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RESEARCH ARTICLE

EVOLUTION OF TECHNOLOGY IN FINANCIAL MARKETS

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ABSTRACT

With the gradual evolution of technology, the financial markets are becoming more transparent, accessible, inclusive and efficient and are making it easier for the regulators to obtain a clearer picture of the risks that taken by the participants in the market. The financial markets all over the world have been aggressively adopting technologies throughout history. What appears to be a completely digitalized market today has been through a series of developments through technology to be the power house that it is today. From the mid-1800s to 1967, the financial services industry was largely an analogue industry which is generally referred to as the FinTech 1.0 which lasted until the beginning of the first world war. The 1980s to 2008 period is generally referred to as FinTech 2.0 which was associated with increased digitalisation and banking. FinTech 3.0 is a paradigm shift of providing of financing services by banks to start-ups.

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INTRODUCTION

Technology has always revolutionized the way the financial markets function. With the gradual evolution of technology, the financial markets are said to become more transparent, accessible, inclusive and efficient and will make it easier for the regulators to obtain a clearer picture of the risks that the participants in the market usually take. The quick, sound and intelligent decisions that are generally required in the financial market have always been driven by technology. Out of the different pillars of this complex market, such as regulations, taxes and legal compliance, technology plays a very crucial role having the capability to completely change the mechanism of these markets. (Raman. R, 2017). The financial markets all over the world have been aggressively adopting technologies throughout history. What appears to be a completely digitalized market today has been through a conscious series of developments through technology to be the power house that it is today. "Fintech" is a word used to describe the use of technology to deliver financial solutions. Though this term appears to be recent, the association of technology and financial markets has been a long one with the global financial markets being the largest buyer of the IT products and services, spending over USD$197 billion in the year 2014 on IT. With the entire financial system digitalized, the ATM is the only source for the customer where this intangible product turns into a tangible product i.e cash. (Lodge. G, 2015).

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The Capital Market, one of the major performers of the financial markets works on shortening the period between a trade being initiated and complete to make it worth its salt. Over the years, this trade has been driven by technological innovation making it easier to monitor stocks and decision making.

Early years

Finance has its origins in administrative systems for state administration necessary in the transition from hunter-gatherer groups to settled agricultural states, for instance in the context of Mesopotamia, in which some of the earliest examples of written records evidence financial transactions. (Rowlinson. M, 2010). The first joint-stock company was founded in the late 17th century which would provide shares to finance ventures. Eventually the setting up of the first share holder economy took place in Europe. Around the same time, the famous market crash of the South Sea bubble took place which was partially balanced by the intervention of the powerful British government which played a major role in stabilizing the banking industry. The legislations brought about to balance this hole eventually resulted in the setting up of an official London Stock Exchange in the year 1801. This period depended only on one mode of communication, the horse which would be used for communication of the information affecting the market trends such as information on wars and inventory arrival etc. The trend eventually shifted to the use of pigeons for communication as they were faster. History has it that pigeons were used in the Battle of Waterloo by the famous London based trader, Nathan Rothschild which gave him the

advantage of being one of the first one's to know about the defeat of Napoleon which helped in buying huge chunk of the British government bonds. It was eventually established that the information advantage was essential for wise trading. Since there was no mode of long distance communication, it led to the establishment of the trading institutions closer to the main market and exchanges. This led to the clustering of financial institutions in different geographical areas which are today addressed as the Wall Street of New York, Dalal Street of India and London's "Square mile" on the Lombard street. Due to the impossibility of fast communication over long distances, several separate local stock exchanges especially in the UK in areas such as Manchester, Glasgow, Leeds, Liverpool etc. in the 1800s. Arrival of telegraph and telephone made the horses and pigeons obsolete by the 19th century. This improved communication led to the subsequent mergers of the local stock exchanges in UK to form the Northern Stock Exchange. Eventually telephone and printed paper revolutionised the functioning of these financial markets by the second half of the 19th century. It was in 1967 when the first Automatic Teller Machine was established by the Barclays Bank which marked the onset of the evolution of financial technology. During the same period Diner's club introduced the first credit card in 1950 and telex. (Lerner. T, 2013) From the mid 1800s to 1967, the financial services industry was largely an analogue industry which is generally referred to as the FinTech 1.0 which lasted until the beginning of the first world war. Some consultants prefer to allot the era of 1800s to 1980s as FinTech 1.0 while some prefer to categorize the credit card era in FinTech 2.0.

