THE EVOLUTION OF FINTECH INDUSTRY: THE ROLE OF INTERACTION BETWEEN DISRUPTIVE INNOVATION AND ECOSYSTEM

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ABSTRACT. Disruptive innovations have radically transformed many industries at a time of information and communication technology and fourth industrialization. Salient examples such as Apple, Google, and Facebook reveal how disruptive innovations often emerge at the ecosystem or system level rather than individual firms. Unfortunately, there has been little attention in the academic literature about the role of ecosystem development and the evolution of disruptive innovations. To overcome the chasm, this study introduces the concepts of disruptive innovation ecosystems and clarifies how the financial technology (FinTech) ecosystem has transformed the financial service industry. Finally, this study discusses the evolution of the FinTech ecosystem and proposes a future research agenda on disruptive innovations and ecosystems. Our study shows that disruptive innovation ecosystems are deserving of further attention.

1. INTRODUCTION

Our industries and companies face an increasing number of disruptions and innovations that fundamentally change how companies operate [1,3]. Both practitioners and researchers have shown a strong interest in disruptive innovation and understand how disruptive innovation has influenced various firms

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and industries [4–6]. They have also been attracted to identifying the new approach to organizing economic activities under the dynamic, disruptive, and innovative environment referred to as the ecosystem [7–9]. Indeed, various innovations are created, evolved, and commercialized in the ecosystem, not by a single innovative organization [2,10–12]. Nevertheless, there has been limited knowledge of how the ecosystem is created around disruptive innovation, which, in turn, disrupt existing industries [2,6]. Very few researches have explored the interaction between disruptive innovation and the ecosystem, among which dominant of them examine how disruptive innovation affected the ecosystem [3,6,13]. Contrarily, there has been a dearth of attention on how the new ecosystems around the disruptive innovation developed and impacted the already established industry. Various studies suggested how the ecosystem of disruptive innovations can enhance the viability of innovations in the social and technical environment [12]. Some scholars also have found that the innovation was not disruptively emerged without the development of the related ecosystem in some industries, calling for further research on the investigation of the impact of ecosystem on the disruptive innovation [4,5,14].

In response to these requests, this study demonstrates how disruptive innovation ecosystems emerged and impact the already established industry. In doing so, this study will illuminate the concept of a disruptive innovation ecosystem. This study will then investigate the emergence of ecosystems in financial technology (FinTech) and its impact on the banking and financial service sectors. This study will discuss how new ecosystems around disruptive innovation create and influence the established industry. Lastly, this study will propose potential future research on disruptive innovation ecosystems. This study contributes to the related literature on a meaningful scale by progressing the research on the emergence of disruptive innovation ecosystems and their impact on established industries.

2. Theoretical Background

A. Disruptive Innovation

In his research on disruptive innovation, Christensen et al. (2018) [4] described the "disruptive" as an innovation that has no initiatory appeal to the established product’s dominant customers. It performs far worse than the existing
work in an essential performance dimension. However, disruptive innovation is attractive to a low-end user of the established products or markets due to its far exceeding produce offering in some other performance dimension(s). As technology continually progresses and improves its specific performance, customers of the original product(s) increasingly switch to the innovative products, whereby gradually eroding the use of the existing product and its market share [2,15].

The term "disruptive innovation" has been used in a broader sense to name any innovation that considerably changes its competitive arrangements [2,4]. This study follows this larger sense of disruptive innovation because the broader view is the most prevalent in the disruptive innovation debates among scholars, practitioners, and literature (e.g., [6,13,16]). Moreover, adopting an inclusive and overarching perspective is more common in the applied social science during the early stage of exploring a new research area. Thus, this study denotes "disruptive innovation" when innovation introduces new and previously neglected unique attributes instead of merely improving the product performance along the customer-preference path [4].

Christensen et al. (2018) [4] has highlighted why many incumbent companies are having difficulties with disruptive innovations. Mostly, firms tend to allocate valuable resources to well-established customer preferences and tastes. Likewise, financial aid and investment also tend to be allocated to certain types of innovation that favor existing customer desires. This makes the incumbent firms shying away from prioritizing the innovations that do not immediately attract current customers’ interest. Secondly, the incumbent firms worried that innovative new markets might erode their market. The creation of another market from the disrupted innovation may overlap with the existing market, which may motivate incumbent firms to withdraw to assured higher ties of the existing market as disruptive innovation penetrates the low-end market.

