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Article

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Journal of Open Innovation: Technology, Market, and Complexity

Provided in Cooperation with:

Society of Open Innovation: Technology, Market, and Complexity (SOItmC)

Suggested Citation: Lee, Seungju et al. (2021) : Red Queen effect in German bank industry: Implication of banking digitalization for open innovation dynamics, Journal of Open Innovation: Technology, Market, and Complexity, ISSN 2199-8531, MDPI, Basel, Vol. 7, Iss. 1, pp. 1-15, <https://doi.org/10.3390/joitmc7010090>

This Version is available at:

<https://hdl.handle.net/10419/241675>

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Article

Red Queen Effect in German Bank Industry: Implication of Banking Digitalization for Open Innovation Dynamics

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Abstract: This study analyzed the firm’s actual case in an environment where the financial industry’s paradigm changes due to technological development. It focused on Deutsche Bank’s competitive action at the heart of the digitalizing European banking industry. This study presents the competitive dynamics among firms and the effects of such dynamics on firm performance. Based on the competitive dynamics between Deutsche Bank and other banks competing in the European banking industry, the Red Queen theory was applied. This study has shown that Deutsche Bank’s innovative actions in the digitalizing European banking industry are necessary and are a factor that can lead to successful firm performance in a hyper-competitive environment. Firms need to develop a capability to quickly capture the opportunities to innovate and take advantage of them to stay ahead of their competitors.

Keywords: Red Queen Effect; competitive dynamics; Deutsche Bank; digitalization



Citation: Lee, S.; Kwon, Y.; Quoc, N.N.; Danon, C.; Mehler, M.; Elm, K.; Bauret, R.; Choi, S. Red Queen Effect in German Bank Industry: Implication of Banking Digitalization for Open Innovation Dynamics. *J. Open Innov. Technol. Mark. Complex.* **2021**, *7*, 90. <https://doi.org/10.3390/joitmc7010090>

Received: 5 January 2021
Accepted: 8 March 2021
Published: 9 March 2021

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1. Introduction

Since the external environmental conditions are rapidly changing, adapting to a new environment is critical for an organization to achieve its competitive advantage. A sustainable competitive advantage is required to survive in a hyper-competitive environment where environmental conditions change fast. In line with this phenomenon, firms should adapt to the changing environment and actions of rivals. Improving the performance of one firm leads to a decline in the performance of another. To remain status quo and survive, firms must continue to compete and react to other competitors’ actions [1].

One of the ways to sustain competitive advantage is to observe the actions of market competitors. As observing competitors, firms learn how they adjust to the new environment [2,3]. If observing competitors’ actions helps sustain competitive advantage for a firm, would it be enough to observe their competitors and imitate their actions? How would the intensity of response to competitors’ actions in a market affect a firm’s performance?

Studies of competitive dynamics have focused on this competitive evolution. Derfus et al. [1] has been paying attention to the rivals’ actions and the reciprocal consequences of competition. To discuss firms’ competitive dynamics more specifically, firms must move faster than their competitors not to be cut off in a competition. To this end, this study examined the case of Deutsche Bank competing in the European banking industry under the transition to the digitalized banking system.

Deutsche Bank AG (DB) is a leading German bank founded in 1870 in Berlin. DB has been operated their retail-banking sector concentrated on branches. As the retail-banking sector changes to digitalization, DB faces problems transforming its offline services to online services such as websites and mobile applications [4]. DB implemented its transition to online services; however, it was not enough to compete. Insufficient digitalization of DB had led to losses in profits [4,5].

Digitalization has become a primary topic for banks globally. While DB's customers are familiar with existing services, as the changes in financial services are inevitable, DB should adopt digitalization actively to sustain competitive advantage and achieve long-term growth.

Therefore, based on the Red Queen theory, this study shows that the intensity of how an organization responds to competitors' actions affects firm performance, especially for Deutsche Bank's competitors' actions in the banking sector in the European market. As examining competitors' overall market conditions and activities, we analyze Deutsche Bank's strategic problems and suggest potential strategic solutions that can respond more actively to the digitalized retail-bank market than its competitors' actions.

To achieve this research goal, we first review the literature relevant to the concept of Red Queen and then analyzes the case of Deutsch Bank's competition as an example of Red Queen. By analyzing the competition process of Deutsch Bank, this paper provides deeper insights into the competitive dynamics in the European Banking industry.

