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A REVIEW OF EMERGING TECHNOLOGIES IN BANKING AND FINANCIAL SERVICES

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Abstract: There are various technologies which have emerged and are being used aggressively in finance and banking sectors in the recent decades. Robotic process automation (RPA), Machine learning (ML), Artificial Intelligence (AI), Big Data, Block chain Integration, Cyber security, cloud computation, cryptocurrencies are few technologies among many more. These technologies make human lives easy. However, there exist unawareness about them in public domain. This research attempts to spread awareness amongst the readers about how these technologies are useful in financial services and how they can get benefitted from it. The information provided in this research will help the various stakeholders in making strategies for customer acquisition and business expansion while getting competitive advantage. Descriptive method is used to conduct the research as it was most suitable for this topic. Sources of information used were newspaper articles, published reports and websites of RBI, SEBI and listed companies, etc. The selected technologies are used extensively in the process of credit assessment, cheque payments, funds remittance, merchant services, currency exchange, consulting, wealth management, stock market, portfolio management, and insurance. Hence, this is useful to all the stakeholders related to these businesses. An important finding of this research is that the digital accounting is growing on huge scale which can replace manpower completely in future.

Index Terms – Financial Service, Technology, AI, Banking Sector, fully stack Digital Banks.

I. INTRODUCTION

The world is moving rapidly with the advanced technology and making innovative achievements in all the sectors like education, financial services, supply chain and logistics, transportation, retail and many more. Technology become the part of our day-to-day activities and changing lifestyle of humans from waking up in the morning till visiting the dreamland at the night. Technology made the change-a crucial phenomenon to survive in this competitive planet. One can see the use of technology at the door of their home which uses the sensor bell or landing on the Mars for the first time. All the sectors enjoy the advantages brought by it but on the other side of coin many problems are also erected on the large scale. There are many more uses of technologies which human race needs to research while many more problems which need proper solutions. Financial service are transforming with digital innovations for an example online banking is changing the traditional way for doing transaction by being available to the customers for 24/7, physically handled transaction in stock markets are transferred to the online platforms, Big data helps to organize data in the proper manner on electronic devices and can be used whenever needed, data mining is used for getting new customer and risk management, the rising power of the machine learning and artificial intelligence gave birth to new terms like RegTech and SupTech in financial sectors, cloud computing is use for protecting data and fault tolerance, block chain are used for efficient transfer of money from one end to another end. For an example with the use of block chain Ripple Net allows customer to transfer money within five seconds. With the help of block chain many Fintech has successfully started achieving DeFi system in the market where you hold your money in a secure digital wallet instead of bank. His revolutionary moment going to change the centralized finance. In near future you might find lock at the door of your traditional model using banks and financial firms. After observing the market very deeply it is found that the new innovative ideas are being converted into the traditional ideas in short span of time due to the contribution of technology. With all the above technologies financial sector and banking services have the advantage of cost reduction in transferring services, data can be stored at one place, more security to the data, save a lot of consumers as well as firms' time, flexibly viability of data, attract more consumers, make good strategies and plans, can easily expand to the adjacent market, and many more. Advancement in the services also brings the disadvantages like less security, more frauds, less trust and loyalty issues, hard to change the regularly working functions, difficult to convert mind-set etc. In this research work, reader will get most of the knowledge about emerging technologies in detail with their uses, advantages and disadvantages which help to rebuild new strategies to stand ahead of market and capture the competitive advantage. Readers will also find the future scope on this topic and help to do further research. They will also get introduce with some new terms in banking and finance sector. They will learn the innovation done by Fintech in this domain and how new Fintech are ruling over banks and financial firms.