Previous studies also reviewed how incumbent firms can strategically respond to competitors with disruptive innovations [4,17]. Some of the leading options would be an additional investment on the current customer-preferred trajectory to withstand the disruption or shift to other market segments. A salient alternative is implementing an ambidextrous organizational structure by engaging in
different innovation types and partnering with disruptive innovators via licensing and acquisition. These types of strategic responses contribute to the existing firms to reduce the failure from disruptive innovation.

However, the literature argues that the incumbent firms may encounter somewhat distinct opportunities and challenges when disruptive innovation emerges from an ecosystem rather than a single innovative firm. On the one hand, the ecosystem as a multi-firm blended system tends to be more resourceful than an individual innovative firm. The higher resource endowments in the ecosystem could restrain the incumbent firm's effort to countering the disruption and weaken its ability to license or acquire the disruptor’s technology. On the other hand, the multi-firm nature of a disruptive ecosystem could allow incumbent firms with favorable conditions to participate in the ecosystems than when an individual firm creates disruptive innovation. Such a difference between an ecosystem and an individual disruptive innovator draws the attention to this study. Recent studies by Kumaraswamy et al., 2018, p. 1027 also assessed that numbers of innovations from Uber, Netflix, and Apple serve as a systemic platform to disrupt the existing relationship among entire industries and ecosystems and create dynamics of disruptive innovative ecosystems.

**B. The Concept of Ecosystems**

The use of the term "ecosystem" has been flourished among business scholars and practitioners since its first introduction to business and management studies in the mid-1990s. The concept of "ecosystem" first appeared in Moore's May/June 1993 Harvard Business Review article, in which Moore defined "ecosystem" as: An economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments, and to find mutually supportive roles as mentioned in Moore, 1996, p. 26.
Although Moore did not build a precise and symmetric comparison between business and natural ecosystem, his metaphor had led many business scholars and practitioners to a wide range of application in their research [8, 20]. Some of the subsequent vital developments of ecosystem studies are customer-based solutions and technological platforms, which advanced ecosystem studies much narrower than Moore’s initial proposition [21–23]. The former emphasized that innovation must produce systematic and customer-facing solutions within the ecosystem. In contrast, the latter stressed the role of technology platforms in which platform sponsors and complement provide customers’ present value. The two mainstream advanced ecosystem research into a new phase; the ecosystem is an economic association of interacting organizations offering multiple solutions to customers and presenting more than one platform.

Scholars widely acknowledge that ecosystems are split into smaller ones with lots of complementarities in production and consumption. Thus, members of the ecosystem can coordinate to achieve complementarities without hierarchical control [8, 24]. Given the complementary condition, the ecosystem members keep showing significant interdependence without the contractual contract [8]. As a result, the benefit of individual ecosystem members mostly relies on the ecosystem’s destiny altogether.

C. Disruptive Innovation Ecosystems

Much of the ecosystem tend to be inherent in the industries. In particular, the mature industry’s ecosystem is relatively deep-rooted in terms of organizational members, activities, market position, interfirm relations, etc. Any changes in such a stable ecosystem tend to be the taken-for-granted character of routine-as-truce rather than influencing the structural arrangement of multilateral positions at the individual or dyad levels [7, 25]. These changes may include a new product launch through existing distribution channels and the appearance of a new rival in the same market positions, creating new structural alignment at the individual or dyad levels. The ecosystem becomes apparent and critically requires new thoughts on crafting and understanding strategy when innovation changes the elements and dynamics of ecosystem configuration [7, 16].

Christensen et al. (2015) [26] assert that the junction of disruptive innovation and ecosystem deserves our special attention since the disruptive innovations are likely to unsettle the configuration of the existing ecosystem greater
than non-disruptive ones. This study integrates the concepts of disruptive innovations and ecosystems and defines the disruptive innovation ecosystem as an economic community of collective and interdependent actors. All members seek to coevolve around innovation without much hierarchical governance and order. However, the coevolution does not entirely strive for enhancing organizational performance and customer satisfaction that the market has been traditionally valued but rather for some of the new aspect that has been hitherto ignored by the existing economic actors. In the disruptive ecosystem, individual and organizational members interact to represent complementarities in producing and consuming the product/service associated with the innovation [17].

The innovation studies posit that disrupted innovation can develop into the incumbent market’s dominant position [4,26]. Such development is more likely to be enhanced and effective when disruptive innovation is ingrained in the industry’s whole ecosystem than a single organization advances it. Members of the ecosystem complement and escalate the disruptive innovation remarkably, which will attract the customers’ consideration [21]. Furthermore, disruptive innovation may grow faster in a multi-company ecosystem because a larger number of backing firms can be a source of forceful legitimacy. Such legitimacy effect can increase the acknowledgment of the innovation by investors, regulatory entities, policymakers, and society, who tend to count on innovation more when its consequences do not rest on a single innovation actor [27,28]. With this assumption at hand, this study depicts how the FinTech ecosystem is created and evolved.

