How to Analyze the Disruptive Potential of Business Model Innovation in Two-Sided Markets?: The Case of Peer to Peer Lending Marketplaces in Germany

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Abstract--**Since the financial crisis, established banks have to deal with different challenges. The lack of confidence of bank customers in established banking business models leads to increasing interest in alternative solutions and models in the financial industry. In the area of personal and small business loans and investment, peer to peer (p2p) lending offers an online-based transparent granting of credits between individuals without much need for traditional banking services. These p2p lending marketplaces provides private lenders and investors a more user-centric and interactive digitization of their lending and investing operations. Therefore, the questions arise whether p2p lending represents a disruptive threat for established banks and how the disruptive potential can be analyzed in this context. Since previous approaches did not pay enough attention to the business model aspect linked to disruption in services, we propose further improvement especially in case of two-sided markets which might display different levels of disruptive potential on each market side. We illustrate this enhanced theoretical approach by applying it to the case of p2p lending marketplaces in Germany. Finally, we provide a modified method and research implications together with managerial options for the future of the retail banking industry in the German context. Future research should analyze this approach in other contexts such as other p2p lending markets or similar industries.**

I. INTRODUCTION

Since the onset of the financial and banking crisis in 2007, banks in Germany and elsewhere are facing ever-expanding challenges. Regulation and subsidies, continuing low interest rates and rising costs are just some of the consequences which banks have to deal with. Government bailouts, financial fraud, unethical banking practices, lack of transparence and the sovereign debt crisis motivate the bank customers to avoid established intermediaries such as banks or government agencies [36]. This loss of customer confidence fuels increasing interest in new lending and investment opportunities or alternative financial institutions [80].

At this point, peer to peer (p2p) lending offers, an online-based transparent investment and granting of credits between individuals, emerged as one of these alternatives that have been established first in the UK with "Zopa" in 2005 [84, 33, 49] and in Germany since 2007 with platforms such as "smava" or "auxmoney" [71, 5, 53, 33]. In addition, since 2005 the so called "Web 2.0" is changing the internet economy [63, 81, 52]. Individuals are more and more used to taking part in dissemination of information and digital interaction. Bank customers also want an increasing user-centric digitization of their banking operations but traditional banks usually follow only slowly. These trends seem to fuel the growth of p2p lending offers. The p2p lending market leader in USA, Lending Club, has originated until December 2013 USD 3 billion in total personal loans since launching in 2007 and they had more than doubled the annual loan volume each year [55]. Also Zopa, the biggest online lending platform in UK, is grown rapidly and has lent over GBP 437 million to UK consumers, with over GBP 165 million in the last 12 months [84]. In Germany, a similar picture emerges with auxmoney which has more than doubled the financed credit volume in the last six month [5] and has now an accumulated loan volume of EUR 79 million in January 2014 [7].

Given the current market developments, the question arises whether p2p lending represents a threat in terms of a Disruptive Innovation (DI) for the established banks. The phenomenon of DI that aims at explaining the failure of established companies to successfully introduce this specific type of innovation and their subsequent downfall was identified by Christensen in 1997 [22]. It has been the subject of extensive academic research as well as managerial interest over the last few years [2, 3, 24, 25, 1, 17, 73, 58, 52]. In particular the ex-ante analysis of DI or the Disruptive Potential (DP) of innovations or technologies has been a prime focus of recent research and is of utmost interest of practitioners and analysts but further research need in improved forecasting models remains [24, 25, 20, 46, 51, 73, 40, 52]. Additionally, scholars such as Danneels [24, 25] or Christensen [21] and Christensen et al. [20] call for more published ex-ante case studies to test DI theory. Given that the discussion of the DP of p2p lending marketplaces is still undecided and underdeveloped in a scholarly context but is vital in media, blogosphere or practice, a substantial research interest can be identified [28, 38, 54, 9, 12, 15, 19].

Moreover, a closer examination of the literature reveals that previous ex-ante approaches for DI such as Christensen et al. [20], Keller and Huesig [51] or Hang et al. [41] do not pay enough attention to the Business Model (BM) aspect in the context of disruption in their frameworks as also already identified by Markides [59]. In case of p2p lending innovation, the BM aspect and its specific nature of two-sided markets reveal further research needs. Platforms in two-sided markets have two distinct user groups with different network effects [65]. This means for the analysis of the DP of p2p lending marketplaces that both sides could exhibit different levels of DP that needs to be considered in analyzing the

overall potential. Recent research also emphasizes the need to consider the heterogeneity of incumbents in the face of potential disruptions which has not been paid sufficient attention to in existing approaches and which adds additional complexity [57].

In order to address these research challenges, we develop an improved theoretical approach to analyze the DP of Business Model Innovations (BMI) in two-sided markets and apply it to the case of p2p lending marketplaces in Germany. For this purpose, a qualitative based research method in form of the case study approach is chosen [82, 29]. Typically, case studies take place within a real-life context, combine numerous data collection methods and sources and tend to focus on an in-depth understanding of the dynamics in a single setting [82]. For our purpose, we modify the case study method and follow the research approach of Christensen et al. [20], Keller and Huesig [51] and more recently Klenner et al. [52] who propose case studies to be used as a forward looking method. Moreover, we use this case also in an illustrative way to apply our theoretical approach to a current value network of interest. Therefore, an illustrative, applicative and prospective case study is designed on the basis of secondary data analysis. The following research questions were addressed using this approach:

- How the DP of BMI is evaluated in two-sided markets with considerable firm heterogeneity?
- Which degree of DP of p2p lending marketplaces results for entrants and incumbents in the German banking industry?
- What are the implications for the bank incumbents and the p2p lending marketplaces?

The paper is organized as follows: In the next section, we briefly discuss the theoretical background of DI. Next, we develop an improved theoretical approach to analyze the DP of BMI in two-sided markets. To further test the applicability of the framework, we describe our research methodology and apply the ex-ante framework to the current state of p2p lending marketplaces in the German banking industry. The final section summarizes findings, limitations, and shows further research options.

II. THEORETICAL FRAMEWORK

A. Disruptive Innovation theory

Christensen & Raynor [23] make reference to two forms of innovation: Disruptive and Sustaining Innovations. A Sustaining Innovation (SI) improves existing products along the known and relevant properties for regular customers. This can be a small improvement as well as a completely new development [51]. In contrast, a DI provides a new set of features, performance attributes and/or price characteristics compared to existing products. The DI sneaks up to an existing business and threatens to replace it [67]. Disruption is a new process of goods and services in which the customer expectations and the competition switch to new performance attributes such as simplicity, convenience, affordability or accessibility mostly at a lower price [4].

In theory of DI, two ideal-typical corporate types are distinguished: the incumbent and the entrant. The incumbent is an established company which has - before the emergence of a DI – already been a competitor in the researched industry with "old" well-tried products, technology and/or BM [23]. He acquired a significant market share over the years and keeps developing his existing product and service range to serve the solvent customers of the top market segment. Thereby, the incumbent missed out on using disruptive opportunities for himself [20, 40]. In the course of a DI, he often loses his established position in the market and is sometimes even forced to give it up [20]. The entrant, however, is the company that enters the mainstream market with the emerging DI [23]. As an attacker free of past success and organizational constraints, he is able to seize disruptive opportunities [79]. However, the entrant must not necessarily be a startup [83]. A successful entrant often comes from another industry and has the required resources and skills for success [42]. Upon entering the mainstream market, the entrant first serves customers that are not profitable from the incumbent point of view. Furthermore, he has an inferior offer for the main market which is, however, increasingly improving [20].

By taking a closer look at the different customer groups, Christensen [20] distinguishes three states of need satisfaction among them. Those customers whose requirements for the traditional performance attributes are not sufficiently met are called "Undershot customers". They are buying the existing product but they are not completely satisfied and wish for improvements for which they are willing to pay more [20, 23]. The so-called "Overshot customers" are the second group. As the incumbent continuously launches further performance improvements in spite of only satisfying functional requirements, a growing number of customers is more than satisfied Existing products are then more than good enough – the average customer no longer uses them in its entirety and has no more willingness to pay for further improvements. Due to this fact, the required price premiums can hardly be earned for next generation products [4, 20]. The third group of customers is -called "Non-consumers" that do not or only to a lesser extent consume the existing product [20].

