of Getting Credit	Doing Business: Measuring Regulatory Quality and Efficiency	Economic
	Ease of Paying Taxes	Doing Business: Measuring Regulatory Quality and Efficiency	Political/Legal
	Ease of Protecting Minority Investments	Doing Business: Measuring Regulatory Quality and Efficiency	Economic
	Ease of Resolving Insolvency	Doing Business: Measuring Regulatory Quality and Efficiency	Economic
	Government Effectiveness	World Governance Indicators	Political/Legal
	Logistics Performance	Logistics Performance Index	Social
	Mobile Cellular Subscription	World Bank database (Mobile cellular subscriptions (per 100 people))	Technological
	Political Stability	World Governance Indicators	Political/Legal
	Regulatory Quality	World Governance Indicators	Political/Legal
	Starting a Business	Doing Business: Measuring Regulatory Quality and Efficiency	Economic
Thomson Reuters	Joint Venture/strategic alliance deals	Thomson One Banker Private Equity, SDC Platinum database	Economic
	Venture Capital Deals	Thomson One Banker Private Equity database; International Monetary Fund, World Economic Outlook database	Economic
Transparency International	Corruption Perception	Corruption Perceptions Index	Political/Legal
UBS	Wage Level City	Preise und Löhne	Economic
UNESCO Institute for Statistics	Expenditure on Education	UIS online database	Social
	Government Expenditure on Education per Pupil	UIS online database	Social
	Graduates in Science & Eng.	UIS online database	Social
	Gross expenditure on R&D (GERD)	UIS online database	Technological
	Number of Students from Abroad	UIS online database	Social
	Pupil-Teacher Ratio	UIS online database	Social
	Research Talent in Business Enterprise	UIS online database	Technological
	Researchers	UIS online database	Technological
	School Life Expectancy	UIS online database	Social
	Tertiary Enrolment	UIS online database	Social
United Nations	High-Tech Imports	COMTRADE database; Eurostat, 'High-technology' aggregations	Technological

United Nations Public Administration Network	Gov. Online Services	e-Government Survey	Technological
	Online E-Participation	e-Government Survey	Technological
World Economic Forum	Quality of Infrastructure	Global Competitiveness Report	Social
	Human Capital	The Human Capital Report	Social
	State of Cluster Development	Executive Opinion Survey	Social
	University/Industry Research Collaboration	Executive Opinion Survey	Technological
World Federation of Exchanges	Market Capitalization	World Federation of Exchanges database: extracted from the World Bank's World Development Indicators database	Economic
	Total Value of Stocks Traded	World Federation of Exchanges database: extracted from the World Bank's World Development Indicators database	Economic
World Intellectual Property Organization	Patent families in at least 2 Offices	WIPO Statistics Database; International Monetary Fund, World Economic Outlook Database	Technological
World Trade Organization	ICT Services Imports	Trade in Commercial Services database	Technological
	Intellectual Property Payments	Trade in Commercial Services database	Technological
Z/Yen Group	Global Financial Centers	Global Financial Centers Index	Economic

Appendix C

The cryptocurrency index used in this study ranks the performance of the five largest cryptocurrencies as measured by market capitalization on a weekly basis from July 28th, 2013 to December 31st, 2017. In particular, it is constructed following the Laspeyres-approach by weighting the prices of the five identified cryptocurrencies at a given time with the corresponding share on their aggregated market capitalization. The limitation to the five highest capitalized cryptocurrencies indicates a minimum level of market liquidity. The performance of the cryptocurrency index and its composition at the end of the year 2017 are shown below.





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