

Development of Digital Systems and Financial Markets

Dr. Shuchita Singh^{1*}, Dr. Amit Kumar¹

¹Associate Prof, GL Bajaj Institute of Management and Research, Gr Noida, India

*shuchita.singh@glbimr.org

Abstract

This paper analyzes the prerequisites for developing and promoting digital systems to manage public finance. Nowadays, finance has to manage and adapt to Digital Era. The article focuses on the usage of cash and non-cash forms of money. The author provides comprehensive descriptions for each of the listed states of digital funds and determines the place of digital transactions in the modern financial system as a means of payment. The research presents a detailed analysis of the advantages and disadvantages of new technologies like eXtensible Business Reporting Language (XBRL), Blockchain, Artificial Intelligence, and Fintech. The authors determine the main obstacles hindering the development of the digital economy and assess the risks and prospects associated with it. The main benefits of these innovative tools include reducing the risk of error (especially human error), low risk of fraud, system automation, extensive data analysis, substantial cost savings (by increasing the efficiency and decreasing errors), increased reliability in financial reports, and reduced workflow. The research paper presents how artificial intelligence combines financial information with tech capabilities, accelerates the digital transformation of finance and accounting, and may create a more safe business and economic environment, reducing human error. In conclusion, it is noted that weak integration into the financial system is the main obstacle towards further developing digital modes of payments and the digital economy. However, the rate of adoption of digital methods is very encouraging.

Keywords: Digital Finance, Financial System, Artificial Intelligence, XBRL, Payment System, Fintech, Digital Economy.

1. Introduction

At the end of the 20th and the beginning of the 21st century, the world community took many steps towards the international division of labor, creating supranational organizations, free economic zones, etc. The international financial reporting standards (IFRS) system was introduced to increase transparency and efficiency of the global financial market, facilitate the circulation of global financial resources, and enable a higher number of investors to conduct various financial transactions of a different nature. Foreign investors and international bodies provide funds to corporations in certain countries, helping finance existing businesses, open new ones, or support the Government (investing in Treasury or municipality bonds). Without these foreign flows of funds, the economies would have grown far less rapidly in the past 20 years. The internationalization of financial markets also leads to a more integrated world economy in which flows of goods and technology between countries are more commonplace. The internationalization of financial markets brought many benefits to investors and governments simultaneously. International financials facilitate trade risk management improvement, mobilize resources, and acquire and process information that helps allocate capital. At the same time, with every New Year, the global system of economic relations was becoming cluttered with a vast number of intermediaries, hierarchical structures, lobbyists, and groups of influence within the states that carried out control, regulation, licensing, and prohibitive activities concerning decentralized finance. With this, Opportunities for new activities open up. At the same time, the information and technological environment contain the potential danger of deformations in the structure of personality and the ways of its social integration. There is reason to assume that the development of information technologies in our modern age has both constructive and deconstructive consequences for a person or a business [1]. Management of finance faces new risks from implementing artificial intelligence or digital systems. The changing world affects economic development, taking different meanings and techniques. We are hearing about the presence of artificial intelligence in all economic sectors, and it is already part of our day-to-day life, in one way or another. The research paper presents how artificial intelligence combines financial information with tech capabilities, accelerates the digital transformation of finance and accounting, and may create a safer business and economic environment, reducing human error. Artificial intelligence is an aptitude demonstrated by machines, in contrast to the natural intelligence displayed by humans and other animals.

We can find new business solutions and solve problems that seem hard to fix until now using the most innovative technologies. Artificial intelligence, through knowledge management, links machines, IT, new technologies, and businesses. No matter the economic sector, the size, and the geographical location, all businesses face the same issue: preparation of financial statements, accounting bookkeeping compliance with international GAAPs, human error, and accurate comparison financial analyses. Artificial intelligence brings digital solutions: eXtensible Business Reporting Language (XBRL) and Blockchain. Investments through financial capital infusion lead to increased production, consumption, and income in private and public sectors [2]. Therefore, according to the Government's requirements, we need a standardized tool to submit all the financial accounting reports required by law – XBRL. The most developed countries

(from Europe, the Middle East, and the USA) already use XBRL in their financial statements.

2. Literature Review

2.1 Digital-Financial Markets

FinTech, The most valuable derivative of digitization, is the rich pool of gathered data growing very fast. Advanced computing capability has paved the way for big data analytics. Social media, mobile, analytics, and cloud (SMAC), an application program interface (API) technologies have allowed different data streams to talk to each other efficiently. This has led to integrating multiple services into a single platform, thus creating many cases for digital financial services – fueling the app economy [3]. The survival of financial institutions is connected with the adoption of innovation and embracing digital changes to improve the organization's efficiency and performance. Digital transformation and new technology adoption have changed how businesses and channels that offer banking and financial products and services are more intuitive and trustworthy [4]. Access to modern telecommunications systems is a priority in all countries worldwide. Financial and banking systems implement, use, and encourage online services for domestic and international financial transfers in their evolution. Digitization and digital transformation have become the most commonly used words, especially in recent years. However, there is an excess of definitions of this term used to describe the offline-to-online migration of commercial operations and businesses, including those found in many published research works. Contemporaneous economists have described digitalization as a tool for realignment of advanced technology and business models to engage digital customers more effectively at every touchpoint during the customer experience lifecycle [5].