Fin Tech 2.0

The 1980s to 2008 period is generally referred to as FinTech 2.0 which was associated with increased digitalisation and banking. The post war period marked the use of digital technology which were developed for the war to be used as a means of communication for the financial industry. Information Technology boomed and early computers were developed by International Business Machines (IBM). The handheld financial calculator was also build around the same time by Texas Instruments. (Thibodeau. P, 2007). Mini computer was soon replaced by Personal Computer and the storage capacity of these personal computers increased eventually and by the late 1980s traders all over the world communicated through personal computers and telephones and became a completely digitalized industry. One of the key events of this era was the collapse of the Long-Term Capital management due to the financial crises in Russia and Asia between 1997-1998. The 1990s also saw the biggest revolution which was the advent of internet. The World Wide Web helped in online account checking. (Riggs. C, 2015). Fintech 2.0 was all about the banking institutions and digitalization. It also called for a completely different regulatory approach by the government to keep the process By the onset of the 21st century the internal processes of the banks and all other interactions had become completely digitalised which can be seen by the huge expenditure done by financial institutions on the IT services. Even the regulators had begun to use technology which led to complete digitalisation of information regarding market dynamics and movements. FinTech 2.0 also called for a different set of regulatory aspects for e-banking. There was an associated risk of increased competition in this virtual world which would have high chances of leading towards a financial instability problem. Other major events of this period were the establishment of NASDAQ, SWIFT, BACS and CHIPS. This period ended with the crisis of 2008.

FinTech 3.0

While the FinTech 2.0 was all about *how* trading is done, FinTech 3.0 talks about *who* does it. The global financial crisis of acted as a catalyst for the beginning of this era. Post the crisis, the alignment of the financial market was such that it fostered the entry and growth of innovative players and start ups. The financial crisis had sooner taken the form of an economic crisis leading to almost 8.7 million people loosing their Jobs in the Unites States alone. It eventually led to loss of the trust of public in banks and the financial workforce who did not have enough job opportunities now found a new place to invest their skills into which eventually evolved into FinTech 3.0. (Kell. J, 2014) (Esposito. M, 2014). The compliance obligation of the banks was increased by the regulators altering their business models and incentives. The regulations so put forward fostered the growth of other financing institutes and start ups and other modes of financing like peer-to-peer funding and crowd funding. The demand side drivers of FinTech 3.0 were loss of trust in banks and expectation of the "one-click" delivery while the supply side drivers included availability of skilled financial entrepreneurs who lost jobs due to the crisis, regulations that were put forward to prevent a future crisis and the telecom revolution which made the availability of mobile phones very easy to provide more sophisticated ways of banking.

There came more reinforced ways of risk management and use of the VaR system continues for better risk management. The payment infrastructure now is focused on mobile and internet payments. A key feature of this era is the unbundling of the financial services. The start ups are able to custom choose a particular financial product and service which would earlier be provided by the traditional financial institutes. There are debt funding platforms (crowd funding platforms or credit marketplace) like Capital float, Neo growth etc which are online platforms that help small scale business to get loans. Wealth management firms which are technologically driven to provide automated wealth management recommendations. E.g.: Intelligent portfolio. Payment processing solutions includes products for simplifying in different steps in the payment process. E.g. Currency Cloud The various other start ups with standalone financial functions include personal finance tracking and fraud monitoring, virtual banking (e.g. Banking up), digital currencies and digital wallets. The main changes brought about by FinTech 3.0 in the financial markets are as follows:

Lending and lending models

Till Fintech 2.0 only banks were allowed to perform lending operations to individuals and organizations. (Kuznetsoy N, 2016). Borrowing loans from banks would require a tedious process of implementing all the requirements including proof of ability to repay the loan in future and mortgage property. The interest rates were so designed such that the lending rate was lower than the deposit rate. The chances of a person borrowing money without a collateral was exceptionally low. (Conner. C, 2013). The facilities provided by the FinTech industry are capable of dealing with such loopholes helping

meet the needs of the consumer in a better way. The process of Peer-to-Peer lending as mode of fund raising via links through several computer systems has gained immense importance. The borrower is able to borrow loans from several different lenders at an interest rate which is comparatively lower than traditional banks. Similarly, a lender can lend to several different borrowers at interest rate higher than the banks. (Milne. A, 2016). FinTech helps in playing customised loan services to different segments of the society. Faircent, Lend loans, i-lend are all P2P lending technology using online companies that make the process of lending and acquiring loans easily keeping in mind the benefits of both lender and borrower. Earnest is one such company that provides loans to individuals and small businesses that are associated with low income and short history of credit. Algorithms and software has helped such fintech start-ups in mining the history of the borrower including education, employment details and financial profiles for better decision making. Companies are now able to target young individuals and students for lending loans at interest rates much lower than those being offered by the banks. Companies are now able to provide financial services to students with the flexibility of fixed and variable interest rates along with customization of the loan down period. (Shin. L, 2015).

