The rise of customer-oriented banking - electronic markets are paving the way for change in the financial industry

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Abstract The banking industry has been a pioneer in adopting electronic markets with exchanges, clearinghouses, and multilateral trading facilities having become the backbone of today's globally integrated financial transactions. While most banks use the services of these electronic markets to handle interbank processes, they still strive for bilateral relations in the field of customer-facing processes. This position paper argues that the financial crises, the changing behavior of customers, upcoming innovations based on information technology (IT) and financial services offered by non-banks are strong drivers towards more customer-orientation in the financial industry. A large variety of banking IT innovations has emerged and illustrates that traditional banks are expected to have less power to impede competition at the customer interface and in consequence need to re-position themselves. Building on these developments on the one hand and existing electronic market infrastructures in the banking industry on the other, the concept of a customer-oriented financial market infrastructure is proposed as a possible future solution. The impact is illustrated using a competitive analysis of the banking industry and analogies to the media industry where new entrants from the computing industry have caused disruptive changes. Besides describing the threat to existing banks, the position paper also discusses the perspectives for banks.

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Transformation of the banking industry

The innovative application of information technology (IT) has a strong transformation potential. This applies, in particular, to electronic markets which have changed entire industries. Among the prominent examples are the computerized reservation systems in the travel industry, the ordering systems in the pharmaceutical industry, the electronic home shopping systems in retailing as well as the electronic stock markets in the financial sector (Malone et al. 1987). More recently, the convergence of the media, computer and telecommunication industry has replaced the traditional physical distribution of content (Allon and Gurvich 2007) and physical media, such as CDs, books and DVDs as well as many of the physical stores. A major actor in this shift has been Apple Corporation which not only is a manufacturer of hardware solutions, but has also become the world's largest distributor of multimedia content and software. Apple has used the potential of disruptive technologies, such as the MP3 format, mobile user devices (iPhone, iPad), and electronic markets (iTunes, AppStore) to transform the media industry. These disruptive technologies often feature inferior performance in the early stages of their evolution (e.g. flat screen TVs first had a lower resolution than conventional tube TVs) and their potentials are typically underestimated (Bower and Christensen 1995). In addition, the analysis of several cases indicates a high transformative potential of IT on business models and value chains in service businesses (e.g. (Osterwalder and Pigneur 2011), (Kagermann et al.

2011)) which especially applies to the financial industry (Tallon 2010).

This position paper identifies a similar IT-induced disruption for the banking industry. The banking industry has been among the pioneers in IT adoption. One prominent explanation is that the banking business is essentially an information business where most processes may be IT-supported. Over the last decades banks have undertaken large investments in IT and developed individual applications to support their diverse business. On the one hand, large retail banks, such as Bank of America, use scale (6,139 branches and 18,685 automated teller machines (ATMs)) to pursue a business model based on location and access (Tallon 2010); on the other, small banks, such as private banks in Switzerland, focus on close customer relationships based on trust, personal interaction, familiarity, flexibility, and commitment. Although even large retail banks claim to offer relationship banking, a differentiated high-quality service is known to be incompatible with low-cost strategies (e.g. (Porter 1980), (White 1998)) and in addition profoundly relies on human capital in the banking industry. Despite banks having strongly invested in IT infrastructure, websites, and online banking platforms to offer customers personalized services via electronic channels, these systems mainly focus on operational functionalities around established banking products, e.g. a bank's checking or securities account. From a functional point of view it merely presents an electronic extension of the physical counter in a branch bank and is embedded in a bank's customer retention strategy which usually prevents comparing and managing competing banks and their products.

Drivers of transformation

While banks have successfully established joint electronic infrastructures for supporting interbank-relations, they tend to resist joint IT-based innovations at the customer interface. The financial market infrastructures in the payment sector (e.g. the SWIFT network) and the securities industry (e.g. Euroclear, Clearstream), as well as the various national providers of electronic stock exchanges (e.g. Deutsche Börse in Germany or SIX in Switzerland), provide efficient services to the entire banking industry with some partly owned by banks. In contrast, banks are seeking differentiation at the customer interface and have little interest in unlocking their customers. The last two decades have seen multiple visions for "banking in the future" (e.g. (Gates 1995), (Evans and Wurster 1999)) that conceived banking from a customer perspective, however banks were successful in defending their established models. This position paper supposes that four drivers have become sufficiently prevalent to induce a stronger transformation in the forthcoming years. These drivers are the consequences of

the financial crises, the changing behavior of banking customers, the pace of diffusing innovative downstream IT-solutions, and the emergence of non-banks. Later Porter's Five Forces model is used to discuss the impact of these drivers in more detail.

The first driver refers to the *consequences of the financial crises*. Since 2007 the financial industry has repeatedly experienced severe disruptions and economic as well as regulatory forces imply changes to the way banking has been done in the past. This applies to policies in awarding credits, in proprietary and algorithmic trading, and instruments for risk management, but also to a stronger definition of a bank's core competencies (Wallace and Herrick 2009). The pressure to conform to high levels of equity capital, to limit the hazardous high-margin investment banking and to operate with low margins in many commodity-like products, increases the need to identify profitable and varying services towards customers. Among the strategies is the development of solutions that support customers more intuitively in general and that offer profound advice. They lead to large, highly efficient banks on the one hand and profitable niche banks on the other, but eliminate undifferentiated banks "in the middle" (Hedley et al. 2006).

