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Article

# Integration of Financial Innovations and FinTech

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**Abstract:** The purpose of this article is to address two questions that will aid researchers in understanding FinTech's inception, development, and potential impact on the stability of the financial system. First, it explains why financial technology is a current phenomenon. While many of the underlying technology for FinTech breakthroughs have been around for some time, it is only recently that financial institutions and entrepreneurs have begun to apply them to financial goods and services. Supply and demand factors in "conventional" financial innovation have been studied, and they have been found to converge, leading to a high rate of innovation. And second, this article explains why FinTech is being covered in greater depth than other types of innovation. This study introduces the concept of "depth" of innovation as a means of answering this question. The more fundamental the innovation, the more it will affect the financial sector. In this paper, we demonstrate that many recent developments in the field of financial technology (FinTech) are truly revolutionary advances, with far-reaching implications for the financial services industry. In addition to the benefits of more adaptability, higher transformational potential might bring increased risk to economic security.

**Keywords:** Financial Innovation; FinTech

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## 1. Introduction

The field of financial technology is currently receiving significant attention. The financial press seems to publish articles on its disruptive potential on a daily basis, the word "Bitcoin" has been formally added to the English language, and the total amount invested in FinTech throughout the world surpassed \$20 billion in 2017.

The manner in which FinTech will change the character of the financial environment in the future is an important question. If we were able to provide an answer to that question, it would shed light on a course of action that regulators and supervisors may take to guarantee the security and reliability of the international financial system (He, Zhang, & Li, 2021). However, providing an appropriate response to that inquiry is not simple at all. It may be helpful to gain a grasp of some of the fundamentals of FinTech in order to comprehend its expansion and the excitement that surrounds it (Dwivedi et al., 2021).

Two questions about FinTech's history and development are addressed in this essay. First, it explains why financial technology is a current phenomenon. While many of the underlying technology for FinTech breakthroughs have been around for some time, it is only recently that financial institutions and entrepreneurs have begun to apply them to financial goods and services. So why now? The answer to this complex topic can be somewhat gleaned from studying the forces of supply and demand that motivate "conventional" financial innovation.

Also, this essay explains why FinTech is being praised while more conventional forms of innovation are overlooked. While innovation in the financial sector is ongoing, recent years have seen the emergence of a group of breakthroughs that have been assigned a specific label since they all have the common characteristic of being enabled by technological advancements (Wamba, Dubey, Gunasekaran, & Akter, 2020). Why are these innovations being celebrated more than others do? In this article, I will present the concept of innovation depth as a means of answering this question.

The first step in providing an answer to these issues is to define Financial Technology. To clarify why the FinTech phenomena arose now and why buzz surrounds anything linked to FinTech, I will first define FinTech and then analyse the supply and demand drivers of financial innovation, before introducing the concept of the depth of a financial invention (Oehmen, Locatelli, Wied, & Willumsen, 2020).

## 2. Supply and Demand Drivers of Financial Innovation

A simple supply and demand framework for thinking about financial innovation will be described, and then that framework will be applied to the elements included in the aforementioned description of FinTech to explain why it is happening now.

In order to understand the demand for new financial products, we must first consider the supply side and the factors that motivate individuals to bring them to market. Technologies, regulations, innovation spirals, and shifts in the macroeconomic and financial landscape are all potential causes. As an illustration of how these considerations have contributed to the development of previous financial advances (Colombo, Piva, Quas, & Rossi-Lamastra, 2021).

Automated teller machines are arguably the most well-known example of how technology has contributed to the development of new financial services (ATM). In the late 1960s, a technological advancement made possible the creation of the first ATMs. In example, a PIN code storage system was granted a patent by the British government in 1966. That made it possible to create the ATM, which had been impossible before. The original ATM debuted in London in less than a year after the patent was issued (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021). Online banking, high-frequency trading, and mobile payments are more modern instances of innovations where technology was a key component of supply.

Furthermore, regulation is a common influence on the supply side. For instance, some countries' bank regulators have recently urged their respective financial institutions to shift away from short-term funding in the wake of the global financial crisis. In the meantime, additional changes reduced the interest of money market funds in longer-term products like longer-term repo contracts (Kohtamäki, Rabetino, & Möller, 2018). In this context, financial institutions issued a form of commercial paper backed by collateral (CCP). For the purpose of entering into repurchase agreements, financial institutions would often utilize CCP, or commercial paper issued by a special purpose organization. The CCP is considered

"liquid" by the appropriate legislation, so money market funds can buy it, and the banks who issue the CCP receive the repo funding they were seeking. Futurization of swaps, callable commercial paper, extensible repo, and evergreen repo contracts are some instances of regulatory contributions to financial innovation (Mikalef, Boura, Lekakos, & Krogstie, 2019).