The customers' needs were identified and satisfied by a company in the context called "value network". The BM of the company determines how this is accomplished. It also has an impact on how companies evaluate the economic value of the DI [22, 51]. The DI brings a new supply to the market which is initially showing an inferior performance in the well-known attributes but improves steadily until its performance attributes are considered good enough for the mainstream users [21].

Depending on the way of market entry of the entrant, Christensen [20] differentiates between "new-market DI" (NM-DI) and "low-end DI" (LE-DI). The LE-DI applies to the most unprofitable customers for incumbents in the lower market segment of the "old" value network. Their state of

needs satisfaction is "overshot" because the supply of the incumbents exceeds their requirements considerably. The existing product/service is too expensive in relation to what the low-end customers want to use [23]. They have to pay for product features that are not important to them. Therefore, the probability of them switching to offers with a better price or better convenience is very high. A signal for the LE-DI provides for example a BM that generates revenues compared to the incumbent in a new way and addresses the target group of the overshoot customers [20]. The entrants with LE-DI are often not classified as a threat by the incumbents because in the beginning they (almost) lose no or only little sales by the migration of less profitable customers [70]. Likewise, the incumbent often assumes that the DI will never be competitive in the main market [43]. The NM-DI, however, targets the Non-consumers and serves a new value network in which the customers have different needs [23]. The properties of existing products limit the number of potential customers and force some to consume in a less comfortable environment for them. The NM-DI helps in overcoming the barriers to consumption through a relatively simple, affordable product that allows for solving existing problems with its new performance attributes. Previously, this was not feasible due to for example high prices of existing supplies or ore a lack of access to existing solutions. In the value network of the incumbent, the new solution is less attractive because it is inferior based on the old attributes. However, the offer of the NM-DI becomes good enough over time, whereby the customer can migrate from the low-end of the old value network to the new value network. Since the incumbents do not take notice losing customers in the beginning, it is particularly difficult to identify this form of DI early on. The incumbent perceives the threat often only when the NM-DI has arrived in its final phase. Additionally, many disruptions represent a hybrid form that may include aspects of both categories [20, 23].

Since the disruption process takes time, an innovation usually is not disruptive in the short term. The development sometimes takes a very long period of time and the incumbents don't feel much pressure to react. Until they do, it is often too late to react adequately because the entrants have already acquired new skills unknown to the incumbent that are crucial for success in a changed market environment. This demonstrates the need for early identification of DI [14, 20]. For the entrant the choice of market entry is essential. The focus on building a new value network independent from the established one of the incumbent, promises the best opportunities. The incumbent fails because he is unable to change his strategy towards the new value network. Furthermore, it would be relatively easy for him to react adequately if the value networks possessed a strong overlap. This could be caused by bottlenecks for example monopolies of suppliers or distributors and affect the cost structure and BM of the entrant [20, 46]. Also a strong dependence of an entrant on a venture capital investor could cause problems. These often require quick results whereas patience from the investor side would be more favorable to the entrant's business considering the time required for making a DI work. Also, certain market conditions may hinder a promising DI. This might be the case if the undershot segment is not big enough for the entrant or the incumbents tries to deny the market entry because he depend on the low-end segments for covering high fixed costs [20].

B. The role of the Business Model in disruption

The role of the BM is claimed to be essential for the success of disruption and the failure of the incumbent [47]. Notwithstanding that the BM aspect has been addressed by Christensen et al. [20] before, research has focused more on the BMI aspect in connection with disruptive change in discussion inter alia by Johnson et al. [49] and Markides [59]. Osterwalder and Pigneur [64] define a BM as the rationale of how an organization creates, delivers and captures value. Therefore, a BMI is about new ways of creating, delivering and capturing value. For a more detailed definition, Johnson et al. [49] detail a BM into four interlocking elements that, taken together, create and deliver value:

- The customer value proposition defines the target customer and an offering that satisfies a problem or fulfills a need of the target customer.
- The profit formula which is the blueprint that defines how the company creates value for itself while providing value to the customer. It consists of the revenue model, the cost structure, the margin model and the resource velocity.
- The key resources, i.e. assets such as human resources, technology, products, facilities, equipment, channels, and the brand that are required for delivering the value proposition to the targeted customer.
- The key processes that allow for the delivery of value in a way they can successfully be repeated and increased in scale.

Established companies won't succeed with DI unless they understand how the potentially disruptive opportunity correlates to their current BM and how to handle it accordingly [49]. This theory extends the DI theory where incumbents usually fail to respond to potentially DI due to their inertia, as explained by the Resource-Processes-Values (RPV) framework [23]. The RPV approach explains why the incumbents usually succeed in implementing SI: These are in line with the existing RPV – in contrast to the DI. The entrant may use the opportunity to acquire new processes and cost structures with the DI to which the incumbent has difficulties to respond [20]. The problem is that due to the conflict between old and new BMs the development of new processes and values is required. If the incumbent tries to implement a DI with the "old" RPV, he will usually fail [18].

C. Methods for ex-ante analyses: the Disruptive Potential

DP is a concept and a measure for the ex-ante analysis of Potential Disruptive Innovations (DPI) [46, 51, 67]. It indicates the potential of an innovation by the threat it poses to incumbents to ultimately fail. Or formulated positively, it in-

dicates the potential of an innovation by the opportunity it grants to entrants in an existing or emerging value network to ultimately succeed against the previously dominant incumbents. Those approaches seek to identify the DP of an innovation by measuring it along a set of criteria that are based on Christensen's original theory [22]. The degree of DP is often measured by the relative amount of disruptive characteristics fulfilled. Additionally, trajectory maps are considered very useful for the ex-ante analysis of a potentially DI [20, 25, 46]. A trajectory map tracks the performance of the existing technology, the new technology and market demand along established performance attributes. A disruption can only occur if the new technology is capable of meeting performance demanded in the mainstream market [22]. The result of the analysis of the DP gives an indication of how threatening the potentially disruptive technology is, likely to be at a given time, since the disruption phenomenon is a long-term process that can be divided into different phases [20, 46, 67]. As long as the disruption process is not completed, the monitored technologies might have different degrees of DP but the final outcome remains unclear until the end. Table 1 provides an overview of frameworks for ex ante identification of DI.

D. A framework for analyzing the Disruptive Potential of Business Model Innovation in two-sided markets

To analyze the potential of disruptive BM innovations in two-sided markets and apply this to the case of p2p lending marketplaces, an extension of existing theoretical approaches as shown in Table 1 is necessary. p2p lending platforms, as they are researched in this paper, are characterized as so called "two-sided markets" because of their positive externalities on both market sides [9, 68, 65]. Platforms in two-sided markets have two different groups with different network effects. At so called cross-side network effects, an increasing number of users on one side of the network make it more or less valuable for the user on the other side. Therefore inter alia search costs can be reduced, alternative products and services occur and the choice of transaction partners increase [9, 68]. Otherwise at same-side network effects an increasing number of users on one side of the network make it more or less valuable to users on the same side [65]. We assume that two-sided platforms can have different BM variations on each side. Characterized by the presence of two distinct sides whose ultimate benefit stems from interacting through a common platform, the owners of those platforms have to deal with the "chicken-egg-problem" to get both sides on board. Platforms often treat one side as a profit center and the other as a loss leader, or as financially neutral. Though a healthy BM can only get effective operations on such a platform if both sides get the same attention. Finally, there could be differences regarding the degree of the DP on the different sides of the platform and as a result in the overall BM. Especially this aspect has – until now – not been covered in scientific literature at all, although Christensen and Raynor [23] mention examples of "disruptive" firms with two-sided platform-models such as eBay or Google.

For analyzing the DP of BMI in two-sided markets, we built on the framework of Keller and Huesig. This framework serves as an adequate basis for our study. The rating scheme is based on a criteria catalog which is rooted in the DI theory as well as relevant aspects for the internet economy such as same-side network effects that are explicitly incorporated. We also follow Keller and Huesig [51] with their structure of the process of disruption in three phases which indicates the dynamic of the disruption process and its possible variations of DP in each stage. Additionally, trajectory mapping is suggested to track the performance of the existing technology, the new technology and the market demand along established performance attributes. Moreover, we follow the suggestions of Kaltenecker et al. [50] to drop "coordination costs are low" on incumbent side and our focus outlined above, so that some modifications are made: In the phase of the main market entry on entrant side the factor "products are based on standard components" is redundant in our framework to the resource-aspect. We also include external resources such as licenses or permissions to operate a business by regulation that are externally influenced in this criterion as suggested by Huesig et al. [40]. In addition to that, on the incumbent side we miss one relevant aspect in discussion of BMI and disruptive threat: The aspect that some companies have made experience in successfully dealing with a disruptive threat while others did not ("disruptive black belt" as Christensen et al.