3. Method

A. Context of research

Well established industries such as banking and finance, insurance, and manufacturing fields have been disrupted by digital technologies [29,30]. This study sheds light on the emergence of financial technology (FinTech). Recently, FinTech has emerged rapidly and reshaped the financial service sectors through cryptocurrency, artificial intelligence, and online payment. Growing numbers of FinTech users prove that FinTech is now a new consumer banking and financial industry domain.
The underlying business mechanism of FinTech is that a FinTech company provides information-technology based service solution to all ecosystem members such as individuals, banks, and institutions with increased efficiency in financial and banking transactions. FinTech has opened up a new way of financial service and asset management. The emergence of FinTech has created a new business ecosystem in which lots of new actors interact and converge with their innovative competencies, generating a new business model and competitive factors. There are numerous subfields in FinTech area, introducing disruptive innovation in traditional banking and financial services. Amid continuing investors' attention in cryptocurrencies, other FinTech services such as InsurTech, robo-advisors, and cross-border remittance have been strongly recognized in recent years. FinTech thus offers an appropriate research opportunity in the study of disruptive innovation ecosystems.

The FinTech industry has received a considerable investment recently [31]. Total investment in 2016 reached almost USD 33 billion, which is ten times increase from two previous years. The US has led the FinTech investment for years until the rise of China in 2015. Since 2016 the two nations triggered the continuing expansion of the FinTech investment in other developed countries such as Germany and the UK.

B. Data

Due to the limited knowledge and data availability, the explorative qualitative research method, mostly reliant on the secondary data, has been used in this study. This study also conducted 20 professional and expert interviews with senior-level practitioners or analysts in South Korea from Oct 2019 to April 2020. They were working on the global financial market ranging from commercial banks to privately-run fund managing companies. The interviewees were chosen based on their industry experience of a minimum of eight years, and their positions were diverse, ranging from investment analyst, fund manager, compliance officer, regulator, and trader. The interview went for approximately 40 minutes or so.

The interview questions asked interviewees' views on how the emergence of FinTech disrupts the current banking and financing system and structure a new ecosystem. Before these questions, this study also gathered information about major financial institutions through media reports. The information contains
how they adapt to the transformation of new financial technology, how FinTech would be categorized as a new type of business in relevant fields, What would be the potential opportunities and threats in FinTech industry, and how other players in the market react to the FinTech transformation. This study also reviewed lots of industry reports, newspapers, and economic magazines on relevant issues.

This study adopted the Corbin and Strauss’s approach to establishing a grounded framework for a disruptive innovation ecosystem in the FinTech industry [32]. This approach requires iterations of numerous data sets to uncover various themes to establish grounded frameworks upon emerging new phenomena such as a path to a disruptive innovation ecosystem. The typical procedure of this approach is open-coding documentation of standard terms, identifying theoretically and empirically valid themes, and generating illustrative frameworks. To ensure rigor, reliability, and trustworthiness of the analysis, members of the research center at this institution were joined to discuss and modify the coding scheme with consensus.

4. Research Findings

A. Emergence of financial technologies

The banking and finance industry has been progressed by the emergence of new financial technologies. This study found that such transformation has been largely through four stages of advancement in which FinTech related disruptive technologies and startups continue generating new types of competition, cooperation, and industrial ecosystem. The established FinTech ecosystem has had a significant impact on the structure of the incumbent businesses.

Stage 1: Financial community network

At this stage, electric banking and financing provide services to customers through automated and networked financial information by applying information and communication technologies. These financial information networks are primarily divided into individual financial institutions’ internal information networks, the financial community networks that interconnected them, and the customer service networks that customers can use. At this stage, the Commission sought to streamline the operation of Windows by establishing an online
network within each financial institution and automating the handling of market
tickets through CD/ATM and Giro. Individual financial institutions established
automated business systems and formed a financial network to provide joint
network services. Through this process, customers can use financial transac-
tions that were handled only by individual financial institutions conveniently
and quickly in the cooperative network. A typical example of a cooperative
network structure was the joint network service of banks such as CD Commu-
nity Network, Currency and Fund Management Service (CMS), Securities and
Exchange Settlement System (SUCCESS), and Automobile Insurance Integrated
Inquiry System (AIIS).