What has also changed in the time which is often required in the application and approval of loan. The application for loan can be done online and once processed, the message goes to the borrower instantly. There are certain start-ups which do not even ask for a collateral making the process of application and approval of loan easier. Certain companies like PayPal have an even better flexible system of paying of the interest every month as a percentage of the sales made in PayPal. (Prakash, 2016). Artificial Intelligence, Big data and data analytics have given FinTech 3.0 the shape that it has today. Companies now bank on the data available on online sites to understand the pay back ability of a borrower and his current financial situation. With the availability of a lot of data on social networking sites and other platforms, companies are now focusing on creating customer profiles to decide a loan decision. Financial institutions have an advantage over the traditional banks in that, that they are able to handle the customer data available more intelligently and effectively leading to faster loan processing. There are companies that provide a loan in as less than 3 days of data processing of the customer. (William. R, 2016)

Payments

There is no doubt about the fact that fintech companies have made it easier to pay money. The need to visit a bank for payments is eroded as customers can now make payments at their convenience. (Parker. G, 2016). Peer to Peer payments today has become increasingly useful without the need of bank visits. Money can be transferred from one person's bank account to another person's bank account through a mobile application or over the internet. PayPal is one successful company that has been able to efficiently provide this P2P benefit. The PayPal app required to be connected to the payer's bank account. Such a system removes the need of a third party and directly connects the buyer and the seller. (Broom D, 2016) Mobile wallets which store digitalized valuables in the form of a debit or a credit card have also made the process of payments much easier. Pay tm is one such example which has made life much easier and is now accessible on all the available online and offline buying platforms. Digital wallets have been the most extensive form of revolution with a lot of payers including applepay, samsungpay, paytm, free charge etc. Crypto currency has taken the financial world to a new level as it can be used for transactions online. The most common form of crypto currency is Bitcoin which gained popularity in the year 2009. It also doesn't come under any regulations so far. The fee associated with a transaction is negligible. Bit coin has today become a global virtual currency and is not regulated by any government so far which associates it with no risk of collapse. It may also be noted that bitcoin makes business easier from the buyer perspective. Once the payment is made to the seller, there is no option of payback associated with bitcoin while in case of other payment options the buyer can claim the money back at any time. (Franco. P, 2014) Bitcoin brought along with it, another evolutionary concept of distributed ledger called blockchain which acts as a decentralized source of data, recording all transactions in real time and preventing any data manipulation. A digital distributed ledger when maintained for financial transactions makes the process of providing financial products and services easier. (Rometty. G, 2016)

Investments

Crowd funding has become the trend of peer to peer lending using social media platforms in to quickly raise funds for a particular project by making people hold stakes in the project or simply lending money. Firms mediating this process have gained a lot of importance (Conard. R, 2012). FinTech companies are now in a position to help people better manage their finances by means of budgeting apps. These budgeting apps can either be virtual saving jars or virtual ledger. (Maurer. T, 2015) Portfolio management, a service that would generally be provided by banks at a high cost is now being provided by FinTech companies in the form of digital automated portfolio management apps. Computer algorithms are now used to understand the risk profiles of the customers after the investor has provided sufficient information (Augustine. A, 2015). Robot -advisors have been so far, the most useful platform for automatic portfolio management not requiring the need of a counsellor. After successful entry of data by the investor, they are able to evaluate a low-cost exchange traded fund-based portfolio. Apart from all this, there are now online websites available that provide similar services to investors who need more professional advice but do not have the ability to spend much. Such websites are created with a motive to provide low cost services to people who are new to investing. With certain modifications, such platforms are further customized to be able to provide professional financial advice to investors of different age group. (Nath.T, 2015)

Personal finances

Fintech has made significant developments in the personal finances sector. Enormous amount of efforts has been made in order to make personal financing smarter, more transparent and easier to manage. Online websites and apps are now available that monitor the personal finances of an individual based on their credit card and debit card transactions also offering customized services like daily tips to help customers reach their monthly saving targets, the amount of money that they have spent and the amount of money that they can further

spend at a particular location based on their GPRS tracking ability (Maurer. T, 2015).

Conclusion

The financial industry has always been going hand in hand with technology and has adopted itself accordingly over the years. The first disruption bought by the internet led to a digitalised banking system. The second disruption bought about by the involvement of financial institutes other than traditional banks has taken the technology driven financial market to the next level. There is a definite disruption in the way the financial markets function bringing in enough competition for the traditional banking system that prevails. At the same time, it has created enough flexibility for the customer's providing them a broad range of options to choose from. Along with a change in the manner in which the market functions, the regulations that are required to keep this industry stable also have to change. With the evolution of technology in financial markets, there has to be an evolution of the regulatory parameters governing the financial markets as well. The next generation of evolution of technology in financial markets is FinTech 3.5 which is limited to the developing countries of Asia where in market reforms had led to increased mobile and telecom banking. In India alone, in the year 2015, there was an announcement of making of 11 new payment banks. Around the same time, Jack Ma, the owner of Alibaba announces providing loans to SMEs through his e-commerce platform.

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Highlights

- Fintech 1.0 was about long-distance communication over telegraph and telephone
- Fintech 2.0 started with the discovery of internet revolutionising the way banks worked
- Fintech 3.0 shifted the focus from how the markets run to the who is allowed to provide financial services

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