TABLE 1: FRAMEWORKS FOR EX ANTE IDENTIFICATION OF DI

	Rafii/Kampas (2002)	**Christensen et al. (2004)**	**Huesig et al. (2005)**	**Keller and Huesig (2009)**	**Hang et al. (2011)**
Focus of method	Disruptive threats for incumbent	Industry change due to innovations	DP of a technology	DP of a technology in software markets	DP of an innovation
Scale or classification	Seven-point scale: −3 (=not disruptive) to +3 (=disruptive)	Qualitative assessment	Three-point scale: Yes (=disruptive), No (=not disruptive), Unknown	Three-point scale: Fulfilled (=disruptive), Not fulfilled (=not disruptive), Unknown	"Yes" (indication of disruption) or "No"(no disruption)
Grouping of criteria	Six stages of the disruption process	Three stages	-	Three phases: foothold market entry, main market entry, failure of incumbent	Three phases: market positioning, technology, other drivers

[20] calls it). Therefore, we added the missing aspect on incumbents side ("incumbent has no experience in successfully dealing with disruptive threat"). As mentioned before, all previous frameworks ignored the two-sided markets aspect so far. The consideration of a two-sided market marketplace causes us, to double the modified Keller-Huesig-framework in order to capture the DP of both sides. The resulting framework is shown in Table 2. All criteria have been formulated disruption-positive, i.e. if the criterion is fulfilled, a disruption is more likely to occur. In order to measure the DP, we focus initially on each market side. On each market side, all criteria have to be evaluated. After that, all criteria with the classification "fulfilled" are accumulated for each phase. By doing so, the DP of each phase results in a numerical value. Then, the values of all phases are added up to yield the total DP per market side of both market sides. For consolidation purposes, the arithmetic average of both market sides has to be calculated. The outcome is an aggregated numerical value of all criteria that expresses the total DP in sum. However, the DP values of each phase per market side are also significant, since each phase poses a certain state of the DI process which provides various response options to alter the DP of later stages.

III. METHODOLOGY AND DATA

For analyzing the DP of p2p lending marketplaces in the German banking industry, a qualitative based research method in form of the case study approach is chosen [82, 29]. It fits well for this research because case studies take place within a real-life context, combine numerous methods and data sources and tend to focus on an in-depth understanding of the dynamics in a single setting [82]. Therefore, in this article a prospective case study is designed on industry level, based on secondary data and secondary analyses from March 2007 until January 2014 that are publicly available at firm websites or other media and scholarly publications. The case study approach as the research method has been successfully used by a number of authors with similar technologies and/or innovations such as Christensen et al. [20] (PWLAN, VoIP, discount airlines, regional aircraft, air taxi provider, etc.), Huesig et al. [46] (PWLAN), Keller and Huesig [51] (SaaS/Web Applications), Kaltenecker et al. [50] (SaaS/CRM). For our purpose, we follow the research approach of Christensen et al. [20], Keller and Huesig [51] and more recently Klenner et al. [52] with their forward-looking perspective. Moreover, we use this case also in an illustrative way to apply our modified theoretical approach to a current value network of interest with an applicative and prospective case study.

After getting an overview of the traditional banking sector and the p2p lending marketplaces in Germany, we analyzed entrants and incumbents on both of the market-sides – investment and credit – in five steps:

#1. Comparison of p2p lending and traditional banks on BM level

TABLE 2: CRITERIA TO MEASURE THE DISRUPTIVE POTENTIAL OF A BUSINESS MODEL INNOVATION IN TWO-SIDED MARKETS

	Market side 1		Market side 2	
Phase	**Entrant**	**Incumbent**	**Entrant**	**Incumbent**
Foothold market entry	• Products perform worse based on established attributes • Products are cheaper, simpler, more comfortable or more reliable • Products address current non-consumers • Profitable BM targeting over-satisfied customers • Investors allow experimentation	• Some customers are over-satisfied • Main customer segment does not appreciate entrant's products • Market for products based on PDI appears small and irrelevant	• Products perform worse based on established attributes • Products are cheaper, simpler, more comfortable or more reliable • Products address current non-consumers • Profitable BM targeting over-satisfied customers • Investors allow experimentation	• Some customers are over-satisfied • Main customer segment does not appreciate entrant's products • Market for products based on PDI appears small and irrelevant
Main market entry	• Strategic resources (licenses, capital, etc.) are accessible • Network for PDI is expected to be large • PDI is compatible with existing network	• Established performance attributes are shifting • Customers are unwilling to pay for further improvements along established attributes • Switching costs are low • Incumbent has no experience in successfully dealing with disruptive threat	• Strategic resources (licenses, capital, etc.) are accessible • Network for PDI is expected to be large • PDI is compatible with existing network	• Established performance attributes are shifting • Customers are unwilling to pay for further improvements along established attributes • Switching costs are low • Incumbent has no experience in successfully dealing with disruptive threat
Failure of incumbent	• BM is significantly different • Processes are significantly different • Value network has a low overlap	• Products matching entrant's offer are not offered • Incumbent is fleeing towards premium customer segments • PDI is not implemented in separate organization	• BM is significantly different • Processes are significantly different • Value network has a low overlap	• Products matching entrant's offer are not offered • Incumbent is fleeting to premium customer segments • PDI is not implemented in separate organization

#2. Comparison of retail banking and p2p lending: Value network, network effects and trajectories
#3. Target groups: Overshoot customers, LE-DI and non-consumers
#4. DP of smava and auxmoney for the traditional banking
#5. Consolidation of the results of both market-sides and players

IV. APPLICATION OF THE METHODOLOGY AND THE CASE OF P2P LENDING MARKETPLACES IN GERMANY

A. Overview of traditional bank sector and p2p lending marketplaces in Germany

1) Threatened incumbents: the investment and credit business of retail banks

For analyzing the DP of p2p marketplaces for German banking industry, a basic understanding of traditional banking services is required. In addition to that, for two-sided market aspects, the investment and the credit business have to be considered [16]. Due to the similar target groups of p2p banking and traditional banking, we focus on the retail banking sector. This sector has the usually highly standardized volume business with private customers as well as with smaller business and corporate customers, with relatively low individual investment or credit volumes. At product level, payments, loans, insurance, investments and securities can be distinguished [11]. According to a BCG analysis [13], approximately 50% of the global banking earnings are generated via retail banking although a slight downward trend of earnings and profitability can be noticed. From the retail banks' point of view, two investment product groups possess the highest relevance. First of all, the banks' proprietary retail products, especially all bank savings products, are directly used for refinancing of the bank as these funds remain in the institution. Second, banks generate major revenues from acting as intermediary between customers and third-party product issuers, especially the securities business. The universe of the investment alternatives differs greatly according to their risk-return profile [78].

In credit business, the bank allocates financial assets for a certain credit period to a borrower who continuously pays interest – the interest income from the credit facility is still one of the main sources of income for banks [40]. The borrower furthermore guarantees repayment and sometimes even grants rights to information and participation. The credit financing can be characterized with reference to the categories of asset backing, credit type, purpose, and style [78]. Typical retail credits are widely standardized, and include mainly overdrafts, consumer credits and mortgage loans [40]. For the lean p2p lending only the credit amount, the interest rate and the installment amounts are relevant factors. The credit amount is easy for the borrower to obtain because no lengthy approval process is necessary. But this flexibility typically comes along with a significant price premium which is often more than 13% p.a. in contrast to a classic "offline" consumer credit with approximately 6% on average or a classical installment with 2.5% [77, 36, 35]. A retail credit is usually a classic consumer credit paid by installments. It amounts to up to EUR 50,000 and has a term of up to 60 months with fixed installment [78]. Besides a one-time processing fee at the beginning, a fixed interest rate is charged that is usually extrapolated over the entire credit period and will be repaid along with the credit amount in equal installments, so-called annuities [40]. The imperfection of the market dominates the credit business. These forces to meet by the time gap between performance and compensation decisions under uncertainty. According to the principal-agent theory, the agent (borrower) possesses an information advantage over the principal (lender) [69]. This has rendered its performance (repayment of the credit amount) and can only partially influence on the consideration (timely installment payments). The agent could succumb to the incentive, for example to choose a riskier than agreed with the principal action alternative because it promises him higher profits ("moral hazard"). There is thus an incentive on their ability and willingness to repay the credit to better present than it corresponds to reality. The management of this risk and the different incentives define a core problem of credit business, which is to be achieved by the credit check [78].