2. Literature Review

Competitors' actions could trigger a behavioral change in an organization, especially when the external environments are insecure. When a market environment is unstable and changing, a firm inevitably should observe what its competitors do for their survival in a marketplace. By observing competitors' actions, a firm is likely to engage in a way to improve performance [6]. The innovations created by competitors affect the firm's behavior and its rivals, promoting a loop of changes among firms [1]. For example, when the three-blade disposable razor released by Gillette, Gillette's competitors also introduced a new blade razor that even progressed; four-blade [7]. Several prior studies have proved that firms' competitive dynamics could help them develop and grow [8–10]. Competition stimulates firm's change and development for their products and services. However, imitating or merely following up competitors' actions is not enough to achieve a competitive advantage in the rapidly developing market.

In the story of *Through the looking glass*, Alice and Red Queen had a conversation during their run. Alice asked the Red Queen why she could not get anywhere, relative to her surroundings. For the answer to the questions, the Red Queen said that "Here, you see, it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!" [11]. Several studies applied this story to the business context known for the "Red Queen Effect." According to the Red Queen Effect, running can be replaced by competition among the firms. To get better performance than other competitors, a firm needs to run twice faster, at least, and the speed or performance depends on the firm's rivals that should be overcome [1,12,13]. Therefore, to sustain and get a better performance in a dynamic environment, a firm should observe what its competitors do and take proactive actions compared to its market competitors.

Red Queen theory posits that competition is the engine of organizational growth. Therefore, according to the Red Queen theory, when a firm is exposed to more viable and stronger competitors, its performance is increased since it needs to search for ways to survive and improve performance among strong competitors [6].

Several studies provide evidence that the Red Queen Effect helps to improve the growth of an organization. Derfus et al. [1] show that rivals' actions affect focal firms' actions and lead to various performances. Even if an investment occurred to imitate a competitor's action, it turns out to be positive outcomes for focal firms [14].

While competition has a positive effect, according to Red Queen, if the severe competition is continued in the long-term, a firm experiences negative consequences; as mentioned above, competition would stimulate a firm's reactions to its rivals' actions in the short term. When competition lasts longer, firms that fail to react to competitors will be left behind and extinct. Thus, relatively strong organizations that have survived the competitive environment will compete again. This phenomenon makes a firm encounter stronger competitors. Previous studies show this negative side of the Red Queen [1,15,16]. For instance, Barnett

and McKendrick [16] show that the worldwide hard disk drive market's survival rate tends to decrease since technologically leading companies must compete for each other. Therefore, to get out of the Red Queen, a firm should go beyond merely imitating the competitor, especially when a firm survives long-run with a positive performance. In short, it is insufficient to imitate market competitors' actions to achieve a competitive advantage in the rapidly changing market.

Additionally, in the fierce competition, organizations that survive in the Red Queen race by going beyond their competitors are trapped in the new Red Queen's shadow. While the "Red Queen" evolution has enabled organizations to adapt to their environment, organizations that have survived the competition in the same context have a more insensitive movement to new contexts and are obsessed with their past glories, making biased choices. Barnett and Pontikes [17] showed this phenomenon empirically through the U.S. computer industry. This phenomenon is more pronounced when organizations survive for a long time in the same industry and achieved great success. This study analyzes the case of Deutsche bank (DB) by applying the Red Queen Effect. Over the past decades, established banks have competed with similar services and similar competitors, continuing to race, making it challenging to generate revenue. However, IT technology development has shifted the landscape of the banking industry. Existing banks have to compete with traditional banks and startup firms offering E-payment services such as online base banks. European banks have incorporated new technologies to attract existing and new customers to online banking, offering an active variety of online and mobile services.

Although DB pursued digitalization to adapt to the change, it was not enough. Failure of DB's digitalization is because DB was satisfied with its actions that followed digitalization without differentiating from competitors, such as launching online websites or making banking applications. DB could take advantage of its numerous branches with its reputation and credibility as a traditional German bank. In the new digital era of banks, DB's reputation and credibility would be advantageous to the changing market. However, during the process of transition to digital environments, DB did not utilize their competitive advantages.

Instead, they imitated their competitors' actions simply and became complacent. This passive decision came from their past race's success since their traditional customers are not accustomed to online, and DB has the largest market share in Germany. DB's passive actions led to lowering performance in the new generation of the bank industry.

3. Research Method

Based on the discussions in existing competitive dynamics, this study adopted case studies to analyze Deutsche Bank's strategy for responding to changes in the external environment and understanding the firm's actions and consequences accordingly. A case study is a research method that emphasizes the context of real-world phenomena [18]. It is divided mainly into a single case study and multiple case studies.