Second, the *behavior of banking customers* is changing. In view of the so-called "digital natives", the use of electronic channels is expected to grow and these technology-affine customers will become more informed and also demand more transparency (Hedley et al. 2006). An illustration of these developments is provided by Memberlink, the online social network of the Institute for Private Investors (IPI) in the US, which is used by more than 90 % of its members to request references of customer advisors/banks, to compare fees, and to unravel opaque charges. As stated by IPI, "Greater transparency in the wealth management industry is arguably the most applauded of the unintended consequences [of Memberlink]" (Fischer 2010). Another study of the Spanish market reveals that most bank customers (97 %) use multiple channels to interact with their bank (Cortiñas et al. 2010). 52 % of these customers use physical banks and ATMs and approximately one third more (88 %) uses the online channel in addition. However, current studies report that innovative services, such as personal finance management, mobile payment, crowd funding etc. that are valued by "digital natives" are usually not within the scope of the established IT systems offered by banks (e.g. (Anand 2011), (Hoppermann 2011), (McKinsey and Company 2010)). Together with the third and the fourth driver this already points to critical future challenges for banks.

Third, the *pace of diffusion of innovative downstream IT solutions* which directly involve banking customers has increased. Driven by widely accepted technological innovations on the hardware side, such as smartphones, tablet computers, touch-sensitive screens, a variety of community-based solutions has emerged on the software side. One example

refers to "User Generated Content" (UGC) websites which enable a paradigm change in the generation, organization and transfer of information and media as well as in the social interaction between users. Out of the top ten global traffic generating websites, six are based on UGC (Alexa 2012). The technological infrastructures, the types of web applications, and the resulting user experiences through UGC websites are commonly summarized as "Web 2.0" or "Social Web" (O'Reilly 2007). These applications are believed to re-shape the consumer-supplier relationships of all organizations and businesses (McAfee 2006). In an analysis of banking-related web applications for customer interaction a recent study of eleven cases observes social pressure on organizations to quickly adopt social web technologies ((Stone 2009), see also (Seo and Rietsema 2010)). Another broadly available community example refers to the software ecosystems.[1] In analogy to the "platform-as-a-service" concept, operating platforms are increasingly ecosystems which also comprise electronic marketplaces, such as the Apple AppStore or the Google Play marketplace (e.g. (Basole and Karla 2011), (Karhu and Botero 2011)). They are innovative distribution platforms and already feature a broad variety of financial services.

Fourth, *non-banks are emerging* and provide innovative IT solutions. While online banking systems are still limited to payment transactions and security order management systems, third party social web applications, such as online investment communities and peer-to-peer business models, are emerging which include the possibility to compare bank products and to obtain neutral advice. These banking innovations are mostly provided by new actors for a realm of financial customer processes. Among the examples are services, such as Covestor or Prosper, the collaboration of Google, Citibank and Mastercard to establish a mobile payment system, Vodafone's plan to provide a banking infrastructure for Africa and Facebook which is developing its own currency "Facebook Credits". All these providers enter the banking market with new IT-based business models. This is not surprising because many banking products, such as savings accounts or loans, are information-based commodities and may be accessed by customers from any device and purchased from any financial service provider in the market. In fact, during the past decade many banks have already reduced their

degree of vertical integration and either outsourced parts of their highly integrated business or insourced others to also develop an offering to other banks. The traditionally highly vertically integrated value chains of banks are already on the way to becoming more disaggregated.

Overall, these drivers create a dynamic environment in an industry that was stable and protected for many decades. Vertical disintegration, specialization, and growing competition with customer-oriented solutions are important developments towards more customer-orientation. To back this reasoning and to derive possible implications, the following sections first summarize the current stage of electronic market development in the banking industry. Second, an overview of IT-based innovations in the banking industry is given. Third, the shape of a possible customer-oriented financial market infrastructure which includes an evaluation of potential actors as well as consequences for banks is depicted, and, finally, the conclusions summarize four findings that pave the way towards customer-oriented banking.

Electronic markets in the banking industry

Electronic markets are well known in the financial industry especially in the area of stock trading. Since the first electronic stock exchange Nasdaq started operations in 1971, the sector has seen the takeover by electronic markets at most traditional floors. Today, many national and global marketplaces exist, such as Nasdaq, NYSE or CBOT in the US, Deutsche Börse in Germany or the London Stock Exchange in the UK. Besides these official markets, several alternative electronic trading floors (referred to as multilateral trading facilities, MTF) have emerged, such as Turquoise or Chi-X, in an effort by banks to establish a more efficient execution of securities and derivatives. In a broader context, these electronic markets are part of so-called "financial market infrastructures" (FMI) which especially gained importance in the light of the ongoing disintermediation in the financial sector. An FMI is an important element when capital markets substitute lending and savings functions offered by banks (Gisiger and Weber 2005). As banks were aware that cost-efficiency dominates differentiation in these interbank processes, cooperation among banks has led to electronic infrastructures for multiple banks and increasingly also non-banks. FMIs typically encompass institutions for business-to-business (B2B) payment and securities processing among banks as well as between banks and stock exchanges. They basically comprise three elements: the stock exchange, the clearing and settlement provider (clearing organization) and the gross settlement payment system (payment organization) (see Fig. 1). FMIs are organized by actors within national markets and contribute to the competitiveness of these markets (Gisiger and Weber 2005). For example, the Swiss Value Chain (SVC) is a joint venture of Swiss banks for

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[1] A business ecosystem can be defined as an "economic community supported by a foundation of interacting organizations and individuals - the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they co-evolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of the ecosystem leader is valued by the community as it enables members to move toward shared visions of aligning their investments, and finding mutually supportive roles." (Moore 1993).
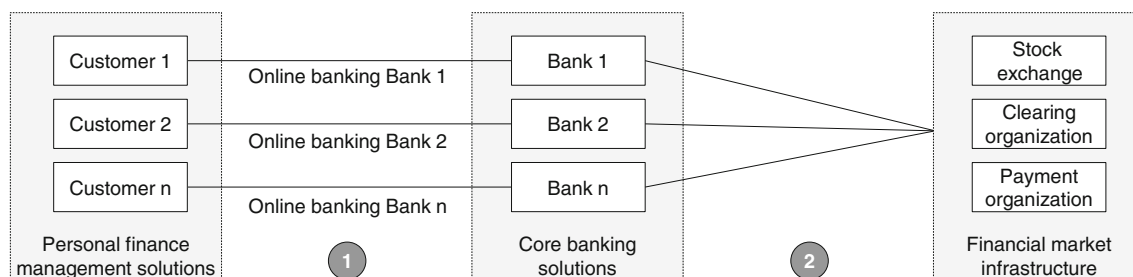
Fig. 1 Value chain of the banking industry

the centralized processing of payment and securities trans-actions. The SVC enables integrated real-time processes from a market sales order to the completion of the securities trans-action executed (see area 2 in Fig. 1) (Gisiger and Weber 2005). Parts of the SVC are audited by the Swiss supervisory authority FINMA and all three FMI elements are bundled in one company called SIX.