REVIEW OF LITERATURE

Gardiner, a. e. Finance (1978) reported that the first transfer of money via electronic medium was done in 1915- in the starting of 20th century by Federal Reserve bank. After this in 1918, American banks connected reserves' telephones, federal reserve board and the treasury by telegraph which results in a telecommunications system to process the funds transfers. In 1934, IBM 801 bank proof machine were invented and IBM 803 proof machines in 1949 to do many kinds of financial services. (WO. Technology and future of financial industry, 1985) In 1950, the first credit card company named Diners club international was developed which has introduced first independent credit card. (Wang j. y. Technology transfer in international business, 1994) In 1952, Artificial intelligence was earliest coined by Mc Cathy and was realize for the smart machine manufacture in science and engineering Sectors. In 1955, the term Machine Learning was introduced by Samuel A. (Simon, H.A. Artificial intelligence: An empirical science, 1995) In 1971, NASDAQ become the largest automated and electric stock exchange in U.S. In 1982, Big data was involved in the finance to make the life of employee easy. In 1993, Citicorp launched the financials services with the help of technology. With the help off all the established technology the Wells Fargo become the first company to offer the online checking service. (Sahut, J.M. the adoption and diffusion of the electronic wallets, world academy of science, 2008). In 1997, use of mobile payment was done on buying of the soft drink by vending machine. PayPal was founded in 1998 in the name of continuity, which started security software for portable gadgets. In 2000 online banking was developed by the Elon Musk. (Armstrong L. Bank of America secures the internet network, 1994) (Lescourret L. cold file, investor risk and information sharing during the pre-1997, 2017).

In 2008, block chain was developed by the pseudonym Satoshi Nakamoto. Similarly in 2009, the first transaction of block chain with the use of bitcoin was initiated. Here bitcoin was declared as cash which can used for the bank transfer or for cash transaction on various things. (Chen M.A. How valuable is FinTech Innovation, 2019) (Rella L. block chain Technology and remittance from financial inclusion to correspondent banking, 2019). Stepping down on the way of innovation, in 2011, google pay was introduced as peer-to-peer payment services which is connected to the sender and recipient's bank that allow the transaction between two person or merchants at zero cost. In 2012, Coin base was invented as a cryptocurrency trading web which give customer to storage and exchange services. (Al,2004) (Do, 2014) Advanced Block chain was introduced in 2014 which has increased the scope of the financial firms and Transactions. Smart contracts and Decentralised applications were developed with the help of the advanced technology in 2015. After invention of so many technologies in finance and banking sector, U.S came with the term Green financial technology to avoid the unnecessary pollution and move towards creating healthy environment. For an example the use of the papers was reduced and almost all the data is started storing in the machines. (Do, 2014). The use of tech in finance become the trendiest thing in modern era. The buzzing word called FINTECH become popular in the market. Due to which university started providing bachelor' degree in FinTech. (Guo. Bouwman. J, an analytical framework for m-payment, 2016).
In 2018, the first investment was made in FinTech be the google ventures. Slowly and gradually many big players started playing in the FinTech firms. (Anastasiei. B, Dospinescu. N, Dospinescu. O, 2019). The high-level of conference started conducting to approach sustainable finance on international level to connect the financial technologies with the sustainability. (high-level conference: - a global approach to sustainable finance by European commission, 2020).

OBJECTIVES

The objectives of this paper are:

- To study the new emerging trends in technology and their uses in the banking and finance industry
- To study the evolution of banking model from traditional to the modern due to advancements in technologies

THEORETICAL FRAMEWORK

Fully stack digital banks: - In 1949 by the banking regulation Act the term-DIGITAL BANKS are defined which means that the banks rely fully on the internet and other online channels. There will be no physical build-up and no services is provided physically. All the work will be carried by the advanced technology. There are many banks which are opened as fully stack digital banks in foreign countries with government license. Example of some fully stack digital banks operating outside of the India are as follow: Tonik, Revolt, Kuda, Wrapping UP, etc.
In India, there are many Fintech giving digital financial services which are called as challenger banks, neo banks but there is no government licenced fully digital stack bank. Proposal for Licensing of fully stack digital banks are submitted to the government by Niti Aayog in November 2021. The name of proposal is "Digital Banks: A proposal for Licensing and regulatory regime for India. The bank will provide all the services like making loans, deposits, and more with the license and will work fully on the internet and on other proximate ways.