A single case study is applied when it is necessary to understand the context of phenomena in-depth, and multiple case studies are mainly utilized in predicting results that can be inferred from or contradicted from the common results of each case. In this study, a single case analysis methodology was adopted to explore the entire process of a firm interacting and competing in the banking industry. The case analysis method is to make the most of the in-depth contextual information in each case to understand the complex entity [19], such as a firm. This method richly collects and qualitatively analyzes information to describe or derive a theory from new phenomena and meets the research objective of identifying the process of a firm performance [20]. To understand and analyze the inherently complex and multifaceted decision-making process of a firm and find mechanisms corresponding to a consistent pattern, 'Deutsche Bank' was selected as a study object. To supplement existing empirical studies, a case study is desirable [21].

A qualitative research method is appropriate to conduct an in-depth analysis of a firm since it is based on the actual event [22]. A case study research analyzes and examines one or

several cases to seize a complex aspect of a research object [23]. Case studies are adaptable to capture and explain the actual phenomenon, leading to new theory development [24]. When a firm has unique characteristics, such as high performance, an in-depth analysis of a particular firm is adequate [25]. A single-case study method can be justified when the case is unique, representative, or provide new information [26]. Deutsche Bank has a strong firm performance such that it could be a proper object of a single case study.

As a case study, the overall corporate analysis and competitor analysis of Deutsche Bank were conducted. The analysis was done by examining the banking sector, internal and external environments, and Deutsche Bank's outline. The research was conducted through secondary data analysis of the firm. The archival data to reinforce the existing conventional data collection methods was used. Online articles and publicly available data of the firm were collected to perform the analysis. This study is based on the actual banking industry's case to see what behavior firms should take in competition when facing a new environment. The study shows that firms cannot sustain their competitive advantage if they do not take the lead. The analysis depicts that firms should act faster than other competitors in a fast-changing environment.

4. Analysis

4.1. Deutsche Bank AG (DB)

Deutsche Bank AG (DB), a leading German bank, was founded in 1870 in Berlin for financing foreign trade in Germany. DB expanded fast worldwide and focused on accepting bills of exchange, the deposit-taking branch, and equity trading until they began the retail business in 1959 [27]. The retail business provides money management, credit, and deposit for families and individuals [28]. Over the last years, digitalization has become an enormous topic for banks globally. Banks, and especially retail banks who have implemented digital strategies, get better performance. With websites and apps, they can reach customers more efficiently and provide personalized service [29]. DB, for example, implemented an online banking website and an app that complies with the latest technology and security requirements and contains many additional features such as trading bonds or prepaid mobile phone charging [30]. However, DB has not transitioned fast enough to meet the digitalization. They still have 2064 branches and 91,737 employees worldwide, and only half of their customers are using their online services [31,32]. This is one reason why they have performed poorly in the last years. Their lack of successfully digital transitioning resulted in years of losses until they archived a positive after-tax profit of 342 million euros in 2018 [33].

Nevertheless, the improvements were not enough for DB. In July 2019, DB announced a fundamental transformation to improve shareholders' returns, gain long-term growth, and become more profitable. This will be achieved through cost-cutting, the investment in technology, different ways to liberate and manage capital, and the divestment of specific businesses. Especially digitalization is an essential factor [34].

4.2. Corporate Division Overview

DB is organized into three major corporate divisions: Corporate and Investment Banking (CIB), Private and Commercial Banking (PCB), and Asset Management (AM). This paper focuses on the PCB division. The PCB division consists of two main businesses: Private and Commercial Business and Wealth Management. DB's PCB division, or retail banking division, follows a differentiated, customer-focused approach and offers financial products and services to more than 20 million individual clients, wealthy private clients, and small and medium-sized firms [35]. In the future, they will create a new division to make DB technology and digital leader [36].

4.3. Value Chain of the Retail Banking Business

DB's retail banking business can be decomposed into five primary activities. The first primary activity is the investment in and development of infrastructure or puts a well-built

branch network. DB established thousands of branches spanning large geographic areas of Germany to enlarge its customer base. The bank considers its branches as the dominant distribution channel. Over the last decade, however, new distribution channels gained popularity. Remote distribution channels such as digital platforms offered the consumer more convenience. An ongoing trend can be observed: the positive correlation between branches and deposit volumes is fading as digital platforms are more and more preferred by customers [37]. The other primary activity is the development and offering of financial products to private and institutional clients. Financial products offered at DB's retail branches originate from two primary sources.

A part of financial products is self-developed financial products by the bank. The other part originates from DB's key accounts, such as insurance firms and other financial institutions. The retail bank represents a vital distribution channel for other financial institutions on the market. The third primary activity is the management and distribution of financial products and services. DB offers its financial products and services through multiple chains—such as its branches, mobile networks, independent consultants, and online banking applications. The firm follows an omnichannel strategy. The fourth primary activity is the operation of its branches. DB ensures that all branches are coordinated and are well-equipped with its financial products and services. The staff is professionally trained and can consult individual customers on their financial concerns. The fifth primary activity is marketing and sales. DB makes use of its data to identify the different existing customer segments it serves. The firm can target the right customer segment.