End customers only use FMI services via their banks (area 1 in Fig. 1) which assemble many other services for their customers (area 2 in Fig. 1). These usually consist of front office (e.g. marketing and customer service via count-er, online, adviser, call center), middle office (e.g. product development and market research, portfolio and risk man-agement) and back office (e.g. operations, transaction exe-cution, support processes) services. In the past, banks have established large IT departments and developed proprietary solutions to provide these services and to access the FMI or parts of it (e.g. electronic exchanges). More recently, stan-dard software packages (commonly referred to as core bank-ing systems or solutions, CBS) have emerged, such as Avaloq and Finnova in Switzerland, SAP and Finanz Informatik in Germany, Fidelity and Automated Systems in the US, or Misys and Colvir in the UK. Following the idea of integrated enterprise systems (Davenport 1998), they implement cross-functional processes within banks based on a centralized database. For customer interaction additional functionalities often enhance the basic customer manage-ment and online banking functionalities of CBS with dedi-cated applications (e.g. customer relationship management systems, online banking suites).

While these systems are relevant from the bank's per-spective, customer orientation implies the identification and support of customer needs (Vandermerwe 2000). As men-tioned in the introductory section, customers are inclined to have relationships with more banks as well as with other financial services providers and value transparency and ease-of-use across all of their financial touch points (e.g. (Evans and Wurster 1999), (Hedley et al. 2006)). However, what may be reasonable for dealing with one bank becomes difficult when customers have relationships with multiple banks. Among the problems of handling various online

banking systems are keeping up with different access and transactions codes or the heterogeneity of interaction proce-dures with each online banking solution. Personal finance management (PFM) tools, such as Quicken, Starmoney, Gnucash or iOutBank, are first solutions in this direction. They support customers in conducting transactions as well as in account and depot administration with multiple banks. A prerequisite of this cross-bank scenario are shared inter-face standards among the participating banks, e.g. the Homebanking Computer Interface (HBCI) standard in Germany. To date, the latter has important shortcomings. First, the information defined in these standards limit the multi-banking functionality of a PFM to transaction infor-mation with little interactivity. Second, the standards are limited to payment data and do not provide investment, financing or advisory related data. And third, the setup of each bank relationship necessitates substantial technological skills of the internal IT functions or service providers, re-spectively. Clearly on the one hand sophisticated solutions that integrate advanced financial products are required and provide for more intuitive ease of use in managing financial relationships on the other.

Banking IT innovations

Since all customer touch points in the banking industry may be IT-supported, the diffusion of technological innovations as mentioned above has important implications for the future interaction of a bank with its customers. This applies to the clerk at the counter, the agent in the call center, the advisor in personal interviews, as well as to the electronic channel itself. IT-based innovations at these touch points, referred to as "banking IT innovations", have emerged in a broad variety over the last five years. In order to analyze the implications of these banking IT innovations a three step research procedure has been applied.

In a *first step* a literature review was undertaken to develop a classification scheme for a structured overview of these innovations (see Table 1). A widely used classifi-cation approach for customer interaction distinguishes

Table 1 Classification and examples of banking IT innovations

Customer process / Provider	Financial Information (service providing information related to financial products, services and providers)	Planning & Advisory (services for analyzing, optimizing and planning to reach a customer's financial goals)	Payments (services for the administration and execution of bills and other payments)	Investments (services for the investment of money to achieve profits)	Financing (services for the provision and back payment of money)	Cross-process support (services that may be applicable in a variety of finance-related processes)
Bank — B2C	**Mobile information**: many banks offer mobile apps with general service functionalities (financial information, branch locators, etc.)	**Live messaging**: ABN Amro (NL), Rabobank (NL) **Instant messaging**: National City (US), Wells Fargo (US) **Video conferencing**: BBVA (ES), TD Canada Trust (CA), Comdirect "Virtueller Schul terblick" (DE), SmartBanking Bank Austria (AT) **Tablet advisory**: Bank of America (US), Credit Suisse (CH), Deutsche Bank (DE), Deutsche Vermögensberatung (DE), PostFinance (CH) **Personal finance mgmt.**: BBVA (ES), PostFinance (CH)	**Online payment**: Comdirect "Komfortüberweisung" (DE), Dwolla (US), Bezahlcode (DE) **Remote deposit capture**: Bank of Manhattan (US), Credit Suisse (CH), UBS Mobile Banking (CH) **Mobile payment**: ING Direct Bump App (NL) **Electronic payment provider**: Dwolla (US), giropay (DE) **eWallet**: American Express Serve (US), Fidor (DE), Visa (US)	**Mobile brokerage**: Many banks offer smartphone & tablet apps for mobile brokerage **Online private banking**: Nettobank (CH) **Coupon-based saving**: Migipig (CH)	**Mortgage comparison**: Comdirect (DE), Targobank (DE), Independent Bank (US)	**Multi-bank integration**: HDFC One View (IN), Allianz Finanzen App (DE) **Live & mobile chat**: Citigroup (US) **Podcasts**: Credit Suisse (CH), Deutsche Bank (DE), HSBC Private Bank (UK), UBS (CH) **RSS/Social media**: Credit Suisse (CH), Comdirect (DE), Deutsche Bank (DE), Movenbank (US), UBS (CH) **Idea management**: Commonwealth Bank (AU), Deutsche Bank (DE), UBS (CH)
Bank — C2C	**Customer community**: Comdirect (DE), Fidor (DE), Swissquote (CH)	**Customer community**: Bank of America (US), Comdirect (DE), Fidor (DE)	**P2P-payment**: Cashedge (US), Fidor (DE), Movenbank (US)	**Stock discussion**: Wikinvest (US) **Stock analysis/prediction**: HSBC (UK), Stockpulse (DE) **Community-based interest rate**: Fidor (DE)	**P2P-lending**: Auxmoney (DE), Fidor (DE), Lending club (US), Ratesetter (UK), Smava (DE), Zopa (UK)	**Forums**: Comdirect (DE), Maxblue (DE) **Social networks**: Bank of America (US), Barclays (UK), BBVA (ES), Fidor (DE), First Direct (CH), ING (NL), HSBC (UK)
Non-Bank — B2C	**Financial literacy**: Balance Financial (US), Bill My Parents (US), LoveMoney (UK), OneView (DE), Standard Chartered Breeze (UK)	**Client acquisition**: LinkedIn (US), Xing (DE), ASmallWorld (US), ELEQT (UK), SCVNGR (US)	**Payment code**: Bezahlcode (DE), Starbucks (US)	**Online portfolio management**: Betterment (US), Personal Capital (US), Yavalu (DE)	**Interest rate comparison**: Comparis (CH), Canstar (CA), Moneysupermarket (UK), zinshund (DE)	**Financial data analytics**: Bundle (US) **Investment services**: Assetinum (CH)