Besides idiosyncratic risk which relates to individuals or companies, banking institutions face systematic risk which has become well known during the financial crisis from 2007-2009. Both factors significantly influence the risk of a credit portfolio as e.g. described in Gordy [39]. In order to sustain the stability of the financial sector supervisors and banking authorities have developed rules relating risk and capital. Consequently capital standards are defined by the Basel Committee on Banking Supervision (BCBS) which have most recently been adjusted with respect to the financial crisis. BCBS standards are implemented into European legislation via Capital Requirements Regulation (CRR) [32] and Capital Requirements Directive (CRD IV) [30, 31]. National jurisdictions have implemented European standards on January 01, 2014. Including diverse capital buffers, e.g. the countercyclical buffer, minimum capital requirements can reach up to 13% relative to risk weighted assets. The following example illustrates minimum capital requirements of a retail credit (applying the standardized approach which is generally used by cooperative and savings banks) [26]. According to regulatory standards, credits which do not exceed EUR 1 million are designated as retail credits and have to be weighted with a risk factor of 75%. Regarding a credit of EUR 50,000 the minimum capital requirement amounts EUR 50,000 x 75% x 13% (including capital buffers) = EUR 4,875. Since the return on equity (before taxes) of cooperative and savings banks is approximately 15% [26], capital costs average EUR 731.25, representing 1.463% of the credit amount EUR 50,000. Since capital requirements are addressed at banking institutions and not at individuals, such costs do not occur for p2p lenders.

2) Handling of heterogeneity of incumbents and entrants in research context

In this research context, disruption is seen as relative to existing BMs [20]. When looking at the entrants, they are often heterogeneous in the early phases of disruption processes [47]. For this a closer look to the incumbents is sine qua non. So the approach for analyses is following: generate types of incumbents (Table 3) and analyze individual companies of entrants under the assumption that incumbents are relatively homogenous within their group.

3) Overview of p2p lending in Germany

Peer-to-peer (p2p) also "person-to-person" means "from like-minded to like-minded". Therefore a p2p-technology is a direct data transfer between like-minded or equivalent computers over the internet [36]. In our case a p2p credit is seen as a loan, which is mediated between a private borrower and one or more private investors through an online marketplace [49]. Furthermore a p2p lending marketplace is an electronic marketplace for p2p credits [33]. This business contains various aspects of innovation. When regarding to product innovation, p2p-credits are an investment option for private person. In contrast, p2p lending can be interpreted as a process innovation that makes online-granting of credit by private person possible. The investors decide actively and collectively which credit will be financed. Furthermore, a collective funding (crowd funding/sourcing) reduces potential capital costs for the intermediary and spreads the risks for the lenders.

After the p2p lending was established first in UK with Zopa in 2005 [84, 33, 49]. The reputable p2p lending in Germany with factual online processing began with the activities of smava in March 2007 in contrast to less reputable attempts such as eLolly or Money4friends or many platforms that act only as an agent for the initiation of private lending [45, 66, 16].

In 2014 there is still a high diversity within the group of the commercial p2p lending. This is due to different characteristics of the individual components or aspects of the platforms [60, 44]. Though, the p2p lending platforms have one thing in common: The default risk remains ultimately with the lender, not the operator [61]. In addition, there is a great advantage to the borrower is that the deposit of collateral is not required for the p2p loans [9]. Besides smava only auxmoney has claimed with a comparable model. However,

TABLE 3: INCUMBENT GROUPS IN GERMAN MARKET

	Major banks	**Saving banks & cooperative banks**	**Direct banks**
Biggest companies	Deutsche Bank, Commerzbank	Sparkassen, Volks- & Raiffeisenbanken	ING-DiBa, DKB
Business Model	Branch operations and personal customer service	Branch operations and personal customer service	Direct distribution with none branch system
Importance retail banking	Medium	High	Very high

TABLE 4: COMPARISON OF SMAVA AND AUXMONEY UP TO JANUARY 2014

	smava	**auxmoney**
Start	March 2007	March 2007
Mediated credits	9,391 credit projects Total volume EUR 81,767,750	17,342 credit projects Total volume EUR 79,561,950
Loan amounts	EUR 1,000 – 50,000 in EUR 250-steps	EUR 1,000 – 25,000 in EUR 100-steps
Repayment terms	Choice between 36, 60 or 84 month	Choice between 12, 24, 36, 48 und 60 month
Failure quota	8.19% of the loans	2.12% of the loans
Examination of identity and credit-worthiness	Identity: PostIdent Credit-worthiness: SCHUFA score, personal information of the borrower	Identity: Online Ident or PostIdent Credit-worthiness: auxmoney-Score, SCHUFA score, CEG lights of Creditreform, AIS Arvato Infoscore and optional automotive certificate (car valuation), personal information of the borrower
Credit fees	After credit payout: Fee for quarterly statement of account EUR 4 if needed Unique mediation fee dependents on the running time: 2.5% of the loan amount at 36 and 3.0% at 60 and 84 months	After credit payout: Service fee EUR 2.50 / month Fee for annual statement of account EUR 17 Unique mediation fee of 2.95% of loan amount
Investment capital	Investment account at transaction bank necessary EUR 250 – 100,000 in EUR 250-steps	EUR 50 – even deposited auxmoney-limit and possibly credit balances on the auxmoney-investment account
Amount of investment return	Unknown, up to max. 10%	On average 7% interest up to max. 14.95%
Investment fees	1.35% of the investment amount plus a monthly service fee of 50 cents	1% of the investment amount (at least EUR 1)
Transaction bank	Fidor Bank	SWK Bank Correspondent bank for auxmoney-investment account biw AG
Number of customers	20,000 active customers (11,000 investors and 9,000 borrowers)	108,000 active customers (8,000 investors and 100,000 borrowers)

auxmoney was former under constant criticism. Initially, non-transparent general terms and conditions were criticized as well as the fact that credit applications could be set without identity and credit check [75, 76, 36]. Since the founding smava and auxmoney have continuously adapted and changed their BM to the market conditions. In 2012 smava was Germany's market leader in online lending business with a mediated loan volume of approximately EUR 60 million [72], auxmoney in contrast, had only about EUR 21 million [8]. However, in the course of 2013 auxmoney further modified its BM and achieved a credit volume of EUR 79 million in January 2014 [5, 7, 6]. Table 4 shows a comparison of both players.

At p2p lending marketplaces the p2p loan provision technology (LPT) is applied. It is a process in which information on the solvency of the credit seekers and investor capital can be converted into granted p2p loans, but risk was initially partly inadequately evaluated by the individual lender with often additional social criteria. However, recent modifications in this process and further developments such as the development of proprietary credit ratings "auxmoney-Score" left little scope for the individual lender's credit evaluation. This increased automation of the process allows even faster lending. Therefore, the p2p LPT tends to be simpler, less accurate, more transparent and potentially cheaper and faster than the LPT of the incumbents. Further improvements of the LPT may result from investor's and the platform's learning as well as additional information functions provided by the p2p lending marketplaces.

B. Analysis of Disruptive Potential of p2p lending marketplaces for the German retail banking sector

1) Comparison of p2p lending platforms and traditional banks on both market sides of the Business Model

p2p lending platforms are two-sided markets with positive externals of both sides: investment and credit business. Therefore, a closer look to both sides of the BM is necessary. In traditional banking business the incumbents have authority and market rules are determined by their assumed higher state of knowledge. In contrast, in p2p lending a flat and transparent hierarchy is given which anti-authoritarian and horizontal structures that enables users a higher degree of control and individual autonomy [48]. Furthermore, negotiation from person to person meets at p2p lending the advantages of internet and online processing like simplicity, speed and transparency [56]. Aspects of security, trust and tradition plead for traditional banking business. A comparison of the general BMs of p2p lending marketplaces and traditional banks is provided in Table 5.