DB considers itself as a premium provider of financial services. It offers higher prices than its competitors for various basic products, which means pursuing a differentiation strategy. Basic products, however, are bundled with financial advice if needed. In addition to the general management, HR management, information system management, and product management as traditional supporting activities, DB has to focus on other areas. These activities include comprehensive balance sheet management, credit controls, and key account management [38].

4.4. Product Mix

DB offers a wide range of products and services. The portfolio is offered to two groups, small corporates or individual consumers. DB also accompanies and consults startup firms throughout the entire foundation process. Concerning DB's customers, the product and services portfolio contains all basic financial products and services such as savings and checking accounts, mortgage loans, student loans, or any kind of private loans, insurance policies, e.g., property or health, credit cards. DB also offers its advisory service to individuals. The bank advises individual customers on their retirement planning, portfolio management, wealth management. DB also engages in educating its customers about investment strategies. DB complements each of its advisory services with the right financial product. Since the emergence of the Internet and mobile banks, the bank has invested heavily in its digital offerings. In a short time, the bank built and refined its online banking platform, which could be operated on various electronic devices. Through its new digital platform, the bank offers a digital investment advisory that is based on artificial intelligence [35].

4.5. SWOT Analysis

4.5.1. Strength

DB is well-known across Europe. Due to its geographic, physical presence, and long history in Germany, consumers know the bank. The bank has a mighty brand name and a stable financial position, enabling the bank to enter any financial business it wants. Furthermore, the bank has a highly diversified product portfolio. DB's business divisions cooperate and create synergies by offering customized products to its customers. DB's ability to create any financial product at any time it wants is a definite advantage of the firm and differentiates it from its competitors. Lastly, due to its strong brand and excellent

reputation in the financial industry, many highly skilled and motivated people from top-tier universities strive to work for DB. The firm invests in learning and training programs to unfold its employees' potentials.

4.5.2. Weakness

Even though DB can create and market any financial product it wants, its complexity increases uncertainty among customers. DB relies on customers' trust towards DB advisors. DB's financial products, however, remain transparent and provides space for competitive attacks. The second weakness of DB is its lack of innovative thinking. The firm has all resources but does not engage in innovative activities. Instead, the bank has continuously responded to competitors' innovative financial products, losing more and more ground in the German market. They are also struggling to make their online platforms attractive enough to their customers to start using them, which can pose a significant weakness.

4.5.3. Opportunity

In recent years, customers' preferences and behavior have changed dramatically due to smartphones and the Internet. DB can use the Internet and self-developed applications to launch and market new financial products and create new revenue streams. These new sales channels and information sources can leverage the bank's understanding of customer behavior. Virtual platforms can also be used to conduct more effective customer acquisition initiatives.

4.5.4. Threats

Customer preferences and behaviors are changing steadily, which could threaten the existing branch network of DB. The role of physical branches is changing with customers' preferences. Digital solutions and services substitute services offered at DB's branches may lead to large restructuring measures. Additionally, the competition inside the financial industry intensifies. New agile players have entered the German market and digitalized almost the entire retail business. These Internet banks do not run any physical branches, allowing them to offer essential banking services for free. In combination with the ongoing low-interest environment, this puts pressure on DB's profitability [39].

5. Retail Banking Sector

5.1. General External Environment and Influence

The retail banking industry refers to banks providing direct services such as checking and saving accounts, investment accounts, and other banking activities intended to the general public. It mainly generates revenue through its loans and services [40]. In Germany, the sector is controlled not only by private, physical banks, also by public banks, like consumer banks, cooperative banks, and digital-only banks [41,42].

The emergence of new technologies and the utilization of smartphones have revolutionized various industries completely. The banking sector has caught this trend as it has completely changed the sector's habits. Thus, general public expectations have evolved. Indeed, IT-related services are nowadays more and more offered to customers. With a new generation becoming the workforce and looking for fast digitalized services, the banks mainly target those segments. Hence, we understand that this industry faces significant changes in its overall managerial, strategical, and structural organization to respond to their expectations and the hyper-competitive environment involving massive new actors. To satisfy the demand and retain their customer, customer experience is at the heart of retail banking issues [43]. Additionally, companies like Amazon pursue forward integration. For example, Amazon offers its credit card or cash payments at the front door [44].

However, the conservative German customers' preferences and the aging population have created a gap between them and some other European countries. As can be understood from Figure 1, the German population prefers cash over cards or e-payments and useless online banking compared to other European countries. However, there are still

countries using Internet banking even less. Nevertheless, there was no early adaptation from traditional German banking, and they are now struggling with core IT systems.