Table 1 (continued)

Customer process / Provider	Financial Information (service providing information related to financial products, services and providers)	Planning & Advisory (services for analyzing, optimizing and planning to reach a customer's financial goals)	Payments (services for the administration and execution of bills and other payments)	Investments (services for the investment of money to achieve profits)	Financing (services for the provision and back payment of money)	Cross-process support (services that may be applicable in a variety of finance-related processes)
	Real-time videos: Thomson Reuters Social (US)	**Personal finance mgmt.**: Geezeo (US), HelpMyCash (ES), Kontoblick (DE), Simplifi (US), Meniga (IS), Mint (US), Personal Capital (US), Strands (US)	**Expense trackers and budgeting**: Budgetedge (US), Mvelopes (US), SponsorPay (DE), Xpenser (US)	**Multi-bank / multi-asset trading for corporate clients**: 360t.com (DE)	**Mortgage comparison**: Bankrate.com (US, Check24 (DE), Hypoplus (CH), Moneynet (UK), Moneysupermarket (UK), Money.com (UK), Uswitch (US)	**Insurance services**: Credit Suisse (CH), Deutsche Bank (DE), Postbank (DE), Wells Fargo (US)
	Online research reports: MyPrivateBanking (CH)		**Checking account comparison**: Banrate.com (US), FindAbetterbank.com (US), Check24 (DE)	**Coupon-based saving**: Payoff.com (US), SmartyPig (US)	**Corporate financing**: Finpoint (DE)	**Client advisor comparison**: Whofinance (DE)
C2C	**Community-based stock analysis / prediction**: MoodTRADE (US), Sentitrade (DE), Stockpulse (DE), Stock Sonar (IL), Stocktwits (DE)	**Community-based advisory**: Fidor (DE), WhoFinance (DE)	**Alternative currencies**: Bitcoin (US)	**Stock market games**: Brokertainment (DE), Wall Street Survivor (US)	**Online finance advice**: Credit Karma (US), Savvymoney (US), Studienkredite (DE), Virgin Money (UK)	
			Mobile payment: Google Wallet (US), iZettle (SE), Square (US), Starbucks Card Mobile (US)	**Community recommendations**: Sharewise, Socialpicks, StockTwits, Wikinvest (US)	**P2P-lending**: Crowdcube (UK), Lending Club (US), Prosper (US), Smava (DE), Zopa (UK)	
			Electronic payment providers: Click&Buy (UK), Dwolla (US), Giropay (DE), Mpass (DE), Paypal (US), Popmoney (US), Skrill (US)	**Covesting**: Covestor (US), Investory (DE), Marketocracy (US)	**P2P-lending mortgages**: Money360.com (US)	
				Private lending: Auxmoney (DE), Smava (DE)	**Crowd funding**: Kickstarter (US), Seedmatch (DE)	

functional types of web-based applications, such as blogs, wikis, social networks or mash-ups (see (Godwin-Jones 2006), (Matuszak 2007), (van Zyl 2009)). To assess the implications on the banking industry, a set of dimensions was chosen which differentiates the provider from the customer processes. The former distinguishes whether the service is offered from an established actor in the banking industry or from third party providers (bank / non-bank) and the basic interaction pattern with the parties involved (e.g. Business to Consumer (B2C) and Consumer to Consumer (C2C), see (Chan 2005)). The latter lists the financial processes from the customer perspective and reaches from financial information, planning and advisory, payments, investments, to financing, and cross-process support (see (Chene et al. 2010), (Kohlmann et al. 2010)).

The *second step* focused on collecting banking IT innovations according to the classification scheme that matched the following three criteria: (1) it supports the interaction of a customer with a bank or a non-bank, (2) it is related to any customer process concerned with financial services (financial information, planning and advisory, payments, investments, to financing, and cross-process support) and (3) it is supported by IT. A variety of online databases, blogs, tweets, alerts and events was screened for this purpose[2] and some 120 innovations were identified and surveyed (see Table 1 which shows the most relevant representatives). The collection phase was conducted from February 2011 to January 2012.

In a *third step* the banking IT innovations were reviewed with practitioners from the banking industry beginning in February 2012 to validate the results and reveal practical relevance. In this process companies from all tiers of the financial value chain were involved (e.g. retail banks, outsourcing provider, etc.). This third step led to an iterative adaption of the classification scheme for the banking IT-innovations.

There are three aspects among the observations of the banking IT innovations.

First, many banking IT innovations focus on a specific customer need within a customer process. This is not surprising since a bank customer looking to finance real estate has different needs to a customer simply wanting to pay bills. Banking IT innovations provide support in targeted financial areas, such as financial information, planning and

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[2] These sources comprised ABI/INFORM, ACM Portal: Digital Library, EBCSO, Emerald, blogs (electrouncle.wordpress.com, der-bank-blog.de, blog.volksbank-buehl.de, thefinancialbrand.com, f-i-ts.de, lochmaier.wordpress.com, bankingreview.com.au, netbanker.com, Delicious/Banker2.0, timschaefermedia.com, ambajorat.word-press.com, gft-blog.de), tweets (#HLeichsenring, #Yavalu, #LotharLochmaier, #FIDOR, #workforcetrends, #pascaldurrch), Google Alerts (Bank Innovation, bank*, neuheit*, finanz*, innovati*, financ*, innovat*), events (Finovate USA and Europe, TechCrunch USA) and various online searches.

advisory, payments or investments as well as financing. From the electronic markets perspective, two types of innovations are relevant. On the one hand comparison services (e.g. mortgage comparison) already provide a broad overview of the offerings in many national markets. On the other hand, recent enhancements of PFM solutions, such as mint.com or Personal Capital, are web-based and also consider the integration of services regarding typical life situations, such as education, work, habitation, family or retirement. For example, this may include a stock portfolio which is hosted by a private bank, cash-value life insurances from different insurers, a pension saving plan from a retail bank and a loan on a private lending platform.

Second, a large number of banking IT innovations is based on mobile and, in particular, on social web technologies (C2C processes). An example for the first category is a mobile payment application that is offered by a bank (e.g. ING direct bump app). Social Web or Web 2.0 technologies contribute interacting scenarios which enable virtual advisory and close interaction with and among customers. For example, financial advisors interact with their customers in social networks (e.g. virtual advisory in Facebook from ASB Bank in New Zealand), customers advise other customers in investment strategies (e.g. Marketocracy, Covestor), customers lend money to other customers (e.g. Lending Club, Zopa), or customers organize investment opportunities (e.g. Crowdcube). Even the development of new financial products involves customers (e.g. ING-DiBa bank for private clients and Deutsche Bank for corporate clients) and point in the direction of open innovation strategies (Chesbrough 2003).

Third, although many of the existing solutions are already available on electronic market platforms, such as the Apple AppStore or the Google Play marketplace, the existing banking IT innovations provided on those platforms lack interoperability. They typically crowd a user's desktop and are not linked, i.e. a currency converter app is not interoperable with the checking account app (Seo and Rietsema 2010). Concerning interoperability and standardization, a different degree of maturity can be observed in the customer process categories. While the processes in the payments area are already standardized to a higher degree (e.g. the HBCI standard mentioned above), the investment process has received less attention. One explanation may be the introduction of many new product categories (e.g. structured products) in recent years. In Switzerland, for example, every bank uses its own data feed for stock information from SIX. An even lower degree of standardization can be found in the area of financing processes. Due to the lower and irregular transaction volume most activities for closing a contract are still paper-based. Electronic services are almost exclusively limited to mortgage or interest rate comparison.

Towards a customer-oriented financial market infrastructure

As electronic markets in the interbank area, the FMIs are infrastructures that support the search and the determination of products and prices that provide the necessary services for logistics, settlement, and trust, as well as the legal and regulatory environment. These functionalities are in line with the three generic functions of an electronic market (Giaglis et al. 2002; Alt and Klein 2011), namely market transparency, the use of services via a shared transaction infrastructure, and the regulatory institutions which determine market access and oversee the compliance with certain rules. In the following, these functions are helpful in determining the requirements for a customer-oriented FMI (CFMI) which may be derived from the findings in the evaluation of the banking IT innovations in Table 1 and, in contrast to FMIs which focus on banks and stock exchanges (area 2 in Fig. 1), is positioned between end customers and banks (area 1 in Fig. 1).

Requirements

First, a CFMI attains *market transparency* by offering formalized procedures for describing, selecting and contracting services from competing service providers. Following the order books and matching mechanisms in the stock exchanges, a CFMI may comprise a common user interface, access across multiple channels and providers, and a service directory or catalogue. For this purpose three requirements may be derived from the banking IT innovations (see Fig. 2).

(a) A *common interface* should help customers in navigating and managing their banking services. Similar to an enhanced PFM, customers may import services in an integrated financial cockpit, which reaches beyond the existing transactional functionality to financial information, planning and advisory as well as to payment, investment and financing services. This includes the possibility of defining or selecting specific user processes which link individual services with a customer problem, such as liquidity planning across various life events (e.g.

investments, children) following certain goals (e.g. attain capital, resources). For this purpose users might also upload their personal financial profiles and obtain suggestions based on the collective intelligence of other users and the offerings in the market database.

(b) The future CFMI provides access across *multiple channels and providers*. This requirement follows from the PFM developments and the interaction of customers with banks and non-banks via more than one electronic channel. Most of the core banking solutions still lack the possibility to offer customers an integrated view of different channels and providers (banks and non-banks). Yet the banking IT innovations clearly illustrate that future banking processes will include a mix of channels which are in particular based on mobile and social technologies. A future CFMI not only replicates existing banking channels (e.g. online banking) on other channels, but takes into consideration that mobile and social technologies will also shape and create new banking products (e.g. social lending, crowdsourcing, mobile payment, etc.). In addition to existing multi-channel approaches pursued by banks in the past decade, customer-orientation calls not only for the design of multiple channels. Cross-channel management posits that interactions, configurations and knowledge should be available across all channels and switching channels should be possible without loss of information and redundant activities.

(c) The CFMI is an environment where services are interoperable and thus may be used in various combinations via a *service marketplace*. An important enabler in this dimension is the concept of mass customization which aims to link diversity and standardization. One key element of mass customization is the development of the solution space (Salvador et al. 2009). For constructing an individualized complex product or service (product consisting of multiple modular components) customers require tools that support in building the product outline from a pool of modules. Similar to electronic markets which enable a multi-vendor catalog with standardized description schemes (e.g. the comparison sites mentioned above), the construction process also requires the interoperability
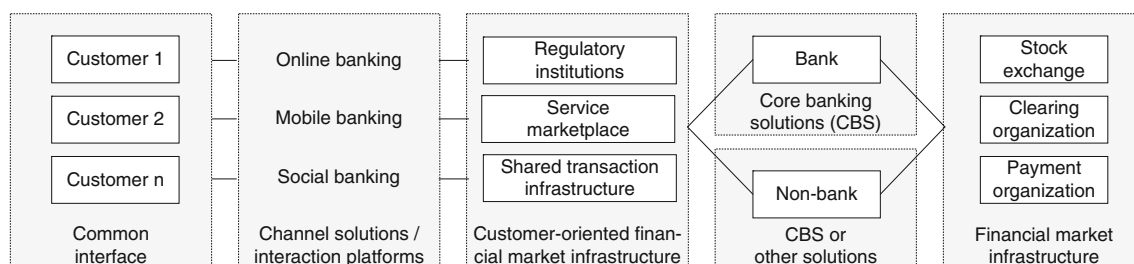

Fig. 2 Scenario of a future value chain in the banking industry

of the modules on a syntactic, semantic and pragmatic level (Schubert and Legner 2011). This means that standardization not only refers to technical protocols or messages, but also to the business-relevant content and processes.

The second generic function of electronic markets is to provide a *shared transaction infrastructure* which includes settlement services for the fulfillment of transactions. This includes handling the order execution process and the entire payment process. Similar to the application stores in the consumer segment, the CFMI should offer services for secure authentication, transactions and the administration of user data. Following the requirements derived above as well as the existing application stores, the infrastructure shapes an ecosystem including web-based elements, mobile devices and communities on the social web.

Finally, electronic markets provide *regulatory institutions* for the organization of the entire transaction environment. This includes institutional (e.g. rules for developing and releasing services, market supervision) and legal (e.g. regulatory compliance, contracts) services. It has to consider the nature of the banking business which differs from other industries. Financial products entail money whereas music and books from the media industry primarily serve entertainment purposes. Depending on the area (e.g. payments or financing), financial services must comply with regulations and fall under the supervision of federal authorities. An important responsibility in this domain is the process of releasing apps on the market platform which involves regulatory and legal rules from national authorities, such as the European Banking Authority, FINMA in Switzerland, Bafin in Germany, the Financial Services Authority in the UK or the Federal Reserve System in the US.

Figure 2 summarizes the elements of a CFMI in a future banking value chain. This scenario includes the three generic functions of electronic markets, namely market transparency, a shared transaction infrastructure, and the regulatory institutions enriched by multiple electronic channels and non-banks as new elements.

Potential actors

Based on the evaluation of banking IT innovations, the core banking systems in the banking industry as well as the existing FMI, several actors have the potential for influencing the genesis of a future CFMI. First, actors with *customer-oriented IT solutions*, such as Apple, Google and Microsoft, and, to a certain extent also PFM software companies and telecommunication providers, already have solutions in place at the customer interface. Many providers are currently aiming at positioning themselves at the interface to the customer. For example, Google has already collected bank licenses in more than 100 countries worldwide, Facebook offers alternative currencies for its users and the Apple AppStore already counts almost 16,000 apps related to financial services (www.148apps.biz/app-store-metrics). These non-banks constantly add new services and hardware for customer interaction. An example is the German telecommunications provider Telekom who has developed a secure infrastructure for mobile payment which can be used by many customers and banks. Remarkably, the structure of the existing software ecosystems already reflects the three CFMI requirements (see Table 2). While the consumer companies could bring in competencies in the areas of the common interface (e.g. for administrating the services), multiple channel and provider access, and the shared transaction infrastructure (e.g. for charging the services), these consumer ecosystems fail to offer a common frontend which is explicitly designed for the description and visualization of financial services. They lack interoperability among the included services in the service marketplace and the institutional regimes are either loose (Google) or strict (Apple). In both cases the marketplace providers are also the rule makers and, thus, these companies have individual interests without having the independence of federal institutions that would be necessary as regulator institutions in the context of the CFMI.

Second, actors with *banking-oriented IT solutions* benefit from the specificity of banking and interbank operations. This critical domain-specific know-how is embedded in the broad variety of banking IT innovations which was observed at banks as well as new financial service providers (see Table 1). To overcome the current isolated solutions and to facilitate the aggregation of financial services, the core banking systems and the FMI could provide a valuable contribution. With the advent of standardized core banking application systems, bank communities are emerging which use similar functionalities for front, middle and back office processes of the same software. These service-oriented application solutions are accredited enabling potentials for

Table 2 CFMI requirements and ecosystem actors

Ecosystems CFMI requirements	Apple Ecosystem	Google Ecosystem	CFMI Ecosystem
Common interface & multiple channels and providers	iTunes	Play services	Consumer platform
Shared transaction infrastructure & service marketplace	iTunes and App Store	Play Store	Banking platform, FMI
Regulatory institution(s)	Apple	Google	FMI, Federal institution

networking within financial value chains (Baskerville et al. 2010) and software providers have already announced the launch of electronic marketplaces for using their modules. Among the examples are the communities evolving around the core banking solutions of Finnova and Avaloq in Switzerland or SAP in Germany (Redcommerce 2011). They could contribute to the necessary standardization of service interfaces which is a prerequisite for the orchestration of services. In addition, FMI providers could extend parts of their solutions to a CFMI. In particular, this applies to the efficient and secure market environments which are increasingly linked on an international level. First FMI services are already offered to business customers, e.g. insurance companies have obtained direct access to the Swiss FMI company SIX or corporate clients to 360 t.com in Germany. If successful, FMI providers could include traditional market actors, such as banks and exchanges, as well as third party providers from outside the financial industry (e.g. crowd funding services, identity providers, etc.). While this points in the direction of an all-in-one market (Koch and Schultze 2011), the FMI solutions are specific to interbank processes and lack functionality in the consumer segment. Thus, a collaborative approach as shown in Table 2 seems promising for a CFMI ecosystem which comprises actors of consumer and banking platforms, the FMI provider(s) and federal institutions.

Pressure on banks

For traditional universal, retail and private banks, the customer-oriented future value chain has severe implications.

Similar to publishing companies in the media industry, banks are aggregators of (financial) content and services, and face the risk of disintermediation by non-banks or other new actors enabled by technological solutions. These either increase the efficiency of interaction (e.g. more convenience in conducting transactions and in managing financial services) and/or the quality of services (e.g. more profound know-how and advice on financial products) as well as customer relations (e.g. increased loyalty to a provider, cross-selling). Discussed vividly in the literature on electronic markets (e.g. (Malone et al. 1987), (Benjamin and Wigand 1995), (Giaglis et al. 2002), (Glassberg and Merhout 2007)), disintermediation suggests that by reducing the costs of transaction and coordination in general, more coordination-intensive patterns are feasible and that electronic markets may substitute existing intermediaries. In view of the existing FMI and increasingly disaggregated financial value chains, banks are merely aggregators of services which may also be made available to customers via a CFMI. Customers would bundle applications from different providers at the customer frontend and pre-defined interfaces between the applications in the backend would make services interoperable. In case additional advice from experts is sought, this may be acquired as a separate service – an offering currently being developed by many financial service providers.

In order to derive a qualitative analysis on the competitive structure of the financial institutions' market Porter's Five Forces model was chosen which has been used for analyzing industry structures in many cases (e.g. Prasad 2011). Hence, the following discussion uses the elements of the Five Forces model to expound the pressure banks are facing in the context of a CFMI (see Fig. 3).
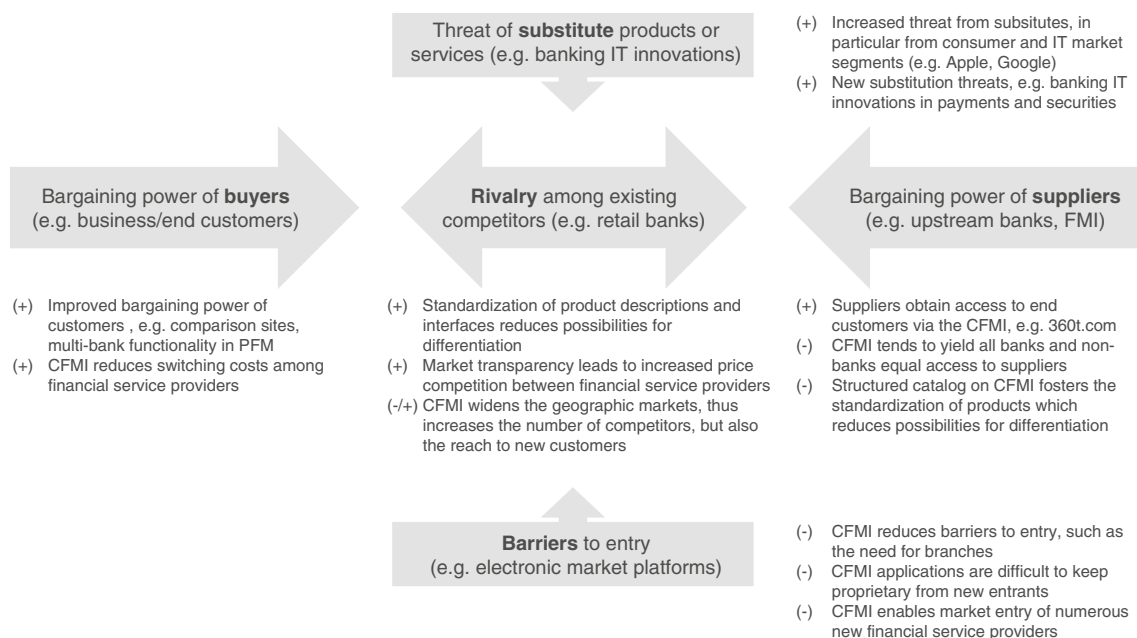

Fig. 3 Impact of the CFMI on the banking industry (based on (Porter 2001))

As expected from prior research in electronic markets (e.g. (Bakos 1991)) the *bargaining power of buyers* grows by reducing switching costs and eliminating existing bilateral channel structures. Using a CFMI, customers are able to manage multi-bank relationships and to flexibly configure financial services from different vendors in one platform. Another factor that lowers the existing power of banks is the increased *rivalry among existing competitors* due to the entry of numerous non-banks. The CFMI has the potential to directly match buyers and sellers with increased effectiveness and lower transaction costs, leading to more efficient markets, and as a result, the role of traditional market participants, in particular the banks, may be reduced or even eliminated, finally leading to disintermediation (e.g. (Giaglis et al. 2002), (Sen and King 2003)). What the Internet has already done on a more general level is to reduce the entry barrier in established markets by opening a virtual shop presence at the fraction of the physical cost. Similarly, financial services can distribute their offerings via the open Internet or via a secure CFMI-environment. For example, some automotive companies have started to establish their individual marketplaces for the distribution of services to consumers. While establishing a closed infrastructure involves large costs, each step towards more openness reduces the *barriers to entry* in the market and leads to a growing *threat of substitute products or services* with direct effects on the *bargaining power of suppliers*. Despite the growing bargaining power of buyers over suppliers, new, purely Internet-based providers have access to more customers. For some suppliers it allows to reach end consumers for the first time. This applies to FMI providers that deliver services not only to banks, but also to corporate customers.[3]

Despite these developments foster the disintermediation of banks, the aggregation of the front-, middle- and back-office processes still determines the competitive advantage of banks. This key knowledge in assembling financial products is important for offering innovative financial products and for sourcing them from an established network of partners (ecosystem). In particular, the knowledge of the banking business is essential for constructing the joint syntax, semantic and pragmatic standards which are required in a CFMI. Actors with a non-bank history typically lack a similar breadth and depth regarding their insights in the banking business. General B2C marketplaces from Apple, Facebook or Google are broad in scope, but have only limited specificity in terms of financial products and many banking IT innovations contribute a narrow, but deep financial offering. Although the services from existing FMIs represent the backbone of today's and tomorrow's financial transactions, the FMI providers still feature a strong national

basis and only future competition will bring more cooperation as well as consolidation among the FMI providers.

Conclusions

In summary, the advent of customer-oriented electronic markets in the banking industry is expected to have important implications for banks and established financial service providers. At least four factors will determine this transformation: the financial crises, the behavior of banking customers, the pace of diffusing innovative downstream IT solutions, and the emergence of non-banks as financial service providers. The growing pressure on banks makes defending the established business models increasingly challenging. In the past, electronic markets transformed the entire trading and execution of financial B2B transactions with physical floors almost disappearing at most exchanges. Since banks are primarily aggregators of information-based goods at the front-end, B2C electronic markets are expected to have a solid impact in this area. Banks as well as non-banks will use the opportunity towards more customer-orientation and recent electronic markets in the consumer segment have been extensively adopted. However, these consumer markets only represent first elements for a future CFMI. The domain-specific knowledge of banks, as well as financial service providers in general, could still prove necessary in realizing a CFMI. In summary, four findings point at paving the way towards customer-oriented banking in this position paper.

First, the convergence of several enabling technological elements (e.g. smartphones, tablet computers, touch-sensitive and three-dimensional displays), user-oriented design concepts (e.g. gamification and simplification) and community approaches (e.g. social communities, app store platforms) leads to the development of a CFMI. The recent software ecosystems which comprise electronic markets, have amplified the disruptive potential of digital compression standards in the media industry and could also have similar effects in the banking industry. However, the position paper argues that a simple transfer of existing consumer solutions to the banking sector is unlikely since financial products are specific information goods. A CFMI has higher requirements regarding trust, security, and the complexity of banking processes. Cooperation between actors with consumer access and know-how on the one hand, and financial experience and credibility on the other, could therefore become important for realizing a CFMI.

Second, a CFMI supports in arranging modular IT-based financial products around customer processes. A major prerequisite for configuring services around customer processes is the interoperability of applications in the CFMI. The growing attention of this "app interoperability" is reflected

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[3] This development is less prevalent if banks are shareholders of the FMI providers. For example, this applies to SIX in Switzerland.

in the discussions within developer communities (e.g. Android native mobile apps) and standardizations in the social and semantic web (e.g. OpenID for social profiles and the Unified Service Description Language (USDL) as a standard for business and IT services description). Another major development is the availability of electronic authentication mechanisms, such as electronic passports, etc., that will allow customers to easily register for new services of any provider on the CFMI. Furthermore, novel security mechanisms not only allow unidirectional secure communication and transactions between customers and banks / non-banks, but also enable new ways of bidirectional processes, such as customer advisory, etc.

Third, the financial value chains will become more global. FMIs are already shifting from a national to an international focus with regions becoming more important (Americas, Asia, Europe). Although the merger of Deutsche Börse and NYSE was aborted, other FMIs (e.g. London and Toronto or Singapore and Australia) have integrated their business models. The position paper argues that a traditional FMI will not only remain important in the interbank market, but that FMI providers might also target business customers with their services. They could place services on a CFMI or even act as providers of the CFMI. Since the FMIs lack knowledge on the end customer market and front-office applications have short lifecycles, the cooperation with actors that contribute customer-oriented competencies in the areas of common interface, channel integration, or platform operation is suggested in this position paper. Cross-border presence will foster market transparency for more participants, create the necessary economies of scale and also calls for supra-national supervision authorities which oversee the CFMI.

Fourth, from a conceptual perspective B2B and B2C markets comply with the basic electronic market functionalities, i.e. the matching of buyers and sellers (e.g. product configurators, order books), the facilitation of transactions (e.g. online banking) and the institutional infrastructure (e.g. security services). This could also imply that both marketplaces could be linked and that end customers obtain direct access to FMI services (e.g. securities processing services) via the CFMI. Contrary to this a multiple marketplace scenario seems more realistic. The discussion in the position paper endorses a high level three-tier value chain where electronic markets address different participants: customers, banks and non-banks as well as interbank providers. In addition to the existing markets in the interbank segment, current developments point at evolving banking communities as well as the CFMI for end customers. Only some infrastructure services (e.g. security, trust, regulation) have the potential to be replicated across multiple markets.

These findings emphasize that banks are under pressure to define their future strategies. As shown by the evaluation of banking IT innovations, traditional actors from the banking industry, such as Credit Suisse, Deutsche Bank, UBS etc. have already initiated first solutions. Innovation at the customer interface is becoming a competitive necessity and non-banks as well as FMI providers will be competitors and partners at the same time. In any case, cooperation in defining and providing a CFMI, in collaborating with customers and offering services on this platform requires a mindset other than simply striving for bilateral customer retention. This collaborative approach would combine the platform provider's expertise from the customer segment, the (non-)banks as specialists for financial services and federal institutions who oversee the transactions in the CFMI ecosystem. After replacing physical cashier desks by ATMs, physical deposit slips by online banking, the application of information technology could again lead to an innovative disruption of the banking industry. Like in the travel or the media industry, electronic markets might pave the way to change another entire industry.

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