The analysis of investment business is complicated by the comparison of different investment products. Investing in p2p loans enables private lenders to access a new asset class, which was previously accessible for institutional investors only. The assets in this class have a high diversity in terms of risk and return [56]. The p2p credit facility is classified between fixed deposits and bonds. In addition, p2p investors are often also motivated by social or ethically-oriented investment targets, willing to forego financial return or to accept a higher risk. But they want to be compensated by a social return in return, which they generate by providing capital for other individuals that are as noticeable as possible [48]. Thus the p2p lending offers a traditional investment business and if desired by the individual investor a social investment, too. In the settlement process and the fee structure, no fundamental differences can be identified between the two models [74, 56]. Though, the toll-free option of early repayment and detachment of the p2p marketplace loans, which is made of considerable use, poses a reinvestment risk for investors, because they have to find a new investment destination [60]. An overview of the findings is provided in Table 6.

TABLE 5: COMPARISON OF THE GENERAL BUSINESS MODELS OF TRADITIONAL BANKING AND P2P MARKETPLACES

	Traditional banking	**p2p lending platforms**
Business type	Full banking license	Startup without a full banking license Only a transaction bank
Distribution	Branch operations, personal customer service and online	Online platform
Revenue sources	Fees and interest	Fees
Lot-size transformation	Given; Bundling small investments in larger amounts of credit	Automated bundling of small-scale systems to individual loan (crowd funding)
Term transformation	Given; Give long-term short-term deposits	Term agreement
Risk transformation	Given; Experienced banks assess risks and diversify	Support, pools of investors (smava)

TABLE 6: COMPARISON OF THE INVESTMENT BUSINESS MODELS OF TRADITIONAL BANKING AND P2P LENDING PLATFORMS

	Traditional banking	**p2p lending platforms**
Return	Dependent on product selection; only economical return	Economical return and social return
Amount	unbounded	smava: max. EUR 100,000
Costs	Fees and provisions; mostly fixed fees at beginning of investment and ongoing management fees	Fees; fixed percentage of the amount invested; plus ongoing fees
Security	Bank and deposit protection	smava: pools of investor auxmoney: investors
Liquidity	Depends on product selection	Low, no resale of the credit claim possible, but installment
Further		Reinvestment risk in case of early redemption of the total loan

TABLE 7: COMPARISON OF THE CREDIT BUSINESS MODELS OF TRADITIONAL BANKING AND ON P2P LENDING PLATFORMS

	Traditional banking	p2p lending platforms
Allocation	Bank manager and policies	Preliminary investigation by platform, investors
Amount	Upper limit depends on load capacity (e.g. budget account, credit scoring)	smava: EUR 50,000 auxmoney: EUR 25,000
Costs for the borrower	Processing fee, interest, partly credit insurance, Cross-selling of inferior banking and insurance products, minimum capital requirements	Mediation fees, interests, fee for statement of account auxmoney: ongoing service fee
Security	Mostly required collateral	Mostly unsecured
Risk of loss	Bank	Investors

A key difference on the credit business side is that p2p loans do not require any collateralization. In addition, the less stringent requirements to borrowers increase the opportunity to obtain a loan. An overview of further findings is provided in Table 7 and is discussed in more detail in the subsequent analysis of the DP. The lack of regulatory minimum capital requirements for p2p credits could significantly contribute to increase its DP. This is especially the case when technical rating standards of p2p lending platforms equal those of traditional banks in the sector of uncollateralized lending.

2) The value network, network effects and performance trajectories of retail banking and p2p lending

An increase in the number of p2p customers increases the value network of p2p banking. As an indicator we analyze the growth-rate of new smava and auxmoney credit projects. Our dataset permits to compare monthly data of new smava and auxmoney credit projects from March 2008 to March 2013. Figure 1 shows the number of new smava and auxmoney credit projects based on monthly data.

On average, the growth-rate of smava and auxmoney is 2.31% and 17.81% respectively. For auxmoney, a significant increase of its platform network can be assumed while the network of smava seems to be limited. An overall limitation of value network increase for p2p banking would be the case, when the increase of new auxmoney credit projects can be explained for example by a reduction of smava projects. Therefore we estimate a simple regression specification of the form:

$$growth - rate_{\text{auxmoney, t}} = \beta_0 + \beta_1 \cdot growth - rate_{\text{smava, t}} \quad (1)$$

where the dependent variable is the growth-rate of new auxmoney credit projects at month t. As independent variable we apply a constant and the growth-rate of new smava credit projects at month t. Robust standard errors by Newey and West [62] are included. A perfect substitution of credit projects implying limited p2p network values would be indicated by a growth-rate coefficient β1 of -1. Since the growth-rate has a significant positive value, a substitution of credit projects is obviously not the case. As also resulting in Table 8, a low R2 of 0.008 indicates that growth-rates can be interpreted to be relatively independent. A significant positive value of the coefficient of 0.165 can be interpreted that auxmoney has a significant higher growth-rate than smava. Overall, the results indicate that the DP of a p2p platform could depend on the BM.

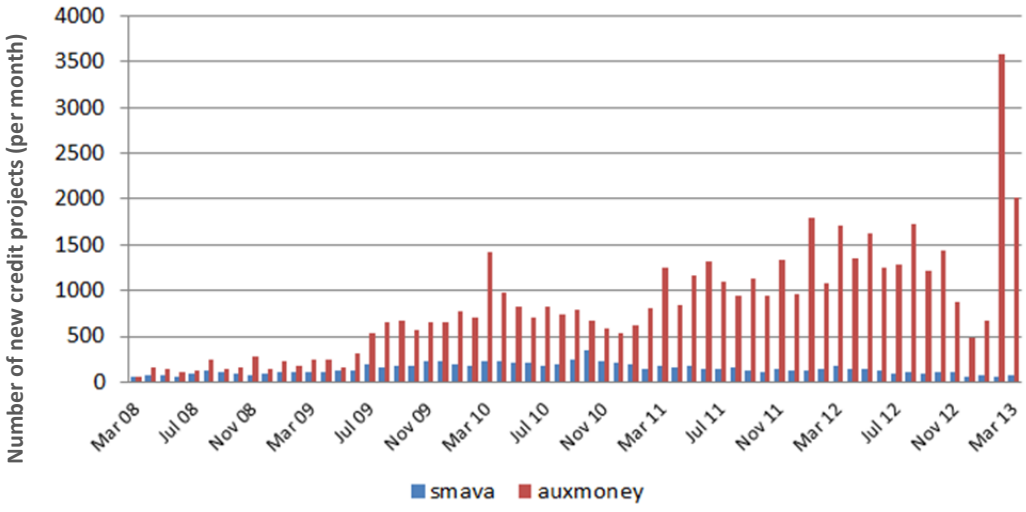

Figure 1: Monthly growth-rate of new auxmoney credit projects

TABLE 8: MONTHLY GROWTH RATE OF NEW AUXMONEY CREDIT PROJECTS

	Coefficient	t-Statistic
Constant	0.165	2.201
Smava growth-rate	0.569	1.933
Adjusted R2	0.008	
Observations	60	

TABLE 9: COMPARISON OF INCUMBENT AND P2P LOANS (CATEGORIZATION ACCORDING TO [78])

	Incumbent loan	p2p loan
Term	In the short to medium term	In the short to medium term
Types of credit	Standard loan/overdraft loan	Annuity loan
Security	Standard loan: collateralized overdraft loan: uncollateralized	blank credit (auxmoney optional automobile)
Usage	Consumption/liquidity/investment	Consumption/liquidity/investment

With the new LPT p2p loans are assigned via the marketplaces. As a starting point for investigating possible changes in customer preferences, a comparison of p2p loans and incumbent loans is used on the basis of their loan features. An overview of the findings is provided in Table 9.