The joint financial network significantly contributed to integrating the entire
country into a one-day settlement. The development of a new payment ser-
vice ensures that each financial institution maintains legal and minor indepen-
dence while operating closely with other institutions regarding fund settlement
functions. Financial institutions greatly enhanced convenience and efficiency;
customers were conducting real-time financial transactions such as deposit and
withdrawal transactions, stock trading, subscription, and loans in Internet space
without facing each other at the existing branch windows. Besides, new elec-
tronic payment methods such as e-money have been developed in each country,
including South Korea, replacing cash in daily life and being used as a payment
method in e-commerce. However, awareness of electronic banking's reliability
and safety has been highlighted as various security incidents have occurred on
non-face-to-face channels, and the damage from electronic financial fraud has
increased through specialized hacking technologies.

Stage 2: The advancement of electronic payments

The advancement of the Internet and smartphones has expanded the ubiquity
of electronic financial exchanges through online account management, banking,
and mobile payment. The move from conventional cash to digital cash has
obscured the line between money and digital information. Exchanges such as
paying for taxi fare and eatery bills can be made utilizing software programs
and applications. Customers presently use more digital payment method by
installing numerous digital payment applications.

Emerging innovations in cash exchange on the web offer new business oppor-
tunities for the private sector and non-private sectors. Low-cost and open-source
innovations such as blockchain permit businesses to reach a far more number of clients in neglected and fragmented markets. Companies can also focus on poor monetary service and administrations inaccessible under the existing financial infrastructure and systems. These contain online digital cash payments, cash exchanges, and online financial loans. Moreover, technological innovation offers an expansion of global e-commerce and its related job creation.

Creating a FinTech environment is critical for stimulating more efficient financial markets and related services via technological innovation. An established FinTech environment and ecosystem can also pull in more prominent business ideas, which produce more business opportunities in numerous fields such as electronic payments, insurance, cross-border remittance, asset management, and trading administration platforms.

**Stage 3: Blockchain and cryptocurrency**

The blockchain and cryptocurrency category consists of companies offering blockchain innovation and cryptocurrency technologies. Blockchain is known as a shared database that supports various cryptocurrencies. A cryptocurrency is a computerized digital resource that uses cryptography to empower the secured exchange. Bitcoin is the most well-known cryptocurrency.

Companies in this category offer a vast extend of service. Cryptocurrency mining companies mostly create equipment and program to mine cryptocurrencies. Many companies in this category deal with money exchange by providing a platform for cryptocurrency trading. These platforms permit their clients to trade cryptocurrencies for fiat cash. A few companies work to provide cryptocurrency storage service, and other companies in this group operate peer-to-peer (P2P) platforms and loan platforms. Various local Bitcoins, Coinia Wallet, and Prasos are the example in this area. Blockchain is likely the primary term that comes to us regarding FinTech cash. The blockchain is a shared database that has pulled in significant consideration from people recently. It is best known as the innovation that underpins Bitcoin and other cryptocurrencies. Much appreciated to the ubiquity of Bitcoin, blockchain has picked up competitive advantage and thrust.

Blockchain and business models for Bitcoin exchange still have a limited number of users. The Bitcoin transaction in trade is still small in comparison with the overall financial market. However, their effect has been eminent, as witnessed
by expanding investment in blockchain, including Bitcoin and other cryptocurrencies.

Blockchain innovation and its potential applications have received numerous innovation representatives within the financial industry since their benefits are not negligible. Although a few investment banks have been doubtful about the high risk of security breaches and extortion amid financial exchanges, many of them have lauded Bitcoin’s innovation as a useful one that encourages a range of results [17]. For instance, blockchain innovation permits security dealers to connect directly without a third party when they trade stocks. All exchanges can be recorded nearly instantly. Hence, the financial industry has sharpened blockchain’s advancement due to its potential applications in streamlining monetary exchange and extending services to clients. Some of the leading investment banks in Korea, such as KB security bank and Kium securities, are seeking business opportunities in association with newly established counterparts.

