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On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services

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Abstract

The financial services industry has been experiencing the recent emergence of new technology innovations and process disruptions. The industry overall, and many fintech start-ups are looking for new pathways to successful business models, the creation of enhanced customer experience, and approaches that result in services transformation. Industry and academic observers believe this to be more of a revolution than a set of less influential changes, with financial services as a whole due for major improvements in efficiency, customer centricity, and informedness. The long-standing dominance of leading firms that are not able to figure out how to effectively hook up with the “Fintech Revolution” is at stake. We present a new fintech innovation mapping approach that enables the assessment of the extent to which there are changes and transformations in four areas of financial services. We discuss: operations management in financial

services and the changes occurring; technology innovations that have begun to leverage the execution and stakeholder value associated with payments, cryptocurrencies, blockchain, and cross-border payments; multiple innovations that have affected lending and deposit services, peer-to-peer (P2P) lending, and social media use; issues with respect to investments, financial markets, trading, risk management, robo-advisory and services influenced by blockchain and fintech innovations.

Key words and phrases:

business models | digital banking | financial services | Fintech Revolution | lending | markets | market operations | payments | process transformation | technology disruption | technology innovation

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Notes

[1]. The IS literature offers many theory-based explanations of technology-driven transformations in the financial services industry. For studies on strategy and market transformation, the interested reader should see, among others: Clemons et al. [33] on the competitive disadvantage associated with market dominance; Han et al. [73] on IT ownership amid market transformation; Goh and Kauffman [65] on firm strategy and the Internet in commercial banking; and Clemons et al. [35] on the information-driven transformation of strategy and society, including financial services.

[2]. These developments are described in a National Public Radio show on the “Digital Industrial Revolution” [136].

[3]. Financial services operations, along with the business value and profitability that they can create, have been studied by researchers and practitioners since the 1980s [109, 132]. The respective themes include: the economics of electronic banking strategy and shared ATM networks [30, 87]; process variation as a basis for service quality and performance [59]; retail banking strategy when electronic distribution technology costs influence bank competition and performance [23]; the economic effects of technological progress on banking [15]; system design and process performance in trade finance operations [43]; customer intimacy strategies with IT for small bank-offered financial services [134]; nowcasting machine-based forecasts for GDP [60]; new management science approaches to credit card risk scoring [27]; and support vector machines [14] and other ML algorithms [94] for consumer credit scoring.

[4]. For an early review of models, see Capon [25].

[5]. There is an interesting similarity here to how the credit card lender, Capital One got its own start, with the slogan “Don’t call us, we’ll call you,” based on their effort to do data mining on potential customers to figure out what card-related interest rate would match the levels of risk of default on loans that were involved [36].

[6]. Research on issues associated with payments in the global economy have been covered by: Clemons et al. [34] on how Mondex reengineered money with nondebit, noncredit plastic cards in the 1990s; Au and Kauffman [8, 9] on how electronic billing infrastructures developed, and on the economics of mobile payments; Staykova and Damsgaard [131] and Kazan et al. [93] on market competition for mobile payments platform; and [76] and Liu et al. [105] on cooperation, competition, and regulation related to mobile payments market changes and ecosystem changes. There have been many others, though these are representative.

[7]. Some of the key issues here involve the cohesiveness and performance of the faster payment settlement system as a business network. In other theoretical analysis work, a variety of issues are highlighted that make procurement platforms, loyalty networks, and group-buying systems all have difficult issues in regard to network viability [35], including: the likelihood of long-term network sustainability; the extent of process standards that support a network; the extent of firm and customer informedness about network and system performance; demand-driven complementary network value; sustainable network value; performance monitoring and fair value sharing [88].

[8]. For several reviews of payment, clearing, and settlement systems around the world by the Committee on Payment and Settlement Systems (CPSS) economists of the Bank for International Settlements (BIS), the interested reader should see the series of white papers that the BIS published in the 2010s [40–42].

[9]. In an interview that the SWIFT Institute [133] conducted in 2015, NPP's chief executive officer Chris Hamilton pointed out the contrast between the low-value payment focus of NPP and its approach to managing liquidity, in comparison to the hybrid settlement system.