In India, after the Niti Aayog proposal to government many Neo-Banks founder are requesting Niti Aayog for license so that they can convert themselves into the fully stack digital bank. The first person to come up with the proposal was CEO and Co-founder of Razor-pay during his interview with the money control as this step will help a lot to increase the economy of country as well as give a huge benefit to the MSMEs. The features of fully stack digital banks are as follow: Minimum paid-up capital, Track record and potential applicant pool, Equal access to the infrastructure enablers, prudent/liquidity risk regulation, phased relaxation of business restrictions, Business continuity planning, Technology risk regulation etc.
Advantage of DBs is cost reduction (mainly operating cost), less time consumption, more transparency, large customer acquisition, easily supervise, less manpower, easy to capture adjacent market, 24/7 availability, good communication accessibility, etc.

Technologies which are used to create digital banks are Biometric Technology, artificial intelligence, IOT, etc. Biometrics are mostly responsible to push the banking system towards the digitalization. Here the technology will only recognize the inputs like ear, voice, face, retina of a authorized person which will make all the services and document secure and safeguard the public's money. AI contributes most of the efforts to convert the manual service into the digital. Here the process will follow the initially given inputs and run automatically which imparts a lot of transaction efficiency. For example, customer queries are answered by the chat boots. This makes the process fast and save a lot of time of both the parties.

TONIK: - It is the first Philippines bank to get the license of becoming fully digital bank from Bangko Sentral ng Philippines (BPS). It was beginning in 2020 by the successful teams of senior fintech leaders. it gives services like loans, payment, cards, current accounts, deposits, and more through mobile device. Example of how digital banks can work at front-side, Backside by getting regulatory license from their countries' government. They can also take help by outsourcing services.

SOURCE: FIDOR SOLUTIONS

There is a lot of confusion between fully stake digital banks, Neo-Banks, and Challenger Banks. **Digital banks** provide all services online and have license from the country's regulators. **Challenger banks** are licensed banks which provide most of the services online like digital banks, but they do have limited physical build-ups. **Neo-banks** are digital banks, but they provide limited services compared to other and they do not have regulator's license.

ARTIFICIAL INTELLIGENCE: - AI was initially identified by the ALLEN NEWELL and HERBERT A. The division of the computer science in which robot or computer will think and act alike a human is called as artificial intelligent. The use of AI contributed a lot in 21st century in all the sectors including finance. Researchers are finding more and more use of AI to make finance simple.

Common application of AI:

1. Forecasting: - forecasting become more important due to the constant change in finance sectors. The environment of the finance sector being very turbulent and volatile now a days due to the invention of new technologies, new services, and a wide range of the competition in the market. Research on a large scale get carried out to find the solution for accurate forecast. Her combing AI with the data analytics allow financial firm to get an accurate estimation.
2. Decision making: - With including AI in decision making can give the profitable results for the financial firms. According to the research it is proven that the decision made with the help of AI is more better comparing to decisions taken by the human 'ability.
3. Bankruptcy: - In old days bankruptcy prediction was very difficult due to which a huge amount of loss were used to occurred because many stakeholders are connected with it for an example lenders, investors, regulators, and suppliers. The various theories as a solution are introduced but they very less accurate. (varetto, 1998)

Theories like case-based reasoning (CBR), statistical techniques, NN theory etc., but this all were generating very less result. (wuu and tsai, 1998). Connecting the AI (machine learning) with the statistical knowledge will create more profits for the shareholders. Research merges the Regression, Neural Topology and Probabilistic NN with which the result is more precise. (AHN and KIM , 2009) AI in Stock market:- It is used for in stock market for algorithmic trading where investors can do the analysis and identify the pattern of stocks. This method helps to make a good decision for trade and result in more money. According to the surveys done in 2020, in US 60% to 75% investor uses AI for their trading's.

Process Automation: With the help of AI, many of the work become automation. For an example, with the help of Optical Character Recognition(OCR) can gradually reduce the time and increase the efficiency of work done by the employees. Finding the particular information from a large set of data can take more than 4-5 hours before application of AI but now it take less than 4-5 minutes. In simple words it breaks a large chunk of data and generate valuable information.