Some of the factors influencing supply are more subtle. One idea might inspire another, creating a spiral of innovation,<sup>1</sup> as an example. Thus, in the real world, innovations might occur in a logical order. For instance, until the credit default swap product is available and the market for it is liquid enough to reliably track pricing, the index of credit default swaps will not be able to go to market. In other words, it's impossible to visualize a product without the precedents that came before it (Jeble et al., 2018). It's hard to picture, for instance, someone making a CDO-squared unless someone has actually made a CDO. Consequently, it is reasonable to view invention as a source of future innovation; the more innovation there is, the greater the likelihood that more innovations will emerge (Wamba et al., 2017).

A shift in the macroeconomic or financial climate may also influence the availability of goods and services. For instance, during the U.S. housing market crash that foreshadowed the 2008 financial crisis, banks and other financial institutions acquired a disproportionate share of the available real estate (Schoenherr & Speier-Pero, 2015). In response to this out-of-the-ordinary circumstance, several banks began securitizing the rents collected from the properties they held.

If the home market hadn't crashed, leaving financial institutions with a surplus of property, they probably wouldn't have thought of creating such a product. That's why the shift in the economy as a whole helped pave the way for the brand new offering. The creation of double- and triple-decker hybrid bonds in Japan in response to that country's extremely low interest rate environment is another case in point of an issue that was at least partly caused by macroeconomic or financial factors (Henseler, Ringle, & Sarstedt, 2015).

This list of supply factors is not meant to be exhaustive; rather, it is meant to give you an idea of the kinds of things that qualify as supply factors, such as technological advancements, government regulation, the introduction of new innovations, and shifts in macroeconomic and financial conditions.

When it comes to consumer demand, however, even if banks come up with a ton of innovative new products and services, they won't sell (Schilke & Cook, 2015). Triple-decker hybrid bonds are just one product that has either disappeared or has a very niche market due of the lack of interest in it. Regulatory constraints and changing demography are two examples of the many external factors that affect the demand for innovative goods and services.

Though it was classified as a source of supply, regulations can actually stimulate interest in novel commodities. Banks must keep enough high-quality liquid assets, as measured by the liquidity coverage ratio, to cover net cash outflows for at least 30 days. Therefore, the bank must keep assets on hand to offset the expected outflow if it has issued a bond or commercial paper that matures within the next 30 days. A

result of this was an increase in interest in products that would not violate the liquidity coverage ratio (Schilke, 2014). That need inspired the development of a product known as callable commercial paper. To clarify, this refers to commercial paper that has been issued for a set period of time, say three months, but that the issuer can choose to redeem before it reaches 30 days to maturity. Rather from having to keep assets as collateral against a potential outflow, the issuing banks can simply call the paper. A new market for this goods emerged as a result of government mandate (Davenport, 2014).

Population structure also plays a role in demand. The rise in the use of mobile financial services such as mobile banking and payments, for instance, has been largely influenced by demographic shifts. According to a quarterly poll performed by the Federal Reserve, only 18% of respondents over the age of 60 had used mobile banking in the previous twelve months, while 67% of respondents under the age of 30 (Homburg, Klarmann, Reimann, & Schilke, 2012). Few are surprised by these findings, since they conform to the idea that younger generations more naturally adept at using mobile technology than their elders. Bitcoin and other virtual currency users tend to be younger, according to a study by the Federal Reserve Bank of Boston. The financial industry is not oblivious to the needs of today's youth, and as a result, new and creative products and services catering to this demographic have been developed (Richard, Devinney, Yip, & Johnson, 2009).

These two examples of demand variables—regulation and demographics—do not constitute an entire list, but they should give you a feel of the kinds of things that qualify as demand factors, just as the supply factors did for the supply side.