> Each participant would keep a pool of funds at the central bank segregated for the NPP. The liquidity inside each pool would be managed by a set of highly automated and effective tools that monitor the transactions of each participant in their respective pool and allow draw-down and top-up on parameters set by the participant. Each individual payment is settled through the pools in real time, creating an account-netting effect in each pool. The netting efficiency would essentially depend on the size of participants, relative to the nature of their transaction flows [133, p. 1].

[10]. For details on the technical underpinnings of blockchain technology, see Mueller-Eberstein [114].

[11]. Blockchain has also garnered the interest of central bankers. For example, He [75, p. 3] proposed the use of a central bank digital currency (CBDC), defined as

> a digital form of central bank money that can be exchanged in a decentralized manner. In other words, it can be transferred or exchanged peer-to-peer, directly from payer to payee without the need for an intermediary… . Such a CBDC would be exchanged at par with the central

bank's other liabilities (its cash and reserves)—either through banks or directly at the central bank.

The ramifications of such a choice on the part of central banks—to issue their own digital currencies—is fraught with technological and public policy issues that parallel those faced in other complex and sensitive domains, such as cybersecurity, the control of fake news, the patenting of digital innovations, and the control of sharing economy innovation [35].

[12]. These kinds of innovations reflect Chesbrough's [28] argument about breakthrough innovations for which the general problem is identified (digital cryptography, in this instance), but the domain will only become known over time as entrepreneurs develop new ideas for their application.

[13]. This is much like what the University of Pennsylvania Wharton School start-up, buySAFE, did. It originally teamed with eBay to diminish the all-in transaction costs between buyers and sellers, who had asymmetric information about the demeanor and performance reliability of their counterparties [32].

[14]. This parallels what was observed with airline price forecasting tools like FareCast (acquired by Microsoft in April 2008), and other oil and gasoline forecasting tools for energy producers and transportation fleet cost management.

[15]. Unlike several of the other fintech innovation areas that we have discussed, the applications in lending services have been very well-studied since the mid-2000s, especially P2P lending, and more recently, charitable crowdfunding and equity crowdfunding. Some of the most interesting works that have appeared in the literature to date make contributions related to fundamental and more advanced issues. For P2P lending, they include: the differences between alternate market mechanisms in P2P lending relative to repayment and other aspects of their performance [147]; how borrower participation in friendship networks may reveal their propensity for P2P loan repayment or default when there are lender-borrower information asymmetries [102]; how loan default can be mitigated with borrower information from social media in P2P lending [61]; how informal lender-borrower social communication influences default rates in P2P lending [151]; and finally, the extent to which platform choice, observed herding in decision making, and regulation influence P2P lending returns [84]. Some of the findings interested readers may wish to see in the current literature on crowdfunding include: the impacts of home bias effects, the tendency for transactions

to be made by counterparties from the same geographic area instead of outside it, in online campaigns [103]; the effects of provision point rule restrictions on the amount of funding an entrepreneur can draw from a fundraising campaign [22]; and the extent to which information hiding and participant contributions influence crowd campaign outcomes [21].

[16]. For studies on financial markets and firm strategies in the investment and trading industry, see: Clemons and Weber [37, 38] on competition between exchange and off-exchange venues for equity trading; Weber [146] on open-outcry and order-matching systems in futures markets; Levecq and Weber [101] on the strategic implications of financial market design choices; Han et al. [72] on JPMorgan's partial divestment of RiskMetrics for value-at-risk metrics infrastructure to Reuters [117]; Parker and Weber [11] on the effects of order-routing on new option market success; and Kauffman et al. [89] on technology ecosystem transformation in high-frequency trading systems.

[17]. This will likely be caused by their lack of technical expertise in some domains of emerging technologies, including ML and AI, natural language processing, blockchain app development, data science and IoT sensors, and the exploitation of open APIs. It is unlikely that the demand for the software development and hardware specialists, along with cybersecurity experts, will abate anytime soon. As a result, financial services firms in many countries around the world will be forced to outsource for application, product, and service development assistance.

[18]. Dietz et al. [50] have pointed to multiple kinds of changes that are likely to occur: expansion in the scope through the value chain of fintech innovation application; fintech start-up diversification in technology, segment, and geographic terms; partnerships and alliances to achieve new functionality and higher business value, as well as industry consolidation due to scale-focused acquisitions; a slowdown in value growth to more normal market valuations for fintech start-ups; regulators' involvement in the development of fintech clusters; and finally, the emergence of much larger fintech ecosystems that span industries and geography.

Additional information

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