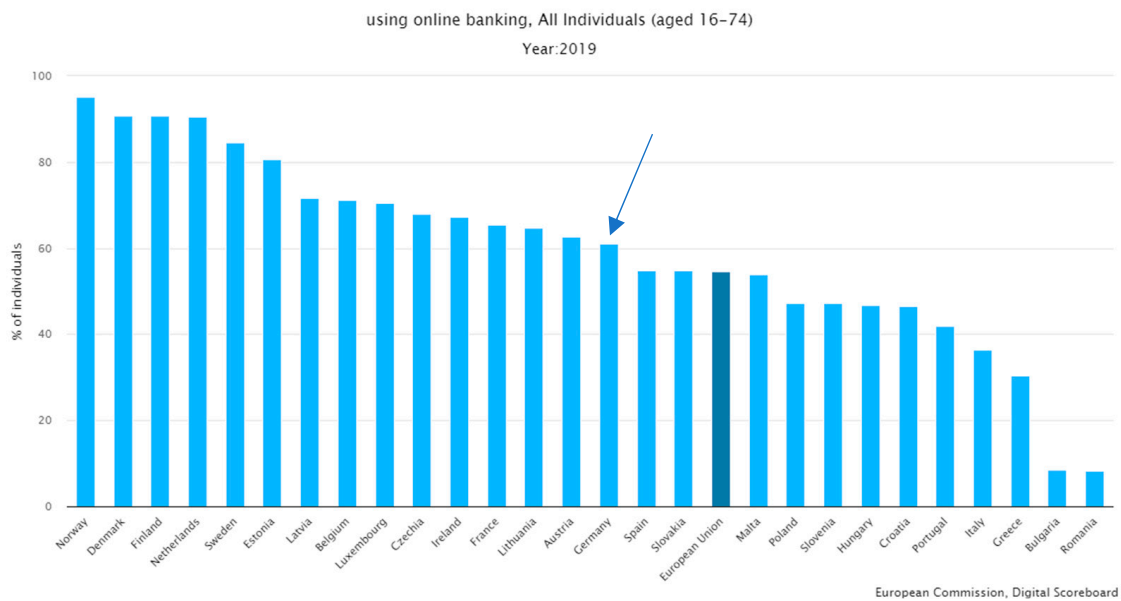


Figure 1. German use of online banking.

5.2. Competitor Analysis

Since competitors are the highest threat in the retail banking sector, the focus will be on these. Also, digital delay weighs on the traditional banking system’s overall profitability, while the threatening emergence of new entrants is natural with fintech and digital online banking. Nowadays, these forms of the mobile banking system are quite successful in Europe, such as the German N26 or the British Revolut. They are providing various banking activities with user-friendly features [43]. Thus, the attractiveness and profitability of Germany’s s banking industry’s current structure are challenged by the intensity of rivalry and the threat of new entrants.

The German banking sector has three different types of banks, all of which are considered universal banks, which means they carry out all banking activities. The first form is the private commercial bank. These were mainly aimed at customers in higher social classes. Private banks include DB, Commerzbank, and Ing-DiBa [41,45].

The other two types of banks (public banks and cooperative banks) have developed to serve other segments. The two are characterized by the fact that they have many branches to be as close as possible to their customers and maintain a personal relationship.

Sparkassen is a well-known example of a public bank. Here, every city or district has its bank. For example, there is the Sparkasse Frankfurt [46]. The most famous cooperative banks are Volksbanken [47]. A similar concept can be found here. Both firms focus primarily on private customer business and consider domestic business to be their primary concern.

Since they pursue a different business model, the following table will mainly compare private banks. In the first column is the Deutsche Bank, in the second Ing-DiBa. Ing-DiBa is a direct bank characterized by the fact that there are no branches, and everything is done online. They rely on a few but transparent products and, in particular, on their App [48,49]. It is a subsidiary of the Dutch bank ING Bank [50]. Another famous German direct bank is N26 [51].

Table 1 shows comparison between German banks and Norewigan. Table 1 omits Commerzbank because it has a similar business model to Deutsche Bank but is smaller (fourth-largest bank in terms of total assets in Germany [52]) and, therefore, less interesting to analyze. The third column shows the Sparkasse, one of the banks mentioned above,

whose business model differs from Deutsche Bank, but it is still interesting to see the differences [41].

Table 1. Comparison between German banks and Norwegian.

