

The Impact of Computerization on Banking

Introduction

The advent of Information Technology (IT), largely referring to the usage computers and peripheral equipment for the purposes of processing, storing and transferring information, has transformed many service-based industries in the recent past. One industry that has been radically affected by IT is the banking industry. The industry's reliance on technology has enabled traditional banks to offer a heterogenous mix of services including but not limited to internet banking, mobile fund transfers, electronic cheque deposits, and online brokerages (Gibbons, 2009). Moreover, the financial services sector has witnessed disruption of many conventional financial processes by upcoming Fintech start-ups. As a result, the core offering of financial services has significantly improved for the average customer.

The banking industry can be sub-divided into three main areas –

1. Retail Banking: The typical mass-market banking in which individual customers use local branches of larger commercial banks. Common services offered include savings and checking accounts, mortgages, personal loans and debit/credit cards (Investopedia, 2018)
2. Wealth Management: Financial services offered to clients which often include investment advice, accounting and tax management, retirement planning and estate planning (Investopedia, 2018)
3. Capital Markets: Investment arm of a bank that channels the wealth of savers for long-term investments (Investopedia, 2018)

This paper will discuss the implications of computerization on each of these three areas, shedding light on both the benefits and drawbacks of using computers and information technologies. In addition, this paper will propose recommendations to address some of the shortcomings of using technology within the banking sector.

Benefits

Retail Banking

In order to scale banking and service a larger customer base, banks have transitioned most of their services online using the Internet. For example, checking one's account balance, transferring funds between accounts, verifying credit statements, applying for a loan, making a payment, or even assessing the status of one's investments can all be completed via online banking. Today, online banking services over 1.2 billion people and handles over 350 million transactions daily (Kumar, 2016).

Furthermore, since these services are no longer limited to a physical branch, customers can take advantage of 24/7 access to online banking and render these services whenever its most convenient for them. In turn this also eliminates the need for customers to visit a branch for common bank-related tasks. Between 1989 and 2012, the no. of visits to a branch per person reduced by over 71% in North America (Kumar, 2016). Additionally, with the widespread dispersal of Automated Teller Machines, access to cash deposit and withdrawal services has become easier then ever before, especially for individuals in remote locations.

What's more is that with mobile banking individuals can use their phones as digital wallets. They can use them to make payments to a merchant or even transfer money to and from the digital wallets of others. Consequently, this enables individuals to transact on-the-go without having the need to carry a physical wallet. Digital wallets also provide an added layer of security because one's financial information is not

only encrypted but also password protected. In comparison, a physical wallet containing cash and often other credit and debit cards, offers no security if it is lost or stolen.

In terms of monitoring and issuing credit, IT systems provide banks not only with an infrastructure for record-keeping but also customer analytics. The use of IT to collect and analyse transactions enables banks to harness customer intelligence in order to accurately predict default rates and identify viable candidates for loans. Moreover, it allows banks to recommend personalized products based on a customer's spending behaviour, and thereby leading to improved customer retention.

Ultimately, by leveraging IT to host various online and mobile banking services, banks are better able to serve their customers while significantly reducing their operational costs. It is estimated that banks save more than \$26 billion annually because of automation provided by technology (Ho, 2016).

Wealth Management

When it comes to wealth management, passive management strategies have become increasingly popular than active management strategies. Under active management, fund managers implement various strategies, often proprietary, in attempt to beat the market (Investopedia, 2018). Whereas in passive management, wealth managers outsource the "management" to algorithms which periodically adjust the asset allocations in portfolios to match those of an index such as the S&P 500 or NASDAQ (Investopedia, 2018). As a result, wealth managers using a passive investment strategy pass down the cost savings to their clients from not having to actively manage a portfolio.

Similarly, there are an increasing number of Fintech companies today that are utilizing technology to reduce the cost of money management for the average consumer. For instance, Intuit Inc., is one company that has developed software applications like Quickbooks, TurboTax and Mint that is used by over 46 million customers to simplify their personal finances (Intuit.com, 2018). These applications collectively offer invoicing, taxing, expense and budget tracking capabilities with visualizations and personalized recommendations for improving wealth management. These applications when compared to a professional wealth manager are approximately 40% cheaper to use (Intuit.com, 2018). Another Fintech company, WealthSimple, uses the internet to offer an end-to-end wealth management experience online. By doing so, the company is able to charge a 0.5% management fee, which is much cheaper than most mutual funds that charge anywhere between 2-3% in fees (WealthSimple, 2018).

Capital Markets

Ever since stock exchanges became accessible online, trading of securities has become increasingly cheaper and faster as there is no need for a broker as an intermediary (Investopedia, 2018). Presently, banking institutions globally engage in high frequency trading, whereby computers transact a large number of orders at extremely high speeds that are triggered by algorithms operating on an automated trading platform (Investopedia, 2018). In an environment where speed is absolutely critical to success, technology enables investment banks to trade millions of dollars in a matter of microseconds. The benefits of such trading include the elimination of human error, improvement in market liquidity and increased profit-sums (Investopedia, 2018).

Besides speed, data is also a key factor in decision-making for traders. As a result, traders today rely heavily on Bloomberg terminals. These terminals are a Windows-based software application that are designed to bring transparency to financial markets by aggregating and delivering real-time market data to traders across the world (Investopedia, 2018). In a study done by Goldman Sachs, it was reported that traders who used Bloomberg Terminals averaged a 23.2% higher return in every asset class over those who didn't during a 6-week test period (Khajeh, 2011).