There are certain broad observations that should be made before diving into the specifics of innovation. First, I gave a number of illustrations of inventions prompted by certain causes; nonetheless, it is essential to bear in mind that the grounds behind an innovation are rarely straightforward. Rarely do you see a new development with only one driving force in supply or demand (Sirmon, Hitt, & Ireland, 2007). Most products are the result of a complex interplay of multiple elements; for example, two or more factors may motivate someone to produce a product, and two or more factors may motivate investors to demand a product (Rothaermel & Deeds, 2006).

Second, we should emphasize that although this basic framework is micro-focused, it nevertheless permits us to consider innovation at the global level. While I illustrated how each aspect affected just one product, it's easy to picture how they play a larger role at the macro level (Dussauge, Garrette, & Mitchell, 2004). If you look at periods of fast technological progress, for instance, you may assume that there will be more financial innovation during those times. It's possible to anticipate a period of rapid innovation following times of big changes to the macroeconomic or financial landscape. For my discussion on Financial Technology, I shall return to both of these considerations.

### 3. Depth of Innovation

In order to continue, I will now explain what I mean by "the depth of financial innovation." For me, this idea is helpful in gauging the potential impact of a new

development on the financial markets. Here are the three levels of innovation that come to mind: superficial, authentic, and fundamental.

Innovations that just affect the surface level of a product or service are called "surface innovations." These advancements are superficial due of their nature. This is where the majority of financial developments take place.

Callable commercial paper is a type of commercial paper that can be repurchased by the issuing institution before the maturity date reaches 30 days. Observe how this represents a superficial improvement (Eisenhardt & Martin, 2000). The breakthrough involves a new facet of commercial paper known as "callability." A product that has callability built into it is still commercial paper at its core. We don't expect there will be a major shift in who uses the product or how they use it (Weerawardena, Mort, Liesch, & Knight, 2007). There is a good chance that the issuers will stay the same. Very little shifts in the product's overall risk profile. An additional type of superficial innovation is a new securitization that modifies the securitization's structure but remains, fundamentally, the same product as its predecessors.

True innovation occurs when the very character of a product is altered, giving rise to an entirely new product or service. Compared to superficial innovations, this one goes a bit deeper (Chen, Chiang, & Storey, 2012). The quantity of available financial products and services is obviously low, suggesting that deep innovation does not happen as often, or at least is not as successful, as surface innovation.

Examples of true innovation from the past include the first ever issuance of bonds or shares of stock and the first ever written life insurance policy. They weren't just tweaks to current products, but entirely novel concepts introduced at the time.

Some recent instances of true innovation exist. For instance, credit default swaps were the first instrument that gave investors a way to measure and manage their exposure to a company's credit default risk (Altay & Pal, 2014). Despite the fact that the underlying product was a swap, it was very different from typical swaps that are used to trade variable revenue streams. This idea of exchanging one company's credit risk for another was revolutionary. Similarly, the first time assets were pooled and securitized, a completely novel commodity was created (Schilke, 2014).

Substantial changes to the foundations of the financial system constitute the highest level of financial innovation. I'd call this kind of breakthrough "foundational," and it happens only occasionally. Financial markets would struggle to function normally if such innovation happened regularly, because markets require stable underpinnings for normal functioning.

The establishment of banks and the banking system, the development of double-entry bookkeeping, and the establishment of corporations are all instances of innovations that laid the groundwork for subsequent developments (Schoenherr & Speier-Pero, 2015). These all represented significant shifts in the underlying architecture of the financial sector. These developments didn't result in new financial products per se; rather, they served as the basis for entirely new categories of investment and banking services.

More recently, adjustments to the central clearance process that happened in the 1970s and 1980s might qualify as foundational innovations. These changes took place more than a century ago. Up until that point, many exchanges handled their own clearing, but as the volume of transactions increased, dedicated organizations took over the clearing and settlements of a wide variety of products (Fisher, DeLine, Czerwinski, & Drucker, 2012).

The three types of innovation I've discussed are superficial, genuine, and fundamental. Although I have divided them up into clear buckets, I suspect there is more of a gradient at play here. It's debatable whether or not a given innovation is merely skin deep (Mikalef et al., 2019). For instance, did the 1970s shift in clearing and settlement actually represent a shift in the financial system's underlying structure? Debated: Were credit default swaps only a new twist on an existing swaps contract, or did they fundamentally alter the nature of swaps altogether?

The focus here is not on trying to place each innovation neatly into one of the three categories but on considering the breadth and depth of each innovation. To the contrary, I contend that the more fundamental an innovation is, the more it will shake up the economy (Weerawardena et al., 2007). One reason for this is that the more substantial the innovation, the more probable it is that new innovations will be built upon it.