As depicted in Table 9, the criteria term and usage show no significant differences between both loan types. However, the opportunity of early redemption of a p2p loan and resulting high financial flexibility, is very attractive for lenders and often used by them. In case of dept conversion from short-time overdraft loans at an incumbent to a mid-time p2p credit mostly the interests at a reduced rate are the deciding factor less than the rates. Furthermore, the security aspect is a critical factor. At traditional banks a standard loan is collateralized. An overdraft loan, in contrast, is, similar to a p2p-credit, uncollateralized, but with high interests. Therefore, a p2p-credit lowers the access-barrier for customers, who otherwise would not get a cheaper standard loan from an incumbent due to the lack of security. In contrast to a personal credit that is lent only to private customers, a p2p credit is lent to private person. Some of the p2p loans were used commercial by small and medium-sized enterprises, freelancers or entrepreneurs, e.g. at smava every sixth credit [9]. Especially self-employed, freelancers and entrepreneurs are interested in uncollateralized loans and particular in flexible runtime. Due to the fact that they usually cannot plan their earnings and expenses for the long term as large companies, these people have difficulties obtaining affordable credits of incumbents. In context of granting a credit, it's critical for the borrower, if he or she finally achieves the targeted credit sum or not. Therefore, the liquidity in case of the maximum credit amount is considered as the main performance criterion. If a customer needs a EUR 100,000 credit, he or she will not accept a credit of only EUR 50,000 for a better price or lower security requirements. For this reason, it is essential if or when p2p loans will achieve a maximum loan amount per person that is usually borrowed by mainstream bank customers. The investment aspect is subordinated, because there is essentially no upper limit on the investment side at p2p marketplaces for private users and there are other performance attributes such as the reliability of credit check (default rate) or the return on investment are in the foreground of investment decision. In order to visualize the performance supplied of traditional retail banking loans and the development of the p2p loans as well as the customer demand along established performance attributes, we developed a trajectory map in Figure 2. A disruption typically occurs at the low end of the mainstream market and further improves upmarket [51, 22].

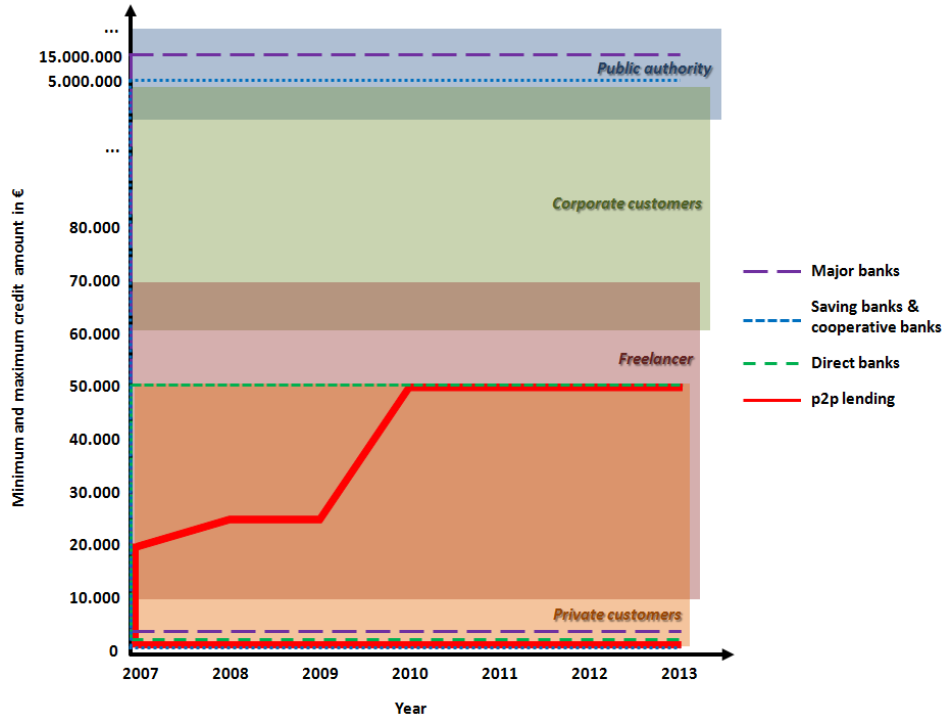

Figure 2: Maximum credit amount performance-trajectories vs. customer-segments and competitors in German lending market

Figure 2 shows the minimum and maximum credit amounts at p2p lending marketplaces and traditional retail banks with plotted lines. The different target groups are visualizes in colored areas. The development of p2p lending marketplaces shows that private customers and freelancers are main customers of p2p lending marketplaces and direct banks. Saving, cooperative and major banks have these two groups as customers, but not exclusive. They also serve the financial attractive groups of corporate customers and the public authority with credit amounts up to EUR 15 million. If the credit amount at p2p lending marketplaces will be amplified over EUR 60,000, also corporate customers may borrow p2p loans and the trajectories expand from low-end into main market of saving and cooperative banks.

3) Customer value proposition and target groups

Especially in the stage of the foothold market entry, the target-groups and their customer value proposition of both traditional and new customers on the credit and investment market side must be understood. Their different needs explain the different causes for a p2p lending application (Figure 3**Error! Reference source not found.**).

- Investment market side
  Overshooting of a part of the customers in the traditional investment business is given, caused by the high diversity and complexity of the banks' investment products. The low costs and conditions of products and services on p2p lending marketplaces are simpler, more transparent and clearly arranged. In addition to that, they are online available without further personal customer service or need to visit a branch. This could also refer to the non-consumers that have not yet felt addressed by the traditional banking products.
- Credit market side
  Low-end private customers with a low degree of creditworthiness receive often none, a too expensive or a too low bank loan. There's a standardized LPT of banks for lower customer segments and a risk limitation at a single transaction level or portfolio level, with high security requirements. At this point the p2p lending technology is a facilitated and provides an improved access for non-consumers and low-end-private persons, especially freelancers and women entrepreneurs at smava 10. p2p lending has compared to traditional banking additional performance characteristics such as transparency, speed and "bank antipathy". Dealing with a nontraditional intermediary for financial transactions such as loans appears to be a new attribute that customers state as reason to choose p2p lending platforms [33]). Frequently the flexible runtime of p2p loans is recognized as advantageous, too. One major disadvantage of p2p loans is that loan amount and term of choice are limited.

4) Disruptive Potential of smava and auxmoney for traditional retail banking

Looking at the different phases as well as the current relevance in the overall market, the P2P lending providers are still in the first phase of its expansion. Details of the analysis depend on the timeframe and are possibly subject to future changes. Especially the ratings for the later stages of the process have a prospective character and could be altered by adequate responses of the incumbents or failures of the entrants. Given the knowledge of today and unchanged future behavior, the results provide the following DP.

- Investment market side
  Entrants show a mixed picture. auxmoney shows a higher DP than smava. At the foothold market entry this may due to the fact, that auxmoney has often the inferior product performance than smava, e.g. no investor-pooling. However, there is a positive performance trend in attributes such as reliable credit check and upper-limit of maximum loan amounts per person improved that will most probably continue. For main market entry of auxmoney it can be decisive, too, that it has more compatibility with a traditional banking value network, because an existing account can be used for transaction, in contrast to smava.

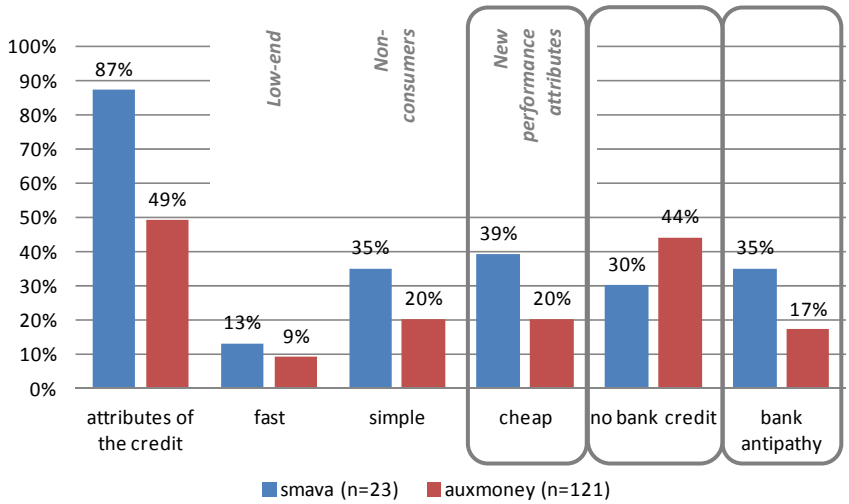

Figure 3: Causes of a p2p-loan application (survey data from [33])

TABLE 10: SUMMARY OF THE DISRUPTIVE POTENTIAL FOR THE ENTRANTS ON THE INVESTMENT SIDE

	smava			auxmoney		
Classification	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*
Foothold market entry	1	2	2	2	0	3
Main market entry	2	1	0	3	0	0
Failure of incumbent	0	0	3	0	0	3
Total DP	**3**	**3**	**5**	**5**	**0**	**6**