	Deutsche Bank [53]	Ing-DiBa [50]	Sparkasse [54]	DNB ASA
Revenue in 2018	342 million €	886 million €	1.8 billion €	50,368 million NOK equals to 5.03 million € [55].
Online Systems	Website and App, very modern and comprehensive [56]	Website and App, very modern and goes smoothly [48]	Website and App, but it looks not as modern as the others	Excellent website (online Internet bank), mobile bank application, mobile savings application, and mobile application to use when a person sell/buy a used car that helps with a safe transaction.
Number of Customers	More than 20 million	9,306,690	About 50 million	2.1 million personal customers [57].
Number of online Customers	Half of their customers, but the structure of their customers can be a problem in archiving more since the people that are not using the mobile services yet are older and less willing to learn [33,58]	All	No official number, but a survey estimates 46% [59]	1.5 million on their Internet bank. 935,000 on their mobile bank application [58].
Account fee	Different monthly fees: –0 € for young people –8.99 € Basis –11.90 € BestKonto [56]	0 €	Different monthly fees: –0 € for young people –2.95 € Online –1.95 € basis –7.95 € comfort, But additional fees for using offline services and different for each Bank [60,61]	The account and online services are for free. They charge customers a fee for debit cards. 0–18 years, and students can have one card per debit account for free. Other customers have to pay 295 NOK per year, which equals 30 € per year [62].
Branches	2064	0	17,530	57 [63]
Number of employees	91,737	4790	301,600	8969 [63]

5.3. European Banking Sector

If we compare the German banking system with other European ones, we can see that traditional banks reacted differently to the urge of digital transformation, creating a gap in implementing strategies. Taking the example of BNP Paribas, a French bank, they implemented a radical strategy to amend their whole business model, doing a partnership, acquisition, and digital renew to satisfy the demand in this changing environment.

Like other banks worldwide, they have a less physical presence and are gradually shutting down their branches to reduce costs. Moreover, they have invested a lot in digital transformation over the past few years to reinforce their operational efficiency and renew customer experience. Instead of competing with promising startups, they have preferred to partner or collaborate with them. That is why they are assisting more than 30 fintech through their Plug and Play Program.

Additionally, as most other banks, they have also developed a mobile application following smartphone emergence. This allows customers to have immediate access to accounts and several other features offered by their partners or fintech acquisition, such as LyfPay or Paylib. The first one allows customers to pay cashless with their mobile. The second one is an immediate payment system that transfers money through the smartphone to our contacts [64].

As we can see from Figure 1, Norwegian bank customers highly rely on online banking. Norway is placed first in Europe regarding how many individuals had used online banking during the year of 2019. The largest personal customer bank in Norway is DNB ASA, with its 2.1 million personal customers and 9000 employees [55]. They have the highest

market share in the Norwegian banking industry, considering only 5.35 million people live there [65].

Due to the changing environment and technological development, they have chosen to close many of their branches. From 2013 to 2017, they reduced their number of branches from 150 to 57 [63]. They had witnessed a change in demand—only 1% of their customers visited their branches [66]. Most of their customers had moved over to the digital platforms, communicated with the bank through their online chat, 24/7 customer service on the phone, or sent an e-mail from the Internet bank. Even though they have gotten many complaints about their decision to focus more on digital platforms, it seems like it has worked out pretty well.

Today, their online bank has 1.5 million users, while their mobile bank (App) has 935,000 users [62]. They have successfully met the new demand at the same time as they have kept their market share. DNB says that they are transforming themselves and moving on “from being a traditional bank to become a technology company with a banking license” [67]. Hence, they are continually working on new products and solutions that, of course, are technological.

One example of this is “Vipps”, a mobile app they invented where you can instantly transfer money to someone else by only having their phone number (both people and companies with an account). A person does not have to be a DNB customer to use this App, and in only three years, more than 75% of Norway’s population over 18 years have started to use the App. This App has now been separated from the firm, and other banks have bought shares in this new firm [68]. As previously mentioned, there are also new types of emerging banking systems.

Fintech has revolutionized financial and banking services these last years using new information, digital and artificial intelligence technologies. It is the case with Revolut, a British fintech, created in 2015. Unlike other fintech’s or startups, it has settled down by itself in this hyper-competitive industry. Thus, it is targeting connected people as the bank is working from a mobile application. It offers no fees on payments or international transfers and a pleasant customer experience as a multi-services bank with immediate treatment, including account management, international features with attractive rates, smooth transfer, insurance, crowdfunding services, and crypto money trade. This bank is consistently innovating to keep up with technology development and offer innovative services to its customers. Building on its success, this bank attracts more customers and is taking significant market share in the banking industry worldwide [43].

Another popular concept is Online banks, which only provide services online. An example is ING, a Dutch bank, who has no agencies. Unlike other online banks, it has launched Yolt, a budget management application, to collate all customers’ financial information, track their transactions and then provide an appropriate budget for their spending [64].