Consider the case of commercial paper to see this in action. I've already highlighted the advent of callable commercial paper. The characteristics of callable commercial paper could be expanded upon by include put-ability (Schreiner, Kale, & Corsten, 2009). The market for a product can decrease since it's unclear whether or not adding a new feature will increase demand.

However, if you start with a truly novel product, you'll find that subsequent innovations are simpler to implement. There have been many iterations of securitization since the originals, including securitizations of various assets, securitization indexes, securitizations on securitizations, and even options on securitizations.

Now, if the financial system's fundamentals are altered, a considerably broader variety of possibilities opens up. Every one of the offerings is backed by the same solid structure. Every potential outcome can be rethought when the groundwork is altered (Altay & Pal, 2014). The first bank allowed for the introduction of savings accounts, checking accounts, home mortgages, and bank notes; subsequent banks built on these foundations with additional features.

#### 4. Why did the FinTech Phenomenon Occur Now?

To begin answering the paper's first question, "Why is FinTech happening now?" Let's approach FinTech from the perspective of the forces that influence its supply and demand.

Most individuals immediately think of technological advancements when asked to name the supply variables that have enabled businesses to deploy FinTech advances. This is immediately apparent from both the meaning of the term and its spelling (Fin-TECH). Typically, when a company implements a new FinTech

solution, they are able to extend their product or service offering in ways that were previously impossible without the use of technology (Mentzer, Flint, & Hult, 2001). Technology has recently been applied to the banking sector, but this is nothing new. Even though no one probably used the word "FinTech" in the 1960s when automated teller machines were first introduced, these machines are a prime example of the category. One recent technological advance is high-frequency trading (Das & Teng, 2000).

It's important to note that FinTech breakthroughs aren't the first or even the first group of technological innovations. Technology is being used in a wide variety of recent advancements, which is what sets them apart. The term "FinTech" was used to describe the burgeoning field of financial innovation made possible by technological advancements (Dussauge et al., 2004). Because of this, we can't merely point to technological advancements as the reason for FinTech's rapid ascent in the market. It would be impossible for me to list every supply component that contributed to the development of Fintech.

To begin, there have been significant shifts in the financial environment since the 2008 global financial crisis. Both the regulatory burden and the resistance to taking risks increased. To counteract this, banks slowed down on several forms of lending (Lee, 2004). Some new companies stepped in as banks withdrew from competition by offering technologically advanced products that negated the advantages that traditional banks held, such as their extensive branch network (Bayraktar, Demirbag, Koh, Tatoglu, & Zaim, 2009). Some of the earliest peer-to-peer lenders, for instance, targeted borrowers that banks were shying away from, like small firms and riskier customers, and so gained a foothold as a result.

Macroeconomic conditions, and particularly the low interest rate environment, also led to the development and adoption of FinTech innovations. As a result, financial institutions were under more pressure to reduce expenses and had more incentives to do so (Schreiner et al., 2009). Startups in the financial technology industry have largely been centered on the idea that technology can be utilized to reduce operational expenses. Online marketplace lenders, for instance, have simplified conventional loan underwriting processes in an effort to lower costs, and blockchain companies have attempted to develop solutions that will speed clearing and settlement (Chen et al., 2012).

Now let's talk about the demand side of things, and I'll list a couple of the main issues again. The widespread use of mobile devices is one such cause. The proliferation of smartphone technology spurred the development of supplementary goods and services to keep up with the ever-shifting needs of its users (Volberda, Van Der Weerdt, Verwaal, Stienstra, & Verdu, 2012). New services like online banking and online brokerage accounts are just a few examples of the FinTech innovations that are meeting this need.

Population structure also plays a role in demand. Younger consumers' need for easy access to their money, assets, and services is a major force pushing the development of new FinTech solutions (Sheng, Amankwah-Amoah, Khan, & Wang, 2021). Survey results suggest, for instance, that younger generations are

disproportionately inclined to utilize Bitcoin and other digital currencies, as well as non-traditional financial service providers and online financial counselling.