**Stage 4: Artificial Intelligence**

Recently, artificial intelligence starts to lead the innovation ecosystem. Unlike natural intelligence, artificial intelligence is intelligence demonstrated by machine. Artificial intelligence in the finance field indicates a mechanism based on a specific algorithm embedded device to interpret and perform specific financial tasks. The devices may be digital traders, digital brokers, or robo-advisers used in security trading, tax and management, currency exchange, and international trade decisions. Artificial intelligence provides a high degree of improvement in automation, proficiency, and efficiency in the financial platform of investment and portfolio management. Well established financial products and services in the prestigious banks are receded from the market as a customer’s need for artificial intelligence service emerges. Many incumbent players encounter critical challenges in adjusting to new financial market environments; new players take over incumbents’ places, becoming the key players in the new business environment. Artificial intelligence is found at the center of many product and technology changes in many financial systems. RegTech (regulatory technology) and wealth management are core cases of Artificial intelligence applications. RegTech indicates FinTech companies helping the customer with compliance process and Wealth Management indicates companies providing alternative technology-based services in asset management and solution.
B. Advancement of Financial Technology Applications

1) Digital Banking

FinTech companies offer a new service solution for commercial and retail banks. Their services incorporate personal finance, online banking, mobile banking, digital loan, wealth management, and P2P loan. P2P loan companies permit their clients to access funds on P2P loan premises, with clients borrowing straightforwardly from money lenders. Some companies offer direct digital lending services to money borrowers, offering personal finance and wealth management. They provide equipment, tool, software, and advice for customers to manage, plan, and decide various financial accounts and services. OK Finance Group and The SCOOP are leading Korean firms in this area.

The advancement of smartphone technology contributes to the increasing demand for online banking [33]. According to the Bank of Korea, the number of mobile banking users in Korea stood at 102.95 million. Young consumers aged between 18 to 24 years are reportedly the primary mobile banking users [33].

The advent of smartphone technology has created new digital banking opportunities that exclusively provide online services through many digital applications. Without offices and physical equipment, the latest generation of FinTech service dramatically lowers brick-and-mortar costs. FinTech digital banks, free from the expense of physical locations, offer customers lower rates and fees along with innovative services. Banking platforms can deliver more user-friendly services to meet individual consumers’ needs by leveraging FinTech and related technology’s advantages. Digital banks provide customers with connectivity the whole day without visiting a branch for service during working hours. A recent study showed more than 90 percent of banking transactions are conducted on non-face-to-face channels in South Korea. The percentage of customers looking for a window is less than 7% [33]. Customers have changed their service preferences toward digital and online banking; they demand easy-to-use digital services with smooth approval and procedures. Digital banks are better at allocating their resources to support and improve the digital experience of the customers.

Digital banks have tremendous potential as well as challenges. Most of all, many customers are still hesitant to move from their current bank accounts into new startup bank accounts. According to a recent survey in Korea, more than
50% of respondents at the age of 50s still believe in the importance of local bank branches, and 75% of respondents over the age of 60s refuse to open an account with a bank with no local branches [34]. This challenge has put digital banks at a substantial disadvantage in comparison with conventional banks. Nevertheless, digital banks’ status will shift for a better position. Their effect on the financial service market will be far more critical when digital banks gain public trust and acknowledgment.

2) Digital Payment

One of the largest components of FinTech business is a digital payment, also called FinTech payments. The services of FinTech payment range from customer personalized needs to security trading and e-commerce. Point-of-sale (POS) payment services are offered at the digital storefronts. Digital storefronts, also called cyber storefronts, refer to websites offering goods and services. Personal payment or online payment are other types of digital payment services that FinTech companies provide. Some payment companies provide Bitcoin payment services to meet the need of the emerging cryptocurrency trend, enabling consumers to use fast and safe digital currency payment. Some businesses in this group also provide a fast and inexpensive digital solution for money transfer. Notable Korean FinTech payment companies include Samsung Pay, KakaoPay, Toss, and NaverPay. Samsung Pay is the most popular payment solution with 11.94 million users, followed by Toss with 7.7 million users monthly in 2019.

3) Crowdfunding

Crowdfunding companies provide digital platforms to raise funds for startups at the early stage of growth in the roadmap of the angel or venture capital investors. Crowdfunding is a way for people, companies, and organizations to raise funds through donations or investments through the Internet. There are four types of crowdfunding: reward-based, equity, and debt crowdfunding [35]. Businesses vary in the types of crowdfunding investment ventures. Crowdfund is the most active FinTech business in Korea. Deregulation of the Korean government drives the crowdfunding project expanding. The investment areas are not limited to cultural industries, technology developments, and industrial property rights projects anymore. The annual stock issuance is raised from 1.5 billion
Korean won to 3 billion Korean won. Twenty-six crowdfunding firms are in business as of 2020 in Korea.