DB is lagging compared with European banks. They have an app and a website, but not many in cooperation with fintech (one with “Deposit Solutions” [69]), too many branches, and above all, not enough customers using the Internet banking.

6. Discussion: Red Queen Effect in the Banking Industry, and Open Innovation Dynamics

6.1. Discussion: Competitive Dynamics in Banking Digitalization and Red Queen Effect

Considering the external and internal analysis of DB, the group’s main problem is that they struggle to attract customers to their Internet bank. As the banking sector will inevitably move to online banking and because many competitors are challenging the market, DB can lose a lot of market share if they do not attract customers to their online platforms.

We have seen so far that there is a digital trend over retail banking. Several researchers [70–72] show that consumer demand has shifted—we find it more convenient to use banking services where we do not have to show up at the branch at a specific time. Foreign banks, which experienced tremendous digital success in their home countries by developing robust online banking solutions, are ready to compete with German banks in

their market. Second, fintech is more flexible, targets customers' new concerns, and poses a real threat to traditional banks. Finally, big tech companies such as Amazon also developed alternative banking solutions and are entering the market. In other words, customers no longer have to show up in a physical branch to pay bills, apply for a mortgage, or get financial counseling; many companies are now offering these services online.

In Germany, because of a preference towards traditional banking use (for example, nearly 50% of Germans' purchases are made by cash [73], the branches are still used by half of DB's customers. However, DB needs to be prepared for the future demands of online services. Moreover, many actors are entering the market to target the online banking segment. Following the recent trends, DB's competitors respond faster and aggressively to win the new race for digitalization. For example, ING thrives in Germany through zero-fee for online-only accounts. At the same time, ING makes a more straightforward process of opening new accounts, which helps Germans break their old habits. This strategy allows ING to win more than 50,000 new customers while other traditional German banks, including DB, struggled with outdated technology stuck in the branch-focus business model [74,75]. DNB ASA also responds progressively to the digital banking gathers pace by closing their old branches resolutely. DNB ASA turns to the dominator of the online banking sector in Europe by concentrating on building proper mobile banking applications Vipps downloaded over million times [76].

Facing these changes and the arrival of competitors, DB also invested a lot to get digitalized and developed its digital App to follow its accounts or benefit from portfolio management services by cooperating with fintech and even starting a new division. However, DB seems to react to the recent trend instead of being a market leader. They simply imitate their competitors for digitalization. DB still adheres to its branch-based business model, although banking environments and customers have changed. DB needs to find concrete solutions to attract young people to its online banking platform and move traditional customers over to online banking. Although Germans highly rely on cash, they are not as digitalized as customers in other countries such as France or Norway. For this tendency of German DB might not have to immediately adapt and change to their behaviors as other countries' banks respond to digitalization, but to keep their throne in the new race among retail banks, DB needs to act aggressively like their competitors or even run faster their competitors. When so many other traditional retail banks in Europe have managed to get most of their customers to use their digital services, this can likely happen in Germany as well. If DB stubborn their old business model and does not run twice faster than their competitors, the gap will be more significant and prominent in new banking digital channels.

6.2. Discussion: The Relation among Banking Digitalization, Red Queen Effect, and Open Innovation Dynamics

Due to the development of technology and rapid changes in the business environment, firms are exposed to an environment of intense competition. This made it challenging to create a sustainable competitive advantage, and the achievement of competitive advantage should be followed by innovative strategies [77]. Firms should pursue unique strategies to survive and develop in an environment of unlimited competition and profit-making. This study examines the competitive process of Deutsche Bank, which has been held a dominant position in the banking industry that starts to provide services online, to illuminate the results of firm behavior in the flow of competition. The success and failure factors of a company vary widely. Depending on which strategy the company pursues, it can lead to different outcomes. Thus, a case study was conducted to see the competition process of Deutsche Bank, which is the dominant bank in the German banking industry. Retail banks seek to solve the problem by digitalization to survive in an environment that is gradually becoming non-face-to-face.

Although Deutsche Bank could utilize its reputation or credibility, Deutsche Bank has shown a passive aspect of organizational change for the competition in the rapidly changing banking market by following changes such as creating applications or creating

homepages imitating competitors. Those simple imitations led Deutsche Bank to negative performance in the banking industry.

Deutsche Bank sticks with offline banking services based on a traditional face-to-face manner. However, as banking services became digitalized, competitors' digitalization rapidly gains momentum in the banking industry. Meanwhile, Deutsche Bank passively imitated its competitors, showing poor performance in the competition. The weak firms left the market due to intense competition, and the competitiveness level of survivors increased among surviving firms [16,17]. Nevertheless, as the intense competition continues over time, remaining firms are likely to fall into a competency trap [78]. Deutsche Bank has consistently performed well as a first-mover, but it is in danger of stepping down from its position while failing to adapt to a changing environment.