This quick overview of supply and demand forces fueling FinTech should make two things apparent. First, FinTech's reliance on technology is not unique. Financial innovation has traditionally included technology (Asmussen & Møller, 2020). Second, supply and demand drive FinTech. Combining supply and demand forces created FinTech (Hossain, Akter, Kattiyapornpong, & Dwivedi, 2020). First, financial services companies weren't using modern technology like smartphones and the internet. Second, the global financial system and macroeconomy changed significantly (Dwivedi et al., 2021). Third, financial institutions adjusted their business models in reaction to the changing financial landscape and macroeconomy (Ivanov, 2020). Because of so many causes in a short time, we got a cluster of financial breakthroughs and named it FinTech (Wamba & Akter, 2019).

## 5. Why Is There So Much Hype around FinTech?

To answer the second question I set out to answer in my paper, "Why is there so much excitement around FinTech?" People may always find something new to be enthusiastic about since innovation is a continuous process. The potential for these innovations to revolutionize the financial system, however, has people enthusiastic about the FinTech phenomena. Let's consider the breadth of FinTech's inventions to grasp its disruptive power and the reason for its widespread excitement (Oehmen et al., 2020).

New services and products are continually being introduced by financial organizations. These days, most of the market's new offerings are the result of cosmetic tweaks. The core of the product remains the same, however there have been some tweaks made to the functionality. One may argue that even the earliest FinTech advancements are only scratching the surface (Ivanov, 2020). To give just one example, online banking wasn't a brand-new product, but rather an added service for people who already had bank accounts.

Recent developments in FinTech, on the other hand, have included numerous legitimate products and services. Peer-to-peer lending platforms, for instance, facilitate direct investment in the enterprises and personal loans of others. Before this, it was extremely challenging, if not impossible, for an individual investor to make a direct loan to another individual outside of more shady, unofficial methods (Crick & Crick, 2020). Crowd funding allows regular people to make direct investments in startups. It's true that loans and stock investments aren't exactly ground-breaking ideas, but I maintain that the fact that they can now be purchased directly by consumers at retail is what really represents an innovation, as opposed to a mere tweak. Examples may include privately issued digital currencies such as Bitcoin (Wamba & Akter, 2019). It's not like these currencies are merely a little tweak to the established system of exchange. Instead, they provide a means of exchange independent of central banks or other centralized institutions. It appears that this is, at the very least, a novel idea.

There are many more in-depth FinTech advances. Bitcoin's underlying technology is called distributed ledger technology. A blockchain is a secure method of storing data that renders it nearly unalterable. This technology allows for the decentralized storage of transactional data (Prasad, Zakaria, & Altay, 2018). Looking at distributed ledger technology from the perspective of the breadth of innovation, I believe that most people would agree that it is a fundamental innovation.

Distributed ledger technology, like double-entry bookkeeping and other seminal discoveries, is not an end in itself but rather the basis upon which other goods and services can be developed. The first product to be developed on top of a distributed ledger was Bitcoin, but numerous businesses are already creating products and services on top of the technology (Jebel et al., 2018). A blockchain platform for issuing private shares is being developed and managed by a single company, which is in turn working with NASDAQ. Similarly, another firm has issued corporate bonds over the blockchain (Gupta & George, 2016). Prototypes of supplementary products and services that can be created on top of a distributed ledger infrastructure are currently being developed by many FinTech startups and established financial institutions (Gupta & George, 2016).

Other, more unique goods, which would be actual inventions in and of themselves, are also being studied for development using distributed ledger technology. To put it simply, "smart contracts" are computer programmes that can execute and enforce the terms of a contract automatically (Davenport, 2014). Assuming widespread adoption of distributed ledger technology, smart contracts might be coded onto distributed ledgers to automate various aspects of the financial system. Similar to distributed ledgers, smart contracts are more of a platform upon which other products can be built (Henseler et al., 2015). By introducing the concept of the smart contract, new developments like organizations governed by predetermined protocols can become a reality.

## 6. Conclusions

It is instructive to consider the motivations for financial innovation. This is helpful for considering advances in a holistic, rather than piecemeal, fashion. Microscopically, it may not seem like there is much of a difference between individual FinTech breakthroughs and other types of financial technology innovations. Yet, at a more global level, examining FinTech's drivers allows us to comprehend the genesis of the FinTech bubble.

The potential scope of an innovation can be estimated by considering the extent to which it has been implemented. Considering the breadth of innovation helps clarify why the financial technology sector is receiving so much attention. A large portion of FinTech represents genuine or even infrastructure innovation, which means it has the potential to have far-reaching, even revolutionary, effects on the financial system.

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