4) InsurTech (Insurance Technology)

The InsurTech companies are FinTech companies working on providing innovation-based insurance services. InsurTech refers to the use of technology innovations formed to extract savings and efficiency from the current insurance industry model. InsurTech is a combined word of "Insurance" and "Technology," inspired by the term "FinTech." The policies and services that InsurTech companies offer vary from health care, annuity, and housing insurance. InsurTech companies have adopted disruptive innovation business models in which lots of clients connect and collaborate to secure them against any risk. Peer-To-Peer insurance is a classic example. With the help of artificial intelligence, some InsurTech companies allow their customers to modify their insurance policies. Such providers have made customer insurance more accessible and user-friendly by offering online purchase and insurance scheme tracking. Rich Planet, a Korean no. 1 integrated insurance management platform company, has recorded more than 4 million cumulative downloads of InsurTech application, the most downloads among domestic ones.

The insurance industry is aggressively leveraging the technical advantages and benefits extracted from FinTech applications. The InsurTech has grown faster than the conventional insurance industry. Dominant insurers believe that the digital ecosystem strongly influences the insurance market and continuous innovation is necessary to maintain a competitive advantage [36]. However, complicated regulations and massive capital requirements increase the difficulties of accessing and joining the digital insurance ecosystems.

Venture capital funds increase their investment in InsurTech companies recently. As InsurTech improves traditional insurance efficiency and becomes one of the most fast-growing segments in FinTech ecosystems, investors intend to seize the market opportunities from this burgeoning segment. Global investment in InsurTech has been doubled from 2014 to 2016, reaching USD 1.7 billion [36]. The US leads InsurTech with more than 50 percent of total deals, closely followed by countries such as the UK, France, German, and India, with high investment growth [36].
The concern now is whether the growth of InsurTech will challenge the current insurance market. While conventional insurance companies confront intense competition from the disruptive innovation from InsurTech, existing consumers still strongly trust traditional insurance companies for account security and fraud prevention. However, InsurTech companies cooperating with conventional insurance firms have a strong potential to enhance efficiency and optimize the operations of dominant businesses. Existing companies may be reluctant to adopt disruptive innovation technology, but they collaborate with InsurTech startups to enable their services to be digitally transformed. Increasing collaboration would make it possible for InsurTech companies to rejuvenate the ecosystem of the whole insurance industry.

5) RegTech (Regulatory Technology)

RegTech refers to FinTech companies that assist clients with the enforcement process. These companies have devices using innovative technologies to enforce and track compliance with rules and regulations. They support clients in managing and minimizing risks related to rules and regulations. Concentrating on governmental regulations, RegTech companies provide an instrumental platform for detecting legislative and regulatory research, including prevention of anti-money laundering and assistance of consumer-reach. RegTech in Cybersecurity delivers consumers with a means to identify compliance breaches and protocols of information security, tax control, and trade management. The US is at the lead of global RegTech, accounting for 74 percent of the total global deal, followed by the UK with 10 percent of the worldwide deal [37]. Ireland, Netherlands, Switzerland, Germany are also increasing their activities in the RegTech area. Korea is at the beginning stage of the RegTech industry, which is mostly led by the Korean government. The Korean government wants to use RegTech to maintain a proper level that does not harm existing financial infrastructure, thereby driving traditional financial institutions and new FinTech companies to achieve balanced growth. As part of the effort, the Financial Supervisory Commission launched the RegTech Development Council in 2019, promoting the system to many banks and companies.

Several governments worldwide have paid attention to the technological disruption caused by the rapid advancement of FinTech, the digital economy, and virtual currency. New regulations and policies have been introduced, such as
International Financial Reporting Standards (IFRS 9) and Financial Instruments (MiFID II), forcing institutions and governments to quickly adopt and enforce compliance rules. Some governments have proven unprepared for rapid technological transformation. RegTech has, therefore, grown to meet this need to tackle regulatory challenges. The new regulatory environment becomes burdensome to current businesses. Many companies have to devote more time and resources to regulatory compliance—however, startups in RegTech experience real business opportunities with innovative and creative solutions.

6) Wealth Management

Wealth Management FinTech provides alternative service and technology-based solutions for wealth management. Some examples are robo-advisors, portfolio management, and investment platforms. The robo-advisors are the most noteworthy in this category. Robo-advisor refers to companies offering platforms for automated investment. The Wealth Management FinTech aims at both business and retail customers and builds its competitiveness in easy accessibility, flexibility, and cost-efficiency compared to traditional Wealth Management services. Robo-advisor platforms help customers with personal investment portfolios based on their risk profiles and investment objectives, whereas Robo-retirement focuses mainly on managing retirement savings accounts.