In finance it is very much important to know your customer to avoid the frauds. Hence many financial firms and Neo-banks use AI to make an easy process. Taking the image of your ID card and selfie of yours can complete this process. AI will check that ID is fraud or not and verify the user's photo. If there is no fraud alarm then process will be complete. Convolutional Neutral Network and deep learning uses in this process is at large. For the banks to get more customers is being difficult with a large number of growing other banks, Fintech, start-up etc. So forth giving clients the personalized banking experience is necessary. AI help bank to create a good communication between banks and clients. Example: chat-bots, which can consult the clients same like the humans do. The technology used behind chat-bots advanced NLP techniques. They can answer all the question of the customers and also able to find out the customer's emotions. If they recognize that customer is angry then they will connect customer to the human consult to solve their queries. AI is used to understand the customer behavior.
Example: Customer is booking the flight tickets from the ABC bank. Bank will analyse the information and understand the customer's preference. After this, bank can provide relevant offer to the customer by which bank can get more customer loyalty.

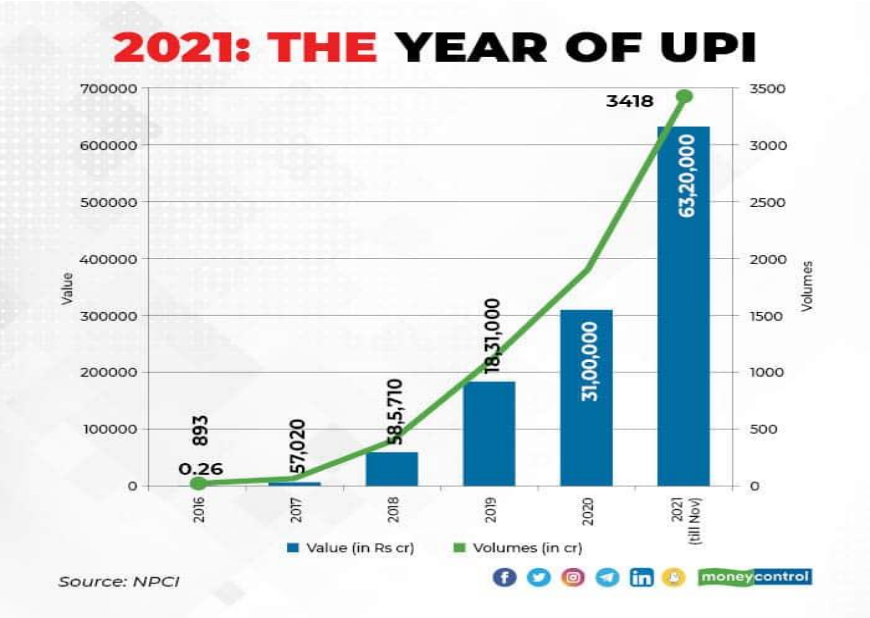
Accounting and tax: many AI tools are used to make the Software which can make the Accounting and tax easy for its readers and writers. According to the research carried by the university, with the help of this software you can get overlook on company's health with just few clicks. This software also give the intelligent advise to the company on how to correct the mistakes with help of some ratios. It even makes the life of the tax auditor simple. They can detect the fraud in financial system with the help of algorithmic recognize pattern. Machine learning will quickly find out the hidden frauds.
BIG DATA:- On daily basis finance firm or banks generated a lot of data internally which is called as structured data. They also need to cover data which are generated outside of the firm (unorganized data) which is called as unstructured data. This type of data generally taken by observing the customer for an example:- social media like LinkedIn, Instagram, Facebook etc. They need to collect all the unstructured and structured data in order to provide the solutions of day-to-day problems, stand a long in competitive world and expand the business. Finance firm are also called as data-intensive firm which needs a lot of data to find out unique opportunities and then process, analyse, use data for internal decision making, form a strategies, and apply it.