TABLE 11: SUMMARY OF THE DISRUPTIVE POTENTIAL FOR THE INCUMBENTS ON THE INVESTMENT SIDE

	Major banks			Saving banks & cooperative banks			Direct banks		
Classification	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*
Foothold market entry	4	0	0	4	0	0	1	1	2
Main market entry	0	4	0	0	4	0	1	3	0
Failure of incumbent	1	1	1	1	1	1	1	1	1
Total DP	**5**	**5**	**1**	**5**	**5**	**1**	**3**	**5**	**3**

The branch banks fulfill all of the criteria for a high DP in the foothold market entry phase. Problems could cause an overshooting of traditional bank customers at traditional lending products with high diversity and low transparency. Furthermore, especially non-consumers of traditional banks are willing to invest in a relatively high-risk lending opportunity with possible high revenue and aspects of self-determination and social return, that is usually not offered at traditional retail especially branch banks. This market side of the p2p lending seems unattractive for branch banks. For direct banks the DP seems comparatively low. However, due to their lack of experience with disruptive threats they have no knowledge accumulated in responding a potential disruptive innovation effectively. Therefore, the DP for branch banks on investment business side is higher than for the direct banks.

- Credit market side
  At this market side both entrants meet almost all criteria that indicate DP. However, there are divergent findings for smava and auxmoney: smava lacks of profitability of its BM (as far as it is publicly known) and suffers from a stagnant growth of loans. Moreover, the overlapping of smava's value network is higher than that of auxmoney because of its loan broker role to banks. In contrast to smava, auxmoney has a positive growth trend at amount of mediated and total volume of loans. In addition to that, auxmoney, although it has a lower maximum credit amount per person than smava, expands its maximum credit amount further, what can be regarded as an important development up to main market entry. Furthermore the BM is profitable and has the larger installed base.

The Incumbent perspective shows a mixed picture. Branch Banking incumbents are typically affected in the first phase. The p2p sub-market appears small and the BM appears unattractive for branch banks relative to their larger business and more profitable private customers. The direct banks appear to be a lot more similar to the p2p lending entrants in terms of revenue generation, cost structure, settlement and speed. However, the LPT is too conventionally for some of the customers. Moreover, the main customer segment of p2p lending marketplaces overlaps with those of direct banks, resulting in a direct competition. But switching costs are low and direct bank loans are free detachable which gives them few control over their customers. In addition to that, direct banks have no experience in successfully dealing with disruption.

TABLE 12: SUMMARY OF THE DISRUPTIVE POTENTIAL OF THE ENTRANTS ON CREDIT MARKET SIDE

	smava			auxmoney		
Classification	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*
Foothold market entry	3	0	2	4	0	1
Main market entry	3	0	0	2	0	1
Failure of incumbent	2	1	0	3	0	0
Total DP	**8**	**1**	**2**	**9**	**0**	**2**

TABLE 13: SUMMARY OF THE DISRUPTIVE POTENTIAL FOR THE INCUMBENTS ON CREDIT MARKET SIDE

	Major banks			Saving banks & cooperative banks			Direct banks		
Classification	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*
Foothold market entry	4	0	0	4	0	0	3	1	0
Main market entry	1	3	0	1	3	0	3	1	0
Failure of incumbent	2	1	0	2	1	0	2	1	0
Total DP	**7**	**4**	**0**	**7**	**4**	**0**	**8**	**3**	**0**

5) Consolidation of the results

Since both the entrants and the incumbents operate simultaneously on the investment and credit market side, it is necessary to bring both sides together for a final evaluation of the DP.

- Findings for entrants

  For consolidation purposes we aggregate smava's and auxmoney's results to a combined representation. The differences of their BM seem decreasing recently. We consolidated the results by each aspect with calculating the arithmetic average for both companies. In the analysis, there was no reference to any unequal distribution of the results that would justify a weighting.

  For the entrants a high DP results of our analysis, especially on the credit market side and less on the investment market side. p2p lending offers borrowers, especially the at the low-end and for noncustomers who were formerly unserved by the traditional retail banks a new chance to get access to an attractive loan with high flexibility. For private investors p2p loans create a new asset class in which they can invest self-directed. However, p2p loans are just another alternative investment that enables the segment of self-directed private investors to allocate their capital into a different return based on a different level of security. The changes in BMs of the entrants improved the initially inferior traditional performance attributes such as security or maximum credit amount per person. Moreover, they are expanding their value network step-by-step up from the low-end of traditional market in higher segments. A main market entry is most likely. Because of the differences in the BM and RPV the DP for the incumbents is high, especially due to the credit market side.

- Findings for incumbents

  Unlike the analysis of the entrants, it's not reasonable to mix all incumbent groups, because of their strong differences of BM. However, the incumbent heterogeneity can be further reduced by generating two separate groups. Two groups "branch banks" and "direct banks" show a similar pattern in their own group and therefore are used for further reference.

  From the perspective of the branch banks a disruptive threat in the foothold market is given, because p2p lending marketplaces address customers, who are not the main profitable customers of branch banks (LE, NM) and the p2p lending business sub-market with its BM seem unattractive for them. This applies to both market sides, investment and credit. On both market sides the criteria for DP at foothold market entry are completely fulfilled with maximum of 4 points (Table 15). Only a little difference can be made at the next phases. Customers on the credit market side won't pay more for services that are significant better at branch banks (e.g. more personal customer service) maybe in contrast to customers on the investment market side (e.g. intensive credit check). But the main market entry and the failure of branch banks is more conceivable at credit market side, but currently unlikely for both market sides.

TABLE 14: AGGREGATED DP OF ENTRANTS ON BOTH MARKET SIDES

	Investment market side			**Credit market sides**			**Both market sides**		
Classification	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*
Foothold market entry	1,5	1	2,5	3,5	0	1,5	2,5	0,5	2
Main market entry	2,5	0,5	0	2,5	0	0,5	2,5	0,25	0,25
Failure of incumbent	0	0	3	2,5	0,5	0	1,25	0,25	1,5
Total DP	**4**	**1,5**	**5,5**	**8,5**	**0,5**	**2**	**6,25**	**1**	**3,75**

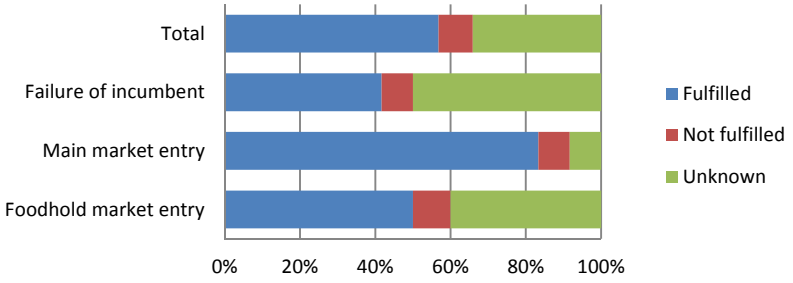

Figure 4: DP of entrants on both market sides

TABLE 15: DP FOR BRANCH BANK INCUMBENTS ON BOTH MARKET SIDES

	Investment market side			**Credit market side**			**Both market sides**		
Classification	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*	*Fulfilled*	*Not fulfilled*	*Unknown*
Foothold market entry	4	0	0	4	0	0	4	0	0
Main market entry	0	4	0	1	3	0	0,5	3,5	0
Failure of incumbent	1	1	1	2	1	0	1,5	1	0,5
Total DP	**5**	**5**	**1**	**7**	**4**	**0**	**6**	**4,5**	**0,5**