Wealth management FinTech companies develop platforms for exchanging and trading financial assets, including bonds, stocks, foreign currency, and other asset classes. Specifically, digital brokerage offers online brokerage platforms to trade financial assets such as bonds and stocks. Some companies provide the platform-based financial advisory service selling their investment portfolios appropriate to individual customer’s needs. Many alternative wealth management services have been created, such as Hedge Fund Tech and social investment networks. The former offers software or platform-based solutions for Hedge funds investment. The latter helps investors interact and share peer’s investment strategies.

Competition between financial companies and FinTech startups for wealth management has started in Korea. Their goal is to secure customers with services that comprehensively analyze all financial information and provide customized recommendations. The number of FinTech companies in South Korea
increased from 62 in 2011 to 303 in 2019. About 16 percent of them are doing business in the wealth management area.

Indeed, robo-advisors are the critical disruptive technology in online investment as they have been the most often referred to in the FinTech industry. The key benefit of robo-advisors is to satisfy the growing number of clients by providing customized financial services. The incumbent financial advisory firms find it more challenging to analyze the financial information and market research data while advising many customers’ financial inquiries. With the help of robo-advisors, new robo-advisor startups enter the financial advisory market with the solution to solve complicated data processing and market research.

Whereas traditional wealth management services are restricted due to limited online technology and platform capabilities, the robo-advisor startups have overcome this limitation and accessed a new market by leveraging the emerging mobile and cloud technologies. A recent survey revealed that 45 percent of the aged 20 to 30 respondents already receive robo-advisor services for their private investment and retirement plan [38]. However, there are also growing concerns about this emerging technology as flaws have been potentially inherent in algorithms for financial advice and data security.

C. Emergence and development of disruptive innovation ecosystem in FinTech

The FinTech ecosystem is made up of lots of technology companies, startups, and global institutions. It is complicated to list all those players in the primary segment of the financial and banking industries. Nevertheless, it is probable to lay out the global FinTech ecosystem of banking and finance industries if we combine the current players’ technological orientation and FinTech industrial segments from recent startups. The emergence of a thousand FinTech startups from various subfields has transformed the banking and finance field. It has been witnessed that the emergence of the FinTech ecosystem has made a significant and systemic impact on the existing players, as seen the Figure 1.

This study proposes four stages of ecosystem evolution. The first stage is the emerging and growth stage of the new industry. As information and communication technologies are introduced in the banking and finance industry,
existing players try to adopt a new system by introducing recent financial transactions such as e-payment and online banking. Simultaneously, they form various joint networks to provide more efficient and convenient services to the market. Although incumbent players intend to increase institutional legitimacy upon emerging new technology trends through collaborative efforts, there are substantial uncertainties from the whole market. No disruptive innovators’ activities are yet noticed at this stage.

The second stage is the growth stage of the salient industry, which generates a path for technology innovation, such as digital payment and crowdfunding via embryonic cooperation with existing players. With the support of the new venture and startups, the current players endeavor to improve their capability to attain rising technological innovations. For instance, in digital payment, the established commercial banks have collaborated with technology startups to provide new payment methods through mobile phones or the Internet. These functions have been helpful and useful to existing players since they can complementarily utilize their tangible and intangible resources. However, in this stage, few financial supports are available due to the limited number of startup ventures.
The third stage is the maturity stage, in which radical, innovative technology such as blockchain and cryptocurrency is introduced to the market. New startups mostly drive these technologies, and conventional institutions try to adapt and exploit them in their transactional practices. The growing volume of digital transactions has slowly replaced physical money or traditional cash in data format. A recent report also notes that physical money is quickly becoming superfluous in the digitalized world [39]. This stage, in particular, tends to be too uncertain and disrupted. New startup ventures start to occupy market share, and incumbent companies try to collaborate with them since they have a suitable investment. By doing so, large incumbent players can rapidly adapt to an emerging new ecosystem, benefitting from technological innovations. As the FinTech market grows, some large players and new startups cannot exploit the market opportunity and innovative projects due to financial risks; this creates a more significant inflow of venture capital to fund these risky but disruptive innovation projects.

The fourth stage is the transformation stage; outstanding startups begin to occupy a considerable market position and acquire a particular share of the market sufficient to reshape the structure of the market; incumbent players encounter the risk of being ousted from the market. This stage positively transforms the industry. The incumbent players lose their influence on the market, and new startup ventures strive to increase the market power instead. Previously outstanding banking services and financial products disappear as new types of customer needs emerge. Customers demand more customized financial services and wealth management plans aided by artificial intelligence. Only very few incumbents can adjust their business model into a new innovative environment, and existing dominant players are battling to survive. However, several new startups can expand and conquer a significant venture capital infusion. Moreover, they start to provide new types of technology applications such as RegTech and InsurTech.