Deutsche Bank's case shows that firms need to run harder to defeat the rivals; however, DB's case implies how firms in the banking industry should evolve under highly competitive environments. If the Red Queen's race among banks maintains the status quo, every retail bank would be stuck in the same place. As the banking environment rapidly changes due to digitalization, the competition is no longer limited to retail banks. Instead, potential competitors would arise from advanced Information Technology. Under this circumstance, Deutsche Bank and retail banks would have to face their limits soon.

Consequently, all firms would fall into the commodity trap, which means firms will eventually be emulated by other firms [79]. The risk of commodity trap in the banking industry raises the need for open innovation in the banking industry. Open innovation would make firms act more proactively to the shortened technological changes [80]. Although this case is confined to the banking industry, a firm's innovative behavior is mandatory to survive in any sector. Therefore, to escape the endless Red Queen race, banks should focus on open innovation for overall banking industries' new value creation.

A firms' innovation is no longer comes from the single path or a company's ideas that closed off from the outside. Instead, since the environment is rapidly changing, firms need to leverage internal and external sources of ideas through open innovation [81]. For successful digital transition, the global banking industry also adapts open innovation strategies to chase up the pace of technological progress. According to Efma-Infosys Finacle [82], over 84% of banks have increased their innovation budgets and establish innovation divisions to drive digital transformation. Additionally, many banks encourage adopting open innovation by collaborating with Fintech startups or building partnerships with incubators or accelerators to harness innovation outside the company. Those open innovation strategies in banking industries would bring vitality for both banking and fintech through reciprocal actions. Simultaneously, open innovation will help to escape from lag in digitalization and guide the global banking industry's innovations.

7. Conclusions

7.1. Findings of This Research

This case study demonstrated empirically by conducting a single case study of how firms behave in competitive situations. It was found that it is difficult to survive if a company does not catch up with other firms in a changing environment. Deutsche Bank showed that firms could be left behind if they did not change their behavior to chase other firms. Additionally, even if a firm speed up to the changing environment, it will fall behind in the competition if it is relatively slow compared to the competitors. In the business environment, firms face many difficulties in the competition, and the reality is that it is too much to follow up with their competitors. From the Red Queen theory point of view, firms compete, and the firm's performance depends on who is relatively fast in the competition. Based on the above results, this study suggests that a firm must move away from merely copying other firms and quickly grasp another firm's competitive behavior and keep up with the changing pace.

7.2. Practical and Theoretical Implications

The findings of this provide the following practical implications. First, although firms had continued to grow and performed well in the past, they could fall behind in competition if they do not quickly adapt to the dynamic environmental changes. To survive the competition, it is essential to create innovative products or develop novel technologies. Rather than merely copying other firms' behavior, the company should quickly recognize environmental changes in advance and react to them promptly.

Second, this study showed that managers should pay keen attention to the actions of competitors. In particular, they need to evaluate the implication of competitors' actions to their current business accurately and develop strategic reactions to nullify the threat of competitors proactively rather than passively. In addition, managers should recognize that dynamic technological changes and fierce competition make the Red Queen Effect more prevalent and frequent in various and diverse industries.

Most of the competition studies so far have shown the impact of intensified competition on firms [1]. To complement prior studies, this study has explored how firms should react to the competition. To cope with the threat of competition more effectively, this study suggests that the firms must achieve competitive parity and outpace the competitors. Also, this study shows that competitive dynamics among firms exist and suggest that firms must move faster than their competitors to get ahead. Additionally, the case shows the necessity of open innovation to escape fierce competition and for developing in the entire global banking industry.

7.3. Limitations and Future Research Topics

This study has the following limitations. Since this study examined the competition process of Deutsche Bank, the findings of this study should be generalized by future studies. Also, there might be other variables that affect the firm's competition. Future studies through longitudinal analysis would be promising. In particular, as it is based on the importance of technical changes to online services in the banking industry, it is necessary to continue to observe changes in firms' competitive processes.

Author Contributions: S.L., conceptualization, original draft preparation, review and editing; Y.K., original draft preparation, methodology, review and editing; N.N.Q., C.D., M.M., K.E., R.B., investigation; S.C., supervision, corresponding author. All authors have read and agreed to the published version of the manuscript.

Funding: This work was funded by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF- 2020S1A5A2A01046005).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data available in a publicly accessible repository.

Conflicts of Interest: The authors declare no conflict of interest.

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