Big data operates on the 4V's which are as follow:- Variety, Volume, Velocity, and Veracity. Now a days, financial firms and banks faced many challenges due to competitions, barriers created by the regulators, increasing demands of the consumers due to which they are leveraging technologies to work more effectively and Efficiently. Traditionally financial firms and banks were doing the number reckoning by Humans(staff) and decisions were also taken based on that results. In this method a huge number of mistake were done by the decision makers due to high range of the inaccurate data. In the modern days, this mistakes are reduced a lot due to use of technologies like big data.

ROLE of Big Data in the STOCK MARKET:- big data works on the vast historical data with the application of the mathematics and help investor to make the better decisions which result in maximization of the profit.
Role of Big Data in BANKING:- With the help of Big Data, Banks can know the customer behaviour pattern. Banks will examine the extracted data of clients, keep on client's preferences, analyse it, and form plans and polices. In simple words, Big Data helps to handle the data of clients in very organized way, helps to analysis of clients' income and expenditure very easily, help to create the segmentation of the customer base, use for Risk assessment and fraud prevention, banks can arrange Feedback management properly to accrue more customers and their Loyalty.

BLOCKCHAIN:- Block chain are built on STOSHI's model (Scheuermann and Tschorsch, 2016). Block chain is the type of the spreadsheet, which can leverage the transaction made among the large network and verify it. Transactions are saved on the time based which apply the time-stamp services. Once the information is stored in the one block it will get the time-stamp and then move towards storing information in another block. This method is used to avoid the duplication or any kind of fraud during the transactions.
Moving value- block chain is used to make a payment, purchase services and goods, and transfer money. It helps to reduces the layer which will increase the speed of the transactions and reduce thee cost. (DUSKO KNEZEVIC, 2018).
SOURCE: Impact of block chain technology platform by Dusko Knezevic, (2018)

D**IGITALIZATION OF PAYMENT**: - A huge change in small period to make living easy.