5. Discussion

The literature on innovative technology and its new business models tend to pay significant attention to its effect on the incumbent market mechanism whereby existing products and technologies are supplanted by disruptive innovation [26,40]. Most research in this field has investigated how entrepreneurial
new ventures impact the existing businesses by creating disruptive technologies and new business models during exploring and practicing an essentially different business solution (for a review, see Christensen et al., 2018 [4]). While previous studies have led our understanding of how individual disruptive companies affect current industries, it has not addressed the critical motivations and collective power in which numerous entrepreneurial startups work together [4, 41, 42]. This study tries to fill this gap by highlighting the financial influence of the disruptive innovation ecosystem in the FinTech industry. Understanding the underlying disruptive innovation ecosystem allows the related research to a broader framework through which a new research proposition can be suggested within a more massive incumbent business structure [20]. This study would tell broader insights into underlying disruptive technological innovation of entrepreneurial startups and how existing businesses deal with new types of competition by adapting their business models into new technologies. The new types of competition would create an innovation stage where the incumbent and new players impact each other through new business models.

Previous research has demonstrated that disruptive innovation has vast implications by emphasizing the impact of individual players. This study points out the chasm in the previous approach by scrutinizing the notion of a disruptive innovation ecosystem. This study contends that disruptive innovation research is not replete without understanding the concept of the disruptive innovation ecosystem. Based on the exemplar case of FinTech and its ecosystem, this study delineates how the FinTech ecosystem has created and transformed the entire sectors in the banking and finance field.

This study concludes that the evolution of FinTech in the bank and finance sector renders us clear information. The disruptive innovation research should not ignore the collective power of new players’ innovative but disruptive activities, which may transform the whole business ecosystem into a new direction. In the case of this study, the disruptive force of FinTech comes from the evolution of ecosystem players. The emerging technologies, together with interdependent actors, created new types of FinTech services in banking and financial sectors. This unprecedented business environment opened up new business opportunities to newly created and existing players. The disruptive innovation will erode the dominance of incumbents. The FinTech ecosystem’s power was feeble at the beginning stage, but it revolutionized the banking and financial industry into a
new industrial trend at the later stage. Based on the description of the disruptive innovation ecosystems using the case of FinTech, this study has demonstrated how a group of complicatedly but closely related players in the FinTech ecosystem establish and progress a path along a technology trajectory. This study finds that the participants in the ecosystem coevolve and establish interdependence that incorporates a knowledge spectrum to maximize value via quicker, smarter, and more innovative value propositions. This study evinces that companies benefit the whole ecosystem on a similar range of technology and capability. This study also reveals that the role of investors and startup ventures are decisive in technological development and disruptive innovation system. A growing number of scholars point out that disruptive innovations forge ahead through the ecosystem instead of any outstanding individual companies [1][2][10][12]. Many academic endeavors are necessary to narrow the gap in research on the interaction between disruptive innovation and the ecosystem.

In sum, the existing studies have examined disruptive innovation from the perspective of individual companies, mainly focusing on the focal one in the emerging ecosystem. Unfortunately, this approach has only tackled the key players’ role without mentioning the broader context of disruptive innovation. Unlike in the traditional approach, this study closely observed how the FinTech ecosystem has evolved through the disruptive innovation system by presenting a convincing case.

However, further investigation is highly needed in the mechanism in the wake of ecosystem development. A potential avenue for further scrutiny would be, for instance, what other characteristics among ecosystem members make the disruptive innovation more or less distinct, and under what situation, if any, individual companies rather than an entire ecosystem better develop the disruptive innovation. Additional inquiries would be more focused on the nature of the ecosystem itself. For instance, ecosystems are variant in creating various disruptive innovation; then, under what situation do various ecosystems make different disruptive innovations whereby incumbent industries are heavily transformed? At what stage of the ecosystem does the transformational effect of the ecosystem start to be greater than the individual innovating firms?
6. CONCLUSION

The academic literature has paid scant attention to the role of the ecosystem in creating and advancing disruptive innovations. This study introduces the concept of disruptive innovation ecosystems and epitomizes it by developing the disruptive FinTech ecosystem. Also, this study briefly a direction for future research. Based on this proposition, this study hopes to initiate new insights to motivate scholars to further conceptual and empirical research on the junction of disruptive innovation and ecosystems.

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