Drawbacks

Retail Banking

As digital wallets become increasingly popular and as financial institutions gather more and more data on their clients, there is a looming concern of a data breach. Though cyber-security is top priority for banks today, the costs of being hacked and giving up user information is extremely high. In 2017, Italy's largest bank, UniCredit, had a major security breach leading to data from 400,000 accounts being stolen (Petkar, 2017). In the same year, hackers stole ~\$60 million from a Taiwanese Bank by installing a simple malware on the bank's computers (Wei, 2017).

Alternatively, there is a growing concern over the fact that financial institutions are using algorithms to determine whether an individual is credit worthy or not. In her book, *Weapons of Math Destruction*, Cathy O'Neil warns against the use of mathematical models or algorithms that claim to quantify a person's creditworthiness at the cost of reinforcing inequality (O'Neil, 2016). As an example highlighting the inappropriate ways these algorithms reward the rich and punish the poor, she shares that "in Florida adults with clean driving records and poor credit scores paid an average of \$1552 more than the same drivers with excellent credit and a *drunk driving conviction*" (O'Neil, 2016). What's worse is that often these proprietary algorithms are shielded from prying-eyes and thus essentially serve as black-boxes to anyone trying to justify their ability to attain credit. She argues that us humans have too much confidence in an algorithm simply because it is unemotional and cannot perpetrate bias or injustice. However, the dangers of such dependence on algorithms can be extremely detrimental if these algorithms are encoded with systematic racism or classism.

Wealth Management

Since passive management strategies rely on algorithms managing the asset allocations across portfolios, it results in homogenous returns for investors as the portfolio is simply following an index. As a result, if passive management strategies become the standard and are widely adopted in the long-term, investors would essentially be following 'a herd mentality', which almost is never a good investing strategy.

Furthermore, as Fintech companies continue to innovate and disrupt traditional wealth management processes using technology, the wealth management sub-sector is expected to lose many advisors and fund managers. In a report outlining future trends within the financial services sector, PwC forecasted that over the next 6 years a North-American institutional fund will let go 33% of its wealth management division because of technology (PwC, 2018).

Capital Markets

One of the biggest risks of algorithmic high frequency trading is that one faulty move from an algorithm can transmit a rippling shock across interconnected markets within seconds, and thus amplifying the level of systematic risk. A classic example of this is the Flash Crash of 2010 where algorithms reacted to a spoofing tactic by executing over 20,000 trades across 300 securities that resulted in the DOW Jones index plunging 1,000 basis points in a span of minutes (Investopedia, 2018). This erratic behaviour led to security prices dropping as much as 60% from their original value (Investopedia, 2018). Such an event goes to show that while computerization can accelerate revenue generation it can also conversely accelerate the accumulation of losses.

Recommendations

Foremost, to curtail the negative effects of job displacements in the banking industry due to technological disruption, companies should implement educational programs that include e-learning modules, in-person boot camps and workshops that give employees with the highest risk of displacement an opportunity to learn new skillsets that will make them employable in other areas. As a prerequisite, it is important that companies first identify the various business areas in which they require additional labour and accordingly design these educational programs. In many cases it is pragmatic for the banks to train employees in the very same technologies that are disrupting their business and re-hiring them as consultants to oversee these technologies and their integration with various banking applications. Despite these educational efforts, it will be almost impossible for all affected employees to be retrained and rehired in a timely manner. Hence, banks can choose either to hire these workers on a part-time rotational basis or let them go with reasonable severance for their contributions at the firm.

Secondly, in order to avoid the incorporation of systematic biases in algorithms that may lead to prejudice outcomes, banks should be prudent in the design and monitoring of these algorithms. This requires banks to dedicate a diverse team of individuals from varying backgrounds that can provide multiple perspectives and in turn challenge the merits of each perspective that ultimately shape the design of the algorithm. Furthermore, banks collectively should be encouraged to be transparent in their design of algorithms and criteria for different outcomes. If not transparent publicly, banks should work with 3rd party agencies and governments that can regulate the banks keeping the consumers' interests in mind.

Finally, to further strengthen the security of the banking infrastructure, institutions should leverage the blockchain technology whereby financial transactions are maintained in a decentralized ledger across a peer-to-peer network. The decentralization of transactions implies that data is never stored or authenticated by a single entity but rather a network of nodes that are all simultaneously storing and authenticating transactions. In effect, the technology makes it extremely difficult for cyber-criminals to hack and steal information as they would have to hack every single node in the network.

Conclusion

Overall, the banking industry like many other industries has undergone a substantial transformation because of computers and information technology. Whether it is in Retail Banking, Wealth Management or Capital Markets, the implementation and application of computer technology has largely benefitted financial institutions by automating and accelerating financial processes. For customers of these financial institutions, technology has made banking more accessible and affordable. Despite these benefits, an unhealthy dependence on technology without careful monitoring can lead to adversities like widescale losses across international markets or flawed decision-making due to systematic algorithmic biases. Hence, institutions should consider a diverse range of perspectives and demonstrate transparency when designing and implementing large scale systems. Moreover, as technological disruption creates unemployment in the sector, companies can curtail its effects by offering educational programs to train employees. Lastly, by investing in blockchain technologies banks can significantly improve their current security measures.

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