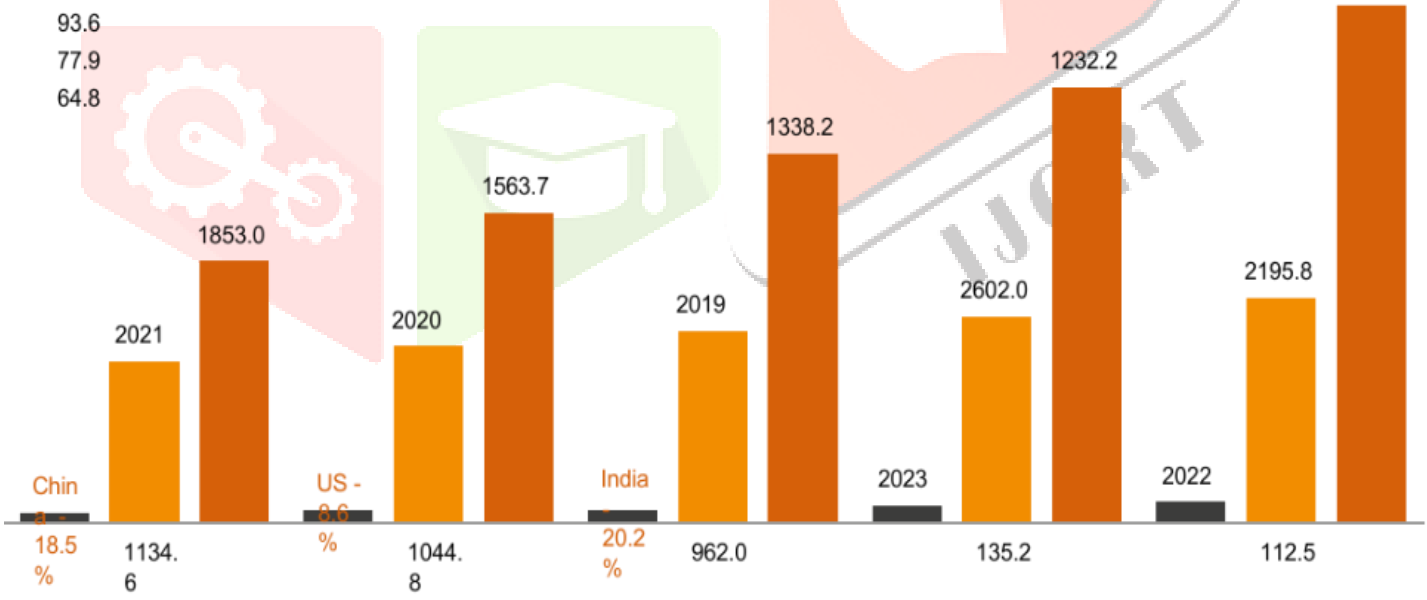


SOURCE: NPCL

Now-a-days payment can be made with few clicks in few seconds from anywhere in the world. This concept has a huge impact in the life of people. It reduced the time while increase the efficiency of payment. There are various ways of digital payments.

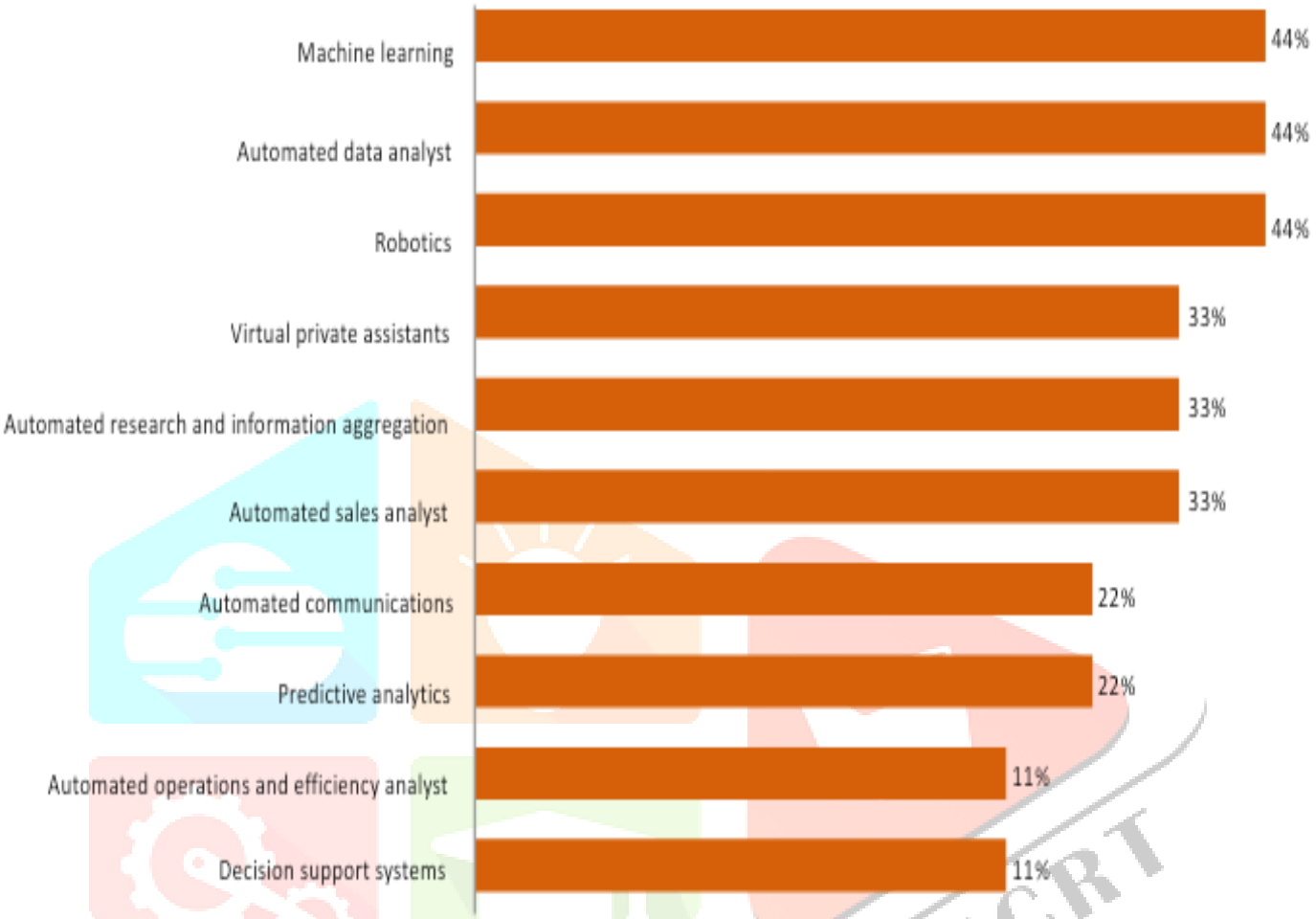
- Digital payment value chain can be classified into 6 division which are describe in the diagram (emerging technologies disrupting the financial sector: PWC, 2019)

Source: - Statista,2019 and Pwc: emerging technology



- This graph shows the comparison done between India, China, and U.S. on the digital payment scale from 2019 till 2023 where China is found to be the highest user of digital payment.
- **Tokenisation: Make the payments more secure:**
- Now-a-days we can see emerging Boom of digital transactions in India as well as in other countries. It has many advantages but with that it also brings disadvantages too. Here security of data and money is a crucial thing to handle for any organization. Hence the invention of tokenisation is done to make information more safe and secure.
- In tokenisation the detail like account number or card details which are very sensitive get replaced by the random value in the form of token given by the banks. Due to this customer's data cannot be saved by the merchants, it will use token instead of data which will reduce the chance of fraudent.

- **InsurTech:**
- The model where technology is used to disrupt the insurance value chain which can reduces the time as well as increase the efficiency with democratisation of product is called as InsurTech.
- Comparing all new Technologies used in finance and banking sector:



Source: Pwc analysis

RESEARCH METHODOLOGY

This is a descriptive study. The research explains the various technologies where reader will find the description on topics and give the answers for question "WHAT".

The research states the problem that how new technologies changing the world of finance. How traditional banking sector is becoming digitalized day by day. The selected qualitative type of approach for my study. Due to the limited time span given for this research we could not use the quantitative data. According to the observation, the blended approach (mixture of qualitative data as well as quantitative data) for this research work has a huge scope for writers. The biggest obstacle faced during writing this paper was limited source of information as for this topic new information is very much important.

In this research, secondary data is collected from authenticated sources like published reports of RBI, Pwc, Statista, Niti Ayoge etc. All the emerging technologies like fully stack digital banks, Machine Learning, Block chain, Cryptocurrency, InsurTech, RegTech, application of Big Data, AI, tokenisation etc. are explained in detail which will help managers to make strategies and planning in the finance and banking Sector.

CONCLUSION

The aim of this research is to provide information about new technologies and its uses in the finance service and banking sector. How, when and where the use of technologies in fiancé is explained in detail. The advantage and disadvantage are also analysed and written. The comparison of different technologies on the scale of their uses are done thoroughly. Study also explained how consumers are showing their interest towards the new technology. How finance sector using technologies to target a greater number of consumers. There is huge scope to study this topic further which will help the readers to come up with more ideas and help them to make their life easy. According to the analysis, it shows that globally there is increase trend in research on emerging technologies in the field of cooperate accounting, digital payment, and fully digital banks, depending on the future line of study as well as current number of the research work done. Hence it shows that this research topic is multidisciplinary in nature.

II. ACKNOWLEDGMENT

Thepreferredspellingoftheword “acknowledgment” inAmericaiswithoutan “e” afterthe “g”.Avoidthestiltedexpression, “Oneofus(R.B.G.)thanks...”
Instead,try“R.B.G.thanks”.Putapplicablesponsoracknowledgmentshere;DONOTplacethemonthefirstpageofyourpaperorasafootnote.

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