Financial technology – FinTech refers to an emerging financial services sector becoming increasingly indispensable to financial institutions and has a steady impact on how technology supports or allows banking and financial services. Fintech Financial Technology targets construction systems that model, value, and process financial products, such as shares, bonds, money, and contracts. Contemporary economists define Fintech as a new financial industry that applies technology to improve financial activities [5]. Currently, financial technologies are used by all types of business, from start-ups to large corporations, in all economic sectors.

2.2. Artificial Intelligence

The digital revolution is changing the way of living, working, and communicating. The transformation within the telecommunications industry has had a significant impact on the surrounding world with the emergence and continued improvement of digital technologies [6]. Artificial Intelligence is one of them. It is a recent technological breakthrough that helps overcome many human errors, exceeding human performance in different areas, combined with industrial technology. IT programs are becoming more accurate, detecting and scaling objects better than human performance. Speech recognition systems can now identify the language of telephone calls and voice recordings with levels of accuracy that match human abilities. Translating from one language into another is now done in real-time, using a simple application on the phone.

Glasses can be connected directly to Google Maps or another search program. Artificial Intelligence solutions have the potential to transform such diverse and critical areas as education, research, healthcare, finance, accounting, auditing, transport, and energy. It is not a single technology but a family of technologies. In addition, Artificial Intelligence solutions can help sustainable, rapid, and viable regional development. The regional economic disparities in different areas of the world can be diminished considerably. Therefore, Artificial Intelligence can help successfully implement regional development policy objectives [7], regardless of the geographical area, spoken language, or predominant activity sectors. In many countries/regions, public authorities require the application of the XBRL to enhance business operations and transparency, to advance their market's standing in the eyes of investors.

The history of Artificial Intelligence started around 100 years ago, in 1920, when Czech writer Karel Čapek published a science-fiction piece called *Rossumovi Universal Robots*, which introduced the word robot. This humanoid machine work for people. In 1950, Alan Turing (mathematician, computer scientist, logician, and cryptanalyst) asked himself (publically) Can machines think? [8] and from this question, Artificial Intelligence started its journey. Turing developed three distinct strategies that might be considered capable of reaching a thinking machine: programming; ab initio of machine learning and knowledge management (using logic, probabilities, learning skills). As a result of discoveries in neurology, information theory, and cybernetics simultaneously, researchers, and with them, Alan Turing, created the idea that it is possible to build an electronic brain. Turing introduced his widely known Turing Test, an attempt to define machines' intelligence. The idea behind the test was to call machines (e.g., a computer) intelligent. If a machine (A) and a person (B) communicate through natural language and a second person (C), a so-called elevator, cannot detect which communicator (A or B) is the machine [9]. And the research continued. On May 11, 1997, IBM's chess computer defeated Garry Kasparov after six games. In the last two decades, Artificial intelligence has grown heavily. The Artificial Intelligent market (hardware and software) has reached \$9 billion in 2018, and the research firm IDC (International Data Corporation) predicts that the market will be \$47 billion by 2020. This all is possible through knowledge management to explore Big Data and take advantage of faster computers and advancements in machine learning techniques.

2.3. eXtensible Business Reporting Language (XBRL)

eXtensible Business Reporting Language – XBRL – is used for electronic communication of business and financial data, revolutionizing industry reporting worldwide. XBRL enables the company to generate its required reporting information directly from its financial data. It is a consistent tool also useful for comparability and overall business evaluation. The birth of modern accounting had its origins in the Italian Renaissance, where the favorable climate existed for double-entry bookkeeping to be developed. Using a standardized coding structure, such as XBRL, would help reduce these wage expenses by removing data entry replication over many channels and reducing lost data costs. In 2000, an accounting industry-specific language was released, this was version 1.0, and it was renamed the eXtensible Business Reporting Language, what we called now XBRL. In 1999, the American Institute of Certified Public Accountants, six information technology companies, and experts reported that they had

joined forces to develop an XML-based Financial Reporting Language and extend XBRL internationally for use in business reporting. If the father of accounting is Luca Pacioli, the fathers of XBRL are Charles Hoffman and Wayne Harding. The American Institute of Certified Public Accountants was receptive to this idea and funded the creation of a prototype once a plan was presented. When the prototype was finished, the AICPA created and promoted XBRL International. The group was formed as a not-for-profit global consortium of companies and agencies with one common goal, the development of XBRL and the widespread acceptance and use of the new international coding standardization process for financial information. Currently, XBRL is used by more than 100 regulators in over 60 countries (Europe, Middle East, Asia, North and South of America), supported by over 200 software packages and a growing number of companies, to facilitate structured data reporting across millions of companies.

2.4. Blockchain

Blockchain is another technology enabling businesses to generate their required reporting information directly from their financial data. Blockchain technology continues to grow and is being used in more and more business sectors. Finance, accounting, and auditing have been identified as areas that could greatly benefit the distributed registry and other features of this one. Blockchain is a new technology introduced a decade ago, after the financial crisis of 2008 and there is still a long way to be accepted and adopted by everyone. Blockchain can be described as the chronological record of block transactions. Cryptography is used based on a chain of digital signatures to ensure transactions. Each block is a group of transactions added to the last block by reaching a consensus on its authenticity among users, which is then passed to each network user to update their database. The Blockchain system records all transactions ever made, shared by consensus, and shared among each participant's users, and it is tough to force it. Since every two-key sign-in and any transactions are cryptographed and simultaneously maintained in each Node's distributed ledgers, this makes this almost impossible to be hacked. Nowadays, double-entry bookkeeping is not a complete system, but it is logically extendible to triