

# **CHARTING THE EMERGING BUSINESS ECOSYSTEM OF FINTECHS AND BANKS: SEVEN TYPES OF COLLABORATIVE BUSINESS MODELS**

*Research paper*

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## **Abstract**

*The competition and the collaboration of established banks and challenging fintechs are expected to dramatically change the future financial services business ecosystem. An ecosystem's ability to attract new firms and to continuously evolve is of strategic importance for incumbent companies as well as for those who decide to join the ecosystem. In our study, we analyzed the business models of 286 international fintechs and banks. Based on this analysis, we present seven types of business models in which fintechs and banks collaborate. With these types, we contribute to research on fintechs by providing novel insights on how the ecosystem moves from competition among banks towards cooperation between banks and fintechs.*

*Keywords: business ecosystem, collaborative business model, fintech, bank, business model canvas.*

## **1 Introduction**

During the last decades, companies from the financial services sector became more and more digital in their processes, products and communication. Due to this development, collaboration increased as companies and in particular banks cannot not only rely on their internal competencies. Instead, they have to complement their own competencies with those of other companies of the financial service sector (Graupner et al. 2015; Iyer and Basole 2016). This new focus on collaboration led to significant changes in the managerial, legal and technological capabilities of companies and transforms the existing economy of scale to a new economy of networks (Hedman and Henningsson 2012; Shapiro and Varian 1999). In this network, multifaceted interdependencies create numerous connections that are affected by multiple stakeholders thus forming a business ecosystem (Iyer and Basole 2016). An ecosystem's ability to attract new firms and to continuously evolve is of strategic importance for incumbent companies as well as those who decide to join the ecosystem (Eaton et al. 2015; Um et al. 2015).

The emergence of new technology-oriented niche market players, called fintechs, lead to further changes in the financial services business ecosystem (Mackenzie 2015). The term fintech is used for companies of the financial service sector which create, change or improve existing services, products, process or business models based on new technological opportunities with the aim to increase the quality for the customer who is more and more digitally connected (Zavolokina et al. 2016). The business ecosystem in this case is a business network of banks and fintechs with differing interests bound together in a collective whole (Iansiti and Levien 2004; Tan et al. 2009). The financial services ecosystem can be understood as a living body with a very flexible and changing nature due to the impact of fintechs (Zavolokina et al. 2016).

However, analyzing this complex network of actors and interactions is difficult due to the high number of actors, its global distribution and the high pace of change. Hence, an analysis of this ecosystem requires a clear focus. In context of the digital business strategy, resources and capabilities of banks have to be tightly integrated and improved to keep up with the challenges of digitalization (Chan and Ahuja 2015). For this reason, fintechs and banks form a new business ecosystem, in which "companies co-evolve capabilities around a new innovation" (Moore 1993). Thus, in the business ecosystem of fintechs and banks, the collaboration of fintechs and banks is a critical success factor for their business models. However, despite the lack of central control and a fixed set of design rules, innovation in a business ecosystem often shows remarkably ordered underlying structural types (Um et al. 2013).

The remaining paper is structured as follows: First, we briefly present the overall research design and the theoretical background. Second, we explore the business models (Pareto et al. 2012; Smorodinskaya et al. 2017; Um and Yoo 2016) of fintechs and banks. Third, we classify the collaborative business models, based on existing literature on business ecosystems, network organizations and business models. Fourth, we discuss the theoretical and practical implications and give an outlook on future research questions. Following this focus, our paper addresses the research question: What types of collaborative business models are used by fintechs and banks in the financial services business ecosystems?

## **2 Related Research**

Business ecosystems research is a growing research area driven by the need for a new paradigm for strategizing, competing and innovating in the networked economy (Iansiti and Levien 2004). The roots of business ecosystem rely on theories of complexity (Stacey 1995) and organizational ecology (Hannan and Freeman 1977). A variety of related terms is used to describe network interactions or organizational continua (Hannan and Freeman 1977).

Moore (1993) explains business ecosystems as an allegory of natural ecosystems in order to present the way companies should do business together. Pierce (2009) explains business ecosystems as networks of organizations that are held together through formal contracting and mutual dependency. Current business ecosystems represent an IT-enabled business network of entities with differing interests

(Iansiti and Levien 2004; Tan et al. 2009). Collectively, these entities comprise niche markets within the ecosystem, which are specialized functions tied to the core firm (Teece 2007, p. 2).

In general, the business ecosystem view includes, in contrast to the conventional value chain view, not only the value chain of a business, but also large networks of actors (i.e., distributors, manufacturers, and customers) (Annanperä et al. 2016; Baghbadorani and Harandi 2012; Moore 1993). The use of the business ecosystem analogy provides the value of being able to account for the change dynamics, and the strategic implications of those changes, for organizations; key aspects of business ecosystems are their members and their roles, their coevolution, the dynamics of change, and company strategies for business ecosystems (Annanperä et al. 2016; Mäkinen and Dedehayir 2012). Furthermore, the concept of business ecosystems is utilized to increase the capabilities of explaining how multi-sided businesses evolve (Baghbadorani and Harandi 2012) as well as to enhance the ability of sensing and responding to emergent market opportunities (Teece 2007).

In relation to innovation processes, the combination of new or existing design components has been compared to the adaptive process of genetic recombination in an organism, whereas the number of available design components and its interactions represents the diversity in an ecosystem (Um et al. 2015). Increasingly, firms are creating new products or services by combining existing modules with embedded digital capabilities. The nearly limitless recombination of digital artifacts has become a new source of innovation (Yoo et al. 2012).

Therefore, “distributed business networks became the established way of doing business” (Iansiti and Levien 2004). In contrast, the management of internal assets and competencies became less crucial to business success than managing the concurrent and paradoxical forces of stability and instability (Stacey 1995), collaboration and competition (Lengnick-Hall 1996; Tan et al. 2009). With increasing digitization, the joint value creation in a business ecosystem creating innovation requires collaboration, knowledge sharing, and ecosystem-wide knowledge generation (Annanperä et al. 2016). In digital business ecosystems, digital products are generated from the combination of digital components, which are combined together to deliver a set of coherent functions (Um et al. 2015). Seemingly unrelated digital products form a network over time based on the digital components that they share.

Despite the importance of this inter-organizational perspective, business ecosystems are considered to be neither understood nor managed well enough (Baghbadorani and Harandi 2012). In particular, new research challenges arise as a result of the increasing complexity of business ecosystems and the platform-driven society (de Reuver et al. 2017). There is a need for creating a common understanding of the roles of partners and aligning motivations for participating in a business ecosystem. Structured decision making should be based on an understanding of the core capabilities and value creation potential within the ecosystem (Mäkinen and Dedehayir 2012). Specifically, this can help to understand the industry structure and existing players relevant to the ecosystem topology (Iyer and Basole 2016). In particular, there must be substantial and concerted improvements in traditionally unrelated research areas like enterprise architecture, enterprise modelling and new business models (Krogstie 2012). Our study seeks to contribute to this research gap by identifying different types of collaboration between incumbent companies and new technology-oriented companies on the business model level.

### **3 Research Design**

For tackling our research question, we created a dataset of fintechs for our analysis by using and integrating several sources, as there is not one single comprehensive website or portal listing the majority of fintechs. Each of the sources provided a set of seven up to one hundred fifty successful or presumably successful fintechs from the last two years. Lists we used include: Deutsche Start-ups (Hüsing 2016), Investors Marketing (Investors Marketing 2015), Handelsblatt (Hilal Kalafat 2016), Payment and Banking (Payment and Banking 2016), Leading Global Fintech Innovators Report (KPMG and H2 Ventures 2015) and Friendsurance (Nauck 2016). We prepared and analyzed the dataset by following a five-step approach.

We started by excluding those companies for which no public information was available, e. g. because they are not in business anymore. By employing this random sampling strategy, we created a repre-

sentative sample which allows generalization (Flyvbjerg 2006), so research bias through a selective choice of the sample is avoided (Johnson 1997). After this first step, the sample consisted of 286 fintechs.

In the second step, further publicly available data was gathered for each fintech of our sample, especially regarding their business models (Zott et al. 2011). We gathered this information by using secondary data to ensure descriptive validity. The websites of the fintechs were used to gather information about the value proposition as well as internal and external core competencies, pricing models and target group (Teece 2010).

In the third step, we used a twofold approach for classifying fintechs. We started by clustering the fintechs by their emerging fintech application areas to gain an overview about the large variety of different and new finance-specific services. Afterwards, we analyzed the underlying business models regarding the nine building blocks of the business model canvas (Osterwalder et al. 2010) and the integration into the value chain (Snow et al. 1992).

In the fourth step, based on the data of the fintechs' business models, we classified the business models by their network focus (Russell et al. 2011; Krogstie 2012; Moore 1993; Um et al. 2013). The classification process was based on the general network organization framework which provides several types, including pure firm, internal network organization, stable network organization and dynamic network organization (van Alstynne 1997; Birkinshaw and Hagström 2000; Gorod et al. 2008, 2008; Miles and Snow 1992; Snow et al. 1992).

In the fifth step, the types of collaborative business models were developed based on the gathered data regarding the business model, the integration into the value chain and the classification of the network organization framework. Additionally, this was inspired by existing approaches from the literature on data-driven business models (Hartmann et al. 2014; Hofman and van't Spijker 2012). Regarding network organizations, business models with focus on internal networks have "loose associations of assets and business units contained within a single company and which subject themselves to market forces" (Snow et al. 1992). In particular, the pure firm does not provide any collaboration to banks. The focus on stable networks consists collaborative business models "engaged in long term relationships with external suppliers who bring expertise into the parent company" (Snow et al. 1992). Participants of this type of network are typically organized around a single large firm. Dynamic networks consist of collaborative business models which "are more temporary alliances of firms with key skills usually organized around a lead or brokering firm" (Snow et al. 1992). Each of the participants tends to be independent and collaborates on a specific opportunity.

Our analysis resulted in seven collaborative business models that show how fintechs and banks use their joint forces to deliver value.

## **4 Key Results on Collaborative Business Models**

### **4.1 Overview and Taxonomy**

The 286 fintechs of our sample were ordered according to the type of network organizations (Krogstie 2012; Moore 1993; Um et al. 2013) which are: internal network, stable network and dynamic network (see Figure 1).

29 percent of fintechs collaborate in internal networks. In particular, fintechs of the application areas savings, order/cash and factoring as business models with high focus on human to human interaction rely on this network organization type. The majority of the fintechs (71 percent) focus on stable networks or dynamic networks with banks and other fintechs.

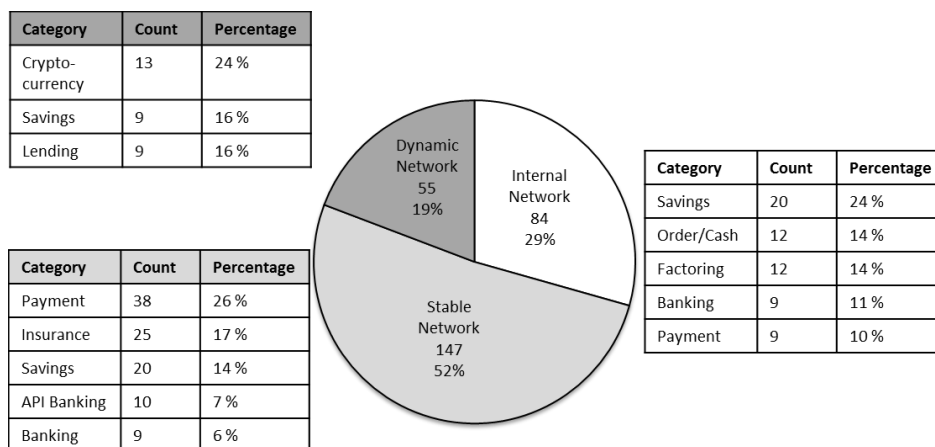


Figure 1. Fintechs clustered by network organization type (n=286)

52 percent of the fintechs collaborate in stable networks (e.g. payment). 19 percent of the fintechs act in dynamic networks with temporally determined collaborations. The set of fintechs in stable networks comprise the highest diversity of collaborative business models (e.g. Whitelabel AddOn Service and Adaptive Service). Dynamic Networks are typically crowd-based or cryptocurrency models and include the application areas cryptocurrency (24 percent), savings (16 percent) and lending (16 percent). As some business models focusing on dynamic networks are not based on collaboration with a bank, we excluded these from further analysis. The remaining fintechs were considered for further investigation.

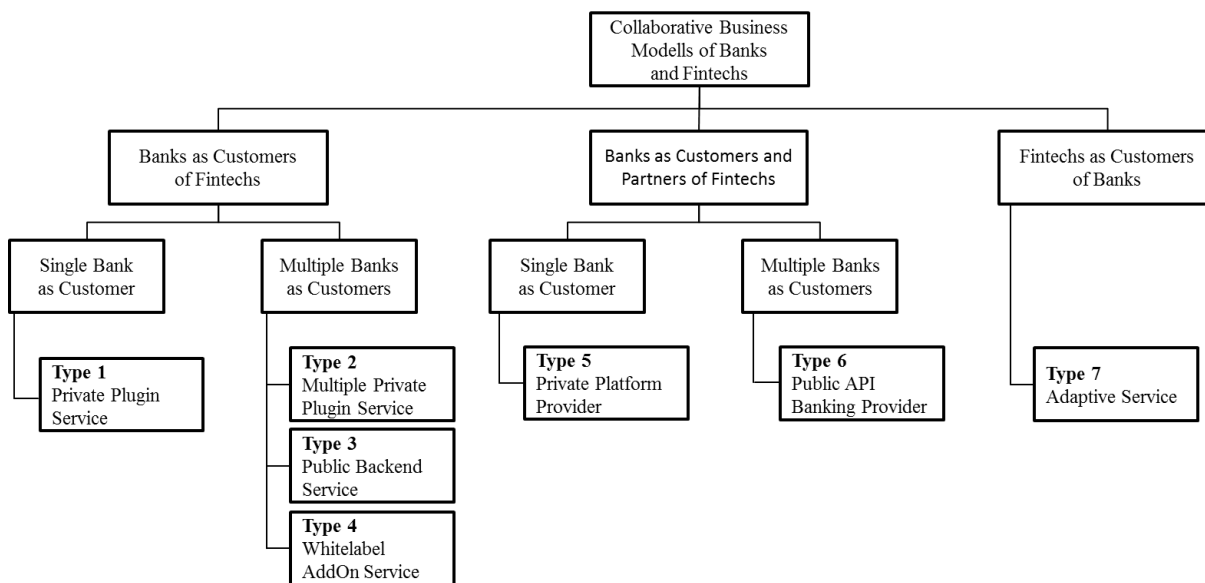


Figure 2. Collaborative Business Model Taxonomy

We used the data of the remaining 252 fintechs for developing a taxonomy of collaborative business models of fintechs and banks. On the first level, we focus on partnerships and customers of fintechs as an inherent part of network organizations. On this first level, the three variants “banks as customers of fintechs” (78 percent), “banks as customers and partners of fintechs” (13 percent) and “fintechs as customers of banks” (10 percent) were identified (see Figure 2). On the second level, we divided the customers into two segments “single bank as customer” and “multiple banks as customers”. Within the category “banks as customers of fintechs” 5 percent of the fintechs have a “single bank as customer”

and 68 percent of the fintechs have “multiple banks as customers”. On a third level, the offered service was used to identify the different types of collaborative business models.

Finally, we identified seven types of collaborative business models. Namely these types are Private Plugin Service (7 percent), Multiple Private Plugin Service (15 percent), Public Backend Service (36 percent), Whitelabel AddOn Service (20 percent), Private Platform Provider (4 percent), Public API Banking Provider (9 percent) and Adaptive Service (10 percent). For each of the seven types of collaborative business models, a detailed description is presented in the following sections.

### 4.2 Type 1: Private Plugin Service

The first type is the Private Plugin Service (see Figure 3). Fintechs using this type deliver value exclusively to a single bank. The fintech is integrated into a bank without any other partnerships. The delivered value is typically a service which depends on the private data of the bank. The bank uses the service of the fintech to improve or enhance its own value proposition. The service is provided under an own brand or as a white label solution.

The canvas in Figure 3 depicts this type. We explain this type by describing an example of the fintech RatePay (ratepay.com) from the fintech application area payment. RatePay handles the entire payment process including instalment payment without postal identification procedure, immediate online approval, open invoice, direct debit and payment in advance. RatePay was bought by Bain Capital Private Equity and will be integrated into Concardis’ payments platform. In the example canvas, the value proposition (A) are secure payment solutions for online retail. This value proposition of the fintech (A) is plugged in to value proposition of exclusively one single bank (B). During the key activities payment processing of the fintech (A), the payment data is processed and transferred. The fintech does not store any payment data but uses the external of the bank. Although the fintechs’ core competence is delivering trustful online payment methods, a further key resource is the interface to the data of the organization. The RatePay example focusses on customer group B2B (X), but other examples like Easyfolio (easyfolio.de) as part of a private bank, focusses on B2C.

By using the collaborative business model type to explore the potential of Private Plugin Service, fintechs with a private integrated service delivery and without any third-party partnerships offer the opportunity to optimize and to innovate the bank’s business processes and services. In the example above, the impact is the requirement of new services based on new technology and fast processes unique service of the fintechs which can be used to optimize and to innovate business processes and services and be kept away from other market player.

However, this type (Private Plugin Service) can be used by banks to exclusively buy and evolve services of fintechs aiming at extending the value proposition of banks.

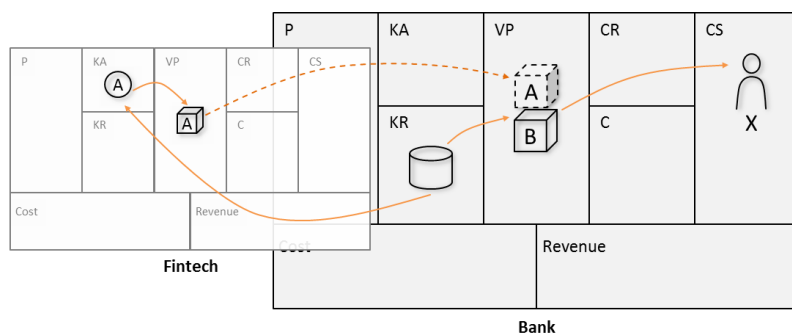


Figure 3. Type 1: Private Plugin Service

### 4.3 Type 2: Multiple Private Plugin Service

The second type is the Multiple Private Plugin Service (see Figure 4). Fintechs using this type deliver value to a number of banks. The fintech is integrated into each bank separately. The delivered value is

typically a service which depends on the bank's data. The bank adds the fintech service to its own value proposition, whereas the fintech service acts as a white label solution.

The canvas in Figure 4 depicts this type. We explain this type by using the example of the fintech GIROMATCH (giromatch.com), a fintech of the savings application area. GIROMATCH offers an investment portfolio as well as an online loan. The investment portfolio is a diversified portfolio of loan projects without market fluctuation and without additional costs. The online loan is a service which offers in a first step a non-binding request for conditions without registration and in a second step an algorithm-based risk test including an immediate confirmation of the individual interest rate. In the example canvas, the fintech's value proposition (A) the focus is on the online loan service. This value proposition of the fintech (A) is plugged in to the value proposition of several banks (B). The online loan service is delivered to the customer groups B2C and B2B by the fintech itself (X) and the bank (Y). During the algorithm-based risk test and the posterior automated payout, the fintech does not persist any personal data but uses the data of the banks. Although the fintech's core competence is delivering an algorithm based online loan, a further key resource is the interface to the banks' data.

This business model type allows exploring the potential of Multiple Private Plugin Service fintechs with an algorithm based and automated service delivery. Banks can use this service to optimize and innovate the bank's business processes and services. This type of collaboration can also be used by banks to buy mature services of fintechs and add these services to the value proposition of banks.

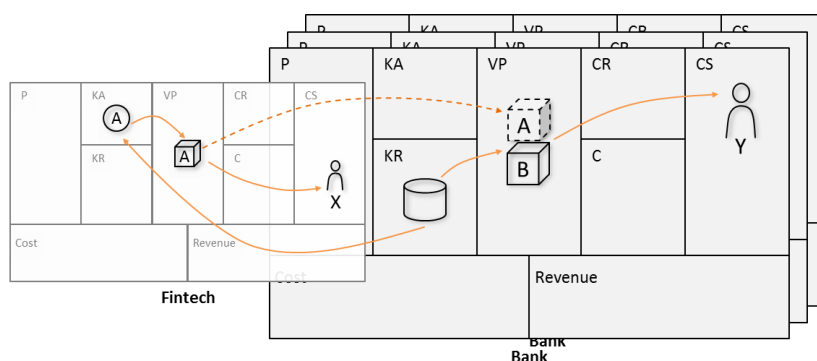


Figure 4. Type 2: Multiple Private Plugin Service

#### 4.4 Type 3: Public Backend Service

The third type is the Public Backend Service (see Figure 5). Fintechs using this type deliver value that is created by their core processes and offer this service to external partners. Value generation is usually not depending on other fintechs or banks. Instead, a digitized state-of-the-art data-driven service is provided. Therefore, this type aims at digitizing a single need of a fintech or a bank. Fintechs of this type offer this service typically with a cheaper price or with faster processes than other competitors.

The canvas in Figure 5 depicts this type. We explain this type by drawing upon the example of the fintech gini (gini.net) from the fintech application area banking. Gini offers a semantical interpretation of documents to customers that help to understand and structure information.

In the example canvas, the fintech's key value propositions are OCR (optical character recognition) and semantic analysis of documents, preprocessing of photos, real-time processing and integration possibilities (A). This service is delivered by the fintech to B2B customers (X). During the use of this product, the fintech performs key activities like processing data for the OCR and semantic analysis (A). The results are transferred and stored in the fintech's database. The OCR and semantic analysis capabilities are integrated into the key activities of the bank (B) which uses the service to extend its own value proposition (B) and finally to deliver this extended value to its own customers (Y). Although the core competence is delivering semantical interpretation of documents, a further key resource is the certified hosting for high reliability and trustworthiness.

This collaborative business model type offers the opportunity to optimize and to innovate the banks' business processes, services and value propositions. The service is also used by competitors.

However, this type (Public Backend Service) can be used by banks to connect to external fintech services and add these services to the banks key activities.

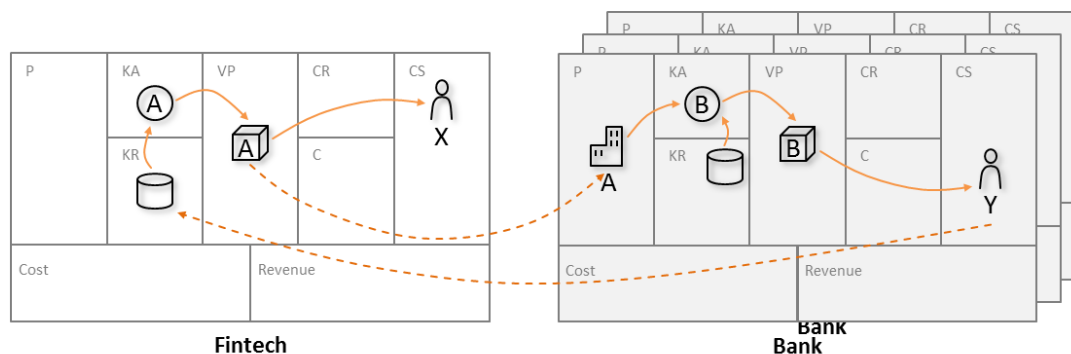


Figure 5. Type 3: Public Backend Service

#### 4.5 Type 4: Whitelabel AddOn Service

The fourth type is called Whitelabel AddOn Service (see Figure 6). Fintechs using this type deliver value that is created by their core processes and offer further value by offering additional services of external partners. External partners are integrated into the offering of another fintech, whereas both brands are visible to the customer.

The canvas in Figure 6 depicts this type. We explain this type by describing the examples of the fintech N26 (n26.com) and TransferWise (transferwise.com/de) from the fintech application areas banking and payment. N26 nowadays is a bank, but former it was a fintech and gained a banking license just one year ago. N26 offers a mobile bank account with different features for investment, savings, instant payment and credit. TransferWise offers money transfer into 19 different currencies.

In the example canvas, the value proposition is a mobile bank account which is extended by the value proposition international money transfer (A). This value proposition of TransferWise is a part of the value proposition of the bank (A), but for the customer it is not visible that TransferWise is a collaboration partner of the bank N26. The bank uses its own key activities (B) to provide a mobile bank account as a value proposition (B) but also to extend the fintech's service for international money transfer (A) with further services. This service is delivered by the fintech (X) and the bank (Y) to the customer groups B2C and B2B.

The fintech TransferWise does not persist any payment data, but N26 uses the payment data as a service call to start the TransferWise money transfer. Although the core competence of N26 is to deliver a mobile bank account, a further key resource is the open business model of N26 which aims to collaborate with a number of fintechs in order to extend its own value proposition with a cobranding strategy.

Using the collaborative business model type to explore the potential of Whitelabel AddOn Service fintechs with a collaborative service delivery offers the opportunity to benefit from the reputation of other fintechs.

However, this type (Whitelabel AddOn Service) can be used by banks to integrate new whitelabel services into its own value proposition by using the brand of established fintechs.



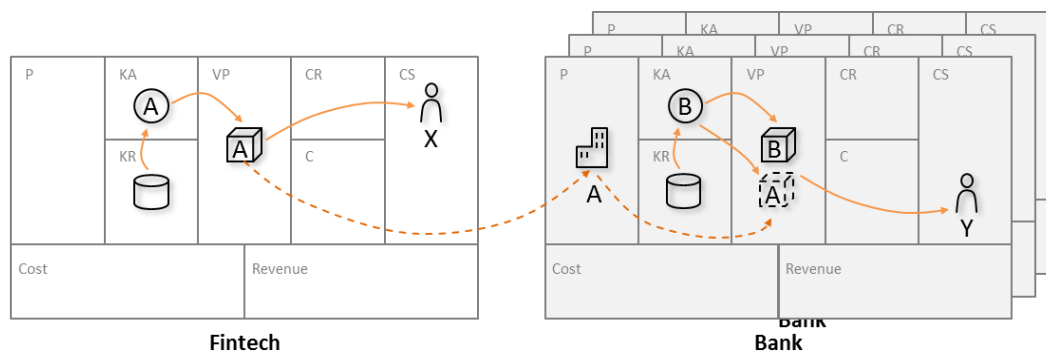


Figure 6. Type 4: Whitelabel AddOn Service

#### 4.6 Type 5: Private Platform Provider

The fifth type is called Private Platform Provider (see Figure 7). Fintechs using this type deliver value that is created by connecting the core processes of external partners and provide a private platform. The value depends mostly on the brand the fintech is part of.

Therefore, this type aims to create and establish a new value proposition for the organization which stays a part of the trusted brand. The value proposition is created by establishing external partnerships and by connecting value propositions of the external partners to combine the value propositions of the fintechs to a single value proposition. This single value proposition is enriched by the data of the organization which represents the trusted brand. The organization uses its trustworthiness to offer this produced value to other organizations.

The canvas in Figure 7 depicts this type. We explain this type by describing an example of the fintech Amazon Pay which is part of Amazon (pay.amazon.com/de) from the fintech application area payment. Amazon Pay offers Amazon customers to use the payment methods stored in their Amazon.com account to pay for goods and services on websites and applications that accept Amazon Pay. In the example canvas, the key value proposition is trusted payment (B) which can be integrated online shops. The integration in online shops is conducted by the platform owner amazon (B). Therefore, amazon offers amazon pay to own customers and customers of online shops (Y). But amazon also offers own products as a value proposition (C) to its customers. During the payment transaction, the data is stored outside of amazon pay. Although the core competence is delivering convenient payment methods, a further key resource is the brand Amazon which gives external users of Amazon Pay the opportunity to increase trustworthiness, loyalty, maintain close customer relationships and benefit from years of Amazon innovation. The Amazon Pay example focusses on B2B and B2C.

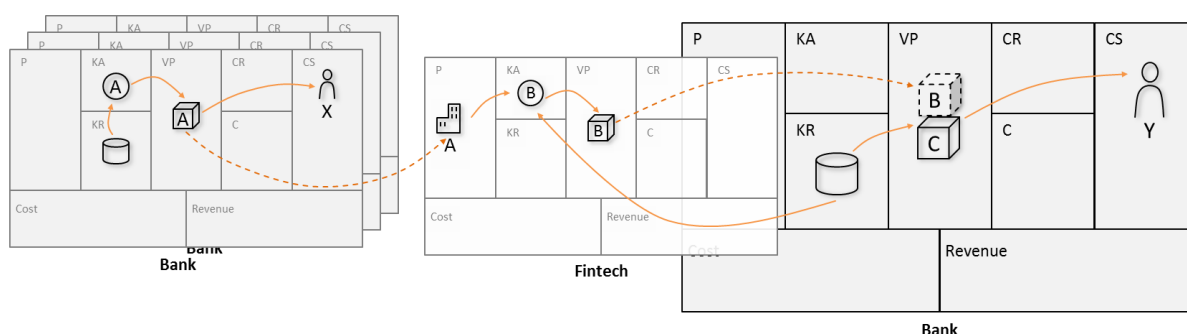


Figure 7. Type 5: Private Platform Provider

Using the collaborative business model type to explore the potential of the Trusted Brand Model offers the opportunity to focus on completely new ways of business by building and orchestrating an own ecosystem of fintechs. However, this type (Private Platform Provider) can be used by banks to recreate

its own business model or in particular to extend the business model into new directions with external capabilities of fintechs.

#### 4.7 Type 6: Public API Banking Provider

The sixth type is called Public API Banking Provider (see Figure 8). Fintechs using this type deliver value that is created by their core processes and an existing external network of banks and fintechs. The value depends mainly on two criteria – the first is the application programming interface (API) and the second is the network of banks and fintechs which are already part of the partner network. Therefore, this model aims to connect a number of fintechs and banks by using a standardized platform with a strong focus on partnerships and collaboration. Fintechs of this group offer the created value with digitized and state of the art technology which was not available on the market before.

The connected canvases in Figure 8 depict this type. We explain this model by describing an example of the fintech figo (figo.io) from the fintech application area API Banking. Figo offers the customers a banking service provider which bridges the gap to innovative financial collaboration. In the example canvas, the key value propositions are the banking API (B) and a number of connected value propositions of finance (A). To deliver the value proposition, figo integrates the services of 3,100 sources of financial data including a number of banks. This product is delivered to customer group B2C (Y) and further banks with over 55 million users. These banks are customers of figo and extend its own key activities (C) to extend the value proposition (C). During the production process, the key activities financial data processing and aggregation is conducted. The data is stored aggregated in a database as a key resource. The customers' account information is not stored in figo's database.

Although the core competence is delivering a state of the art programming interface, a further key resource is the number of financial data which is stored in the database of the fintech. The figo example focusses on customer group B2B but this model also contains a transitive connection to the customer group B2C because the connected banks or fintechs deliver its own value to this customer group.

Using the collaborative business model type to explore the potential of Public API Banking Provider fintechs with state of the art technology and interfaces offers the opportunity to extend the multi-banking or multi-finteching capabilities of fintechs and banks.

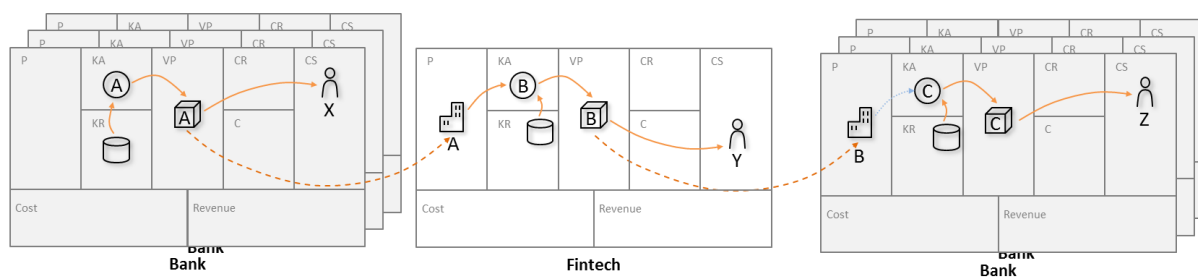


Figure 8. Type 6: Public API Banking Provider

#### 4.8 Type 7: Adaptive Service

The seventh type is called Adaptive Service (see Figure 9). Fintechs using this type deliver value that is created by their core processes and hold a strong partnership with a single bank. The value is not depending on other fintechs or banks, but the value cannot be delivered without a partnership with a bank. Therefore, the model aims at digitizing a single customer need with the support of an established bank. Fintechs of this group offer the created value to very specific target group, in a more convenient digitized way or for a cheaper price than other player within the market.

The canvas in Figure 9 depicts this model. We explain this model by describing an example of the fintech LIQUID (extra-funds.de/go/liqid) from the fintech application area savings. LIQUID offers access to investment strategies, instruments and conditions to its customers which were only reserved

for high-net-worth customers in past. In the example canvas, the fintechs key value proposition is bank-independent private asset management system of more than 100,000 euros (B). This product is delivered to customer group B2C (Y). Although the core competence is delivering access to investment strategies, instruments and conditions, the partnership with Deutsche Bank plays a particularly central role for the fintech in order to offer reliable financial engineering to the customer. Therefore, LIQUID uses the value proposition and in advance banking services (A) to extend its own key activities (B).

Using the collaborative business model to explore the potential of Adaptive Service fintechs offers the opportunity to establish a bank as a safe harbor which aims to extend the established business model by providing existing services to fintechs.

However, this model (Adaptive Service) can be used by banks to extend its own service portfolio and target customer groups in fact to establish a service platform which enables fintechs to use specific services of the banks.

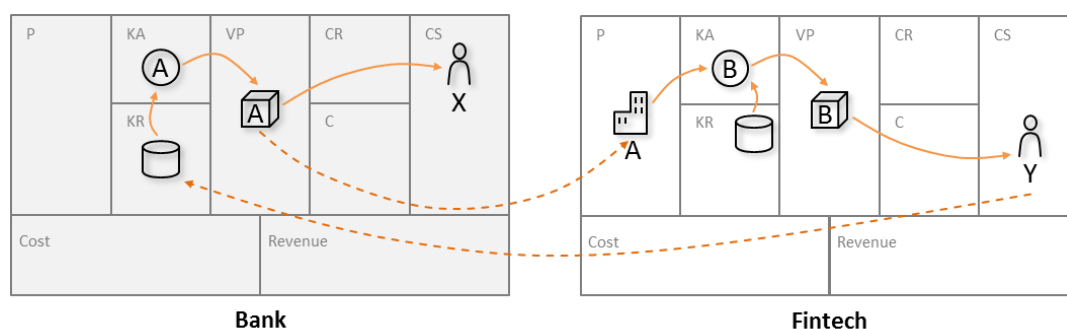


Figure 9. Adaptive Service Model

## 5 Discussion

In general, the business ecosystem view includes people, events, impacts and coalitions that emerge from a shared vision (Russell et al. 2011). The capabilities of explaining how multi-sided business evolves and how ecosystems can be managed or even orchestrated is a current research challenge (Baghbadorani and Harandi 2012; de Reuver et al. 2017).

The conducted analysis provides a detailed view into the diverse types of collaborative business models and show that the collaboration of companies in a business ecosystem can be analyzed on the business model level. Earlier research, e.g. Tan et al. (2009), focuses on business ecosystems as whole and its implications on enterprise agility. In contrast, our analysis of a specific business ecosystem shows that different fintech application areas use different types of collaborative business models. This leads to a more detailed description of the ecosystem which captures that on the one hand a fintech application area fosters symbiosis while on the other hand a fintech application area nurtures internal networks. In regard that the concept of business ecosystems should increase the capability of explaining how multi-sided businesses evolve (Baghbadorani and Harandi 2012), such differentiation of collaborative business models in diverse application areas is necessary to understand the business ecosystem in its entirety. The paradigm that firms are creating new services by combining existing modules with embedded digital capabilities which leads to limitless recombination of digital artifacts (Yoo et al. 2012) increases the importance to distinguish between application areas and collaborative business models in a business ecosystem. Fintechs classified as Private Plugin Service collaborate exclusively with a single bank as a partner. In contrast, fintechs classified as Adaptive Service use existing banking services for creating an own value proposition. This underlines that existing business ecosystems suffer from insufficient support for search and evaluation of useful quality artifacts especially regarding the facet of collaboration (Krogstie 2012). With our analysis, the business ecosystem approach delivers deep insights into the financial services ecosystem of fintechs and banks with regard on col-

laborative business models. This, leads to significant future research for concern based thinking in business ecosystems. In relation to collaboration the artefacts of a business ecosystem are relevant for supporting the management of involved companies (Baghbadorani and Harandi 2012).

This paper makes several theoretical contributions. It serves as a response to call to study the new research challenge as a result of the increasing complexity of business ecosystems (de Reuver et al. 2017) as well as the need for creating a common understanding of the roles of partners and aligning motivations for participating in a business ecosystem (Mäkinen and Dedehayir 2012). Specifically, this can help to understand the industry structure and existing players relevant to the ecosystem topology (Iyer and Basole 2016). The research also acknowledges that the speed of digital business strategy (Bharadwaj et al. 2013) is rapid and firms must develop capabilities to respond to fast-changing market conditions (Tan et al. 2009). Especially, the scope of digital business strategy has evolved and IT and business strategies are increasingly fused together (Bharadwaj et al. 2013; Schmidt et al. 2018) for realizing sustainable value based on collaboration. In regard to IT systems, it emphasizes the use of asset-light and flexible IT systems and services in low-cost settings to take advantage of the underlying systems and technologies (Schmidt et al. 2016).

First, business ecosystem and in particular of fintechs and banks cannot be described as one general business ecosystem (e.g. Tan et al. (2009)), but should be understood as concern based slices of a business ecosystem as know from other research areas like enterprise architecture (Krogstie 2012). In our analysis we focus on collaboration and different types of collaborative business models. By analyzing the business ecosystems of fintechs and banks, seven different types of collaborative business models were identified based on network organization theory (van Alstyne 1997; Birkinshaw and Hagström 2000; Gorod et al. 2008, 2008; Miles and Snow 1992; Snow et al. 1992) contributes to the existence various forms of business ecosystems for each fintech application area, and therefore how each form of business ecosystem can be described with regard to collaboration that are ground in the empirical reality of a real world organization. Second, while prior research suggested that business ecosystems, in particular of fintechs and banks, rely completely on collaboration (Dapp 2015) the developed collaboration models give a more detailed view on how fintechs and banks compete or collaborate in single fintech application areas for co-creation of effective and timely innovations (Tan et al. 2009). This study advances the state of knowledge by making a conceptual distinction between the different forms of business ecosystems with regard on collaboration and providing detailed models of the underlying forms of collaboration mechanisms.

Second, the combination of traditionally unrelated and partially isolated research areas like business modeling and enterprise modelling with focus on collaboration is stated with substantial and concerted improvements, but not realized in research yet (Krogstie 2012). The business model canvas (Osterwalder et al. 2010) was used describe the types of collaboration models on an enterprise level (Hartmann et al. 2014; Hofman and van't Spijker 2012) aiming a common understanding of the roles of partners and aligning motivations for participating in a business ecosystem. For further investigation the artefacts of collaboration, for example corporate form, investors or Interfaces, on business ecosystem level and on enterprise level needs to be related to each other. Specifically, this new focus on collaboration modelling can help to understand the industry structure of fintechs and banks as well as further players relevant to the business ecosystem topology (Iyer and Basole 2016).

Third, of the prescriptions for managing business ecosystems in the literature, most of them have either not been empirically validated (e.g. Dapp (2015)) or are too abstract to offer specific indications for practical action (e.g. Mäkinen and Dedehayir (2012)). Finally, this study also makes two significant contributions to the literature on business ecosystems. Although previous studies have identified a number of antecedents for ecosystem development (e.g. Iansiti and Levien (2004); Moore (1993)), our review of the literature has failed to identify established analysis toolset for business ecosystems on different layers. The collaboration models developed in this article are thus an important contribution, as it not only describes the necessary technical conditions for successful business ecosystem (e.g. API environment by Um et al. (2015), but structures them in a detailed network organization oriented way.

Our exploration of the financial services ecosystem regarding the fintech application areas and types collaborative business models is based on the limitation that detailed information about each player within a business ecosystem is available.

Finally, the collaborative business model analysis and the newly developed types lead to more insight to understand and to manage the business ecosystem with a focus on fintech and banks, which is one of the key weaknesses of banks in mastering the digital transformation (Berghaus and Back 2016).

## 6 Conclusion and Outlook

We contribute to the currently scarce empirical body of literature on the role of fintechs in the financial services ecosystem by identifying seven types of collaborative business models of fintechs and banks, by describing the interaction among their business models and by relating them to forms of network organizations as well as to fintech application areas. The paper provides an empirical analysis of collaboration models in the business ecosystem of fintechs and banks and extends research conducted by Dapp (2015), Wörner et al. (2016), Hartmann et al. (2014) and de Reuver et al. (2017) by describing a research approach, which supports the analysis of network organizations, in particular business models in a business ecosystem with a focus on the role of collaboration.

For future research on the role of fintechs in the financial services ecosystem, we see several avenues. First, studies might investigate the reasons for why banks and fintechs collaborate. Second, as this study focused on the business model layer, collaboration between banks and fintech should be investigated on the technical level and with an integrated business-IT perspective.

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