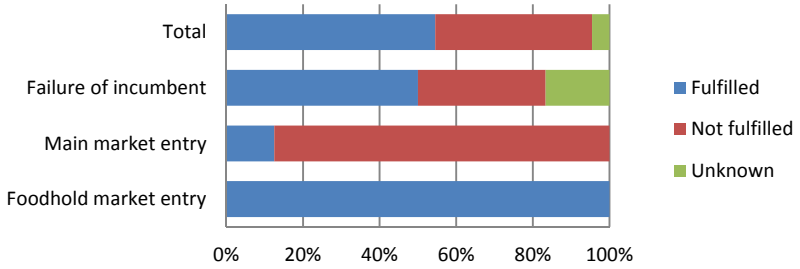

Figure 5: DP for branch bank incumbents on both market sides

TABLE 16: DP FOR DIRECT BANK INCUMBENTS ON BOTH MARKET SIDES

	Investment market side			Credit market side			Both market sides		
Classification	*Fulfilled*	*Not ful-filled*	*Unknown*	*Fulfilled*	*Not ful-filled*	*Unknown*	*Fulfilled*	*Not ful-filled*	*Unknown*
Foothold market entry	1	1	2	3	1	0	2	1	1
Main market entry	1	3	0	3	1	0	2	2	0
Failure of incumbent	1	1	1	2	1	0	1,5	1	0,5
Total DP	**3**	**1**	**0**	**8**	**3**	**0**	**5,5**	**4**	**1,5**

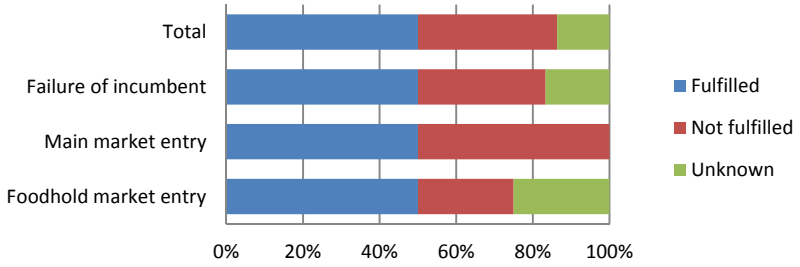

Figure 6: DP for direct bank incumbents on both market sides

Direct banks have a special standing in this case, because they are quite recent entrants in banking market. From our perspective, they are incumbents on the banking side in the p2p lending discussion and they have no experiences with disruptive threats. Direct banks and p2p lending marketplaces target similar customer groups, who are inter alia online affine and have a traditional bank antipathy. Therefore directs banks could represent direct competition for p2p lending platforms which lowers their DP. The DP is higher on credit market side than on investment market side, because of the overshoot and noncustomers at direct banks by their conventionally lending processes. For investment, direct banks are already now chosen by overshoot and non-consumers of traditional retail banks for similar reasons than using p2p lending marketplaces (e.g. lack of transparency, self direction, bank antipathy; compare**Error! Reference source not found.**). But at credit business, p2p lending differs stronger from direct banks in cases of credit-worthiness and flexible loan runtime, that causes a higher DP risk for them (Table 16). In addition to that, the p2p lending BM and sub-market seems rather unattractive for direct banks. A failure of direct banks in case of p2p lending is possible due to their lean BMs that leave less room for alternative revenue streams from diversified businesses.

V. DISCUSSION, CONCLUSIONS AND LIMITATIONS

In this paper, we aimed at addressing the question, whether p2p lending implies a DP for traditional retail banking players in Germany. Therefore, we developed a framework that was able to cope with the DP of BMI in two-sided markets with considerable firm heterogeneity. Our framework builds on previous concepts of Christensen et al. [20], Kaltenecker et al. [50] and Keller and Huesig [51] and particularly revised some of the criteria suggested of Keller and Huesig [51]. Moreover, we also followed their approach of using case studies for forward looking purposes. Furthermore, this paper meets the call of scholars such as Danneels [24, 25] or Christensen [21] and Christensen et al [20] for more published ex ante case studies to test disruptive innovation theory with the option for subsequent re-examination. In addition to that, we added a stronger theoretical based contribution to the ongoing discussion of the DP of p2p lending marketplaces [28, 38, 54, 9, 12, 15, 19].

Our analysis shows that, the investment and credit business of retail banking sector needs to be addressed as a two sided market BM with different DP on each side for each group of players. For handling the heterogeneity of incumbents and entrants, we built incumbent groups and analyzed individual entrants. It turned out that we were able to aggre-

gate the entrants into one group due to their similar DP profile. The main entrants in German retail banking market "smava" and "auxmoney" showed a higher DP on the credit market side than on the investment market side in general. Although our analysis results in a higher DP for auxmoney than for smava, we argue that due to the considerable BM convergence both players can be treated as an entrant group using an aggregated DP score. Also on the incumbent side we had to cope with substantial firm heterogeneity that we finally aggregated on the basis of our results into the two distinct incumbent groups namely "branch banks" and "direct banks".

Regarding the incumbents, our results indicate that branch banks are most affected at foothold market entry at credit and investment market side but a final failure given the foreseeable progress of the entrants is unlikely. Direct banks in contrast show a high degree of DP mainly on credit market side over all phases and have a greater threat not to cope with DP. Branch banks (major banks and saving banks & cooperative banks) fulfill all of the criteria for a high DP at foothold market, because p2p lending marketplaces address customers, who are currently not in their strategic priority or noncustomers (LE, NM) and the p2p lending business sub-market with its BM seems unattractive. The main market entry and the failure of branch banks is more conceivable at the credit market side, but currently unlikely for both market sides. In contrast to that, direct banks and p2p lending marketplaces target similar customer groups, who are inter alia online affine and have a traditional bank antipathy. Therefore directs banks could represent direct competition for p2p lending platforms which lowers their DP. However, the DP of direct banks is higher on the credit market side, because of the overshoot and non-customers due to their conventionally lending processes. A failure is possible due to their quite focused BMs and high market segment overlap that leave less room for alternative revenue streams from diversified businesses. In general, the credit market side shows a higher DP for the German retail banks in total, but this side cannot be seen isolated from the investment side. Even though the investment market is not as disruptive as the credit market, both sides are needed for a p2p lending business. The more p2p loans are demanded by LE, overshoot and non-consumers and the more the LPT of the lending platforms improves, the higher gets the security for investors due to decreasing default rates. Therefore, more investors of other segments with more risk aversion will participate on p2p lending marketplaces. Lesser risk and more capital supply might also lead to falling interests that will motivate customers of higher (mainstream) segments to loan a credit on this marketplaces capturing more business from the incumbents. Additionally, other forms of crowd funding might add to the DP for parts of the German retail bank incumbents by the combined effects of other swarm funding approaches or of community banking. E.g. Fidor, the transaction bank of smava, offers its customers an interest free social lending by their community friends with up to EUR 500 and a regular smava lending from EUR 1,000 to EUR 75,000 [34]. Though direct banks show a lower degree of DP, they are even more threatened than the other groups in retail banking market. Their target group in common, their lower switching costs to p2p loans and free detachable of direct bank loans gives them fewer control over their customers. In addition to that, the regulatory standards e.g. the lack of minimum capital requirements for p2p lenders, shows an increasing DP and a further threat from another angle. This could strike especially the direct banks as a direct competition. For major banks with their main customers at companies and public authorities no significant DP is visible at the moment. Therefore, the response-strategy of ignoring seems rational at this early stage of the disruption process. However, as research of Christensen [23] showed waiting too long could be problematic as well, since it allows the entrants to grow and prosper. A strategy of becoming share holder or active involvement on the investment side could be seen as hedge against further disruption. A retreat to the higher levels of the market as suggested by Adner and Snow [1] could be feasible as well in contrast to saving and cooperative banks that may be threatened at their credit market business side if p2p marketplaces increase their maximum credit amount to the minimum credit amount of company customers and if investment is “secure” enough with higher revenues. An own initiative in the sense of a spin-off that builds an own p2p lending marketplace or an acquisition could help the incumbents to cope with this DP. However, unlike the cases that Christensen and others built their usual response strategy options on, in this case it might be difficult to maintain the image of being a non-bank as a p2p lending platform and being owned or run by an established bank. Maybe a complementary relation between retail bank and p2p lending marketplace could represent a mid-time BM for all incumbent groups. They could occupy the position of a transaction bank or a partner bank for rescheduling. Such a disintegrated platform model could also offer other non-bank financial services such as crowd funding or p2p payment. Further research should also include the integration and disintegration aspect in the context of disruption in the banking industry. Our findings indicate that the DP of a p2p lending platform could depend on the BM. Therefore, it should be further analyzed, how the BM of entrants influences the DP for established companies, the DP of the entrant company, the market growth and the network effects on the market with the new value network. Furthermore, the BM dynamics of the entrants in this young and fast growing market of p2p lending should be core of further research activities. And finally, further studies should analyze p2p lending marketplaces in other countries to compare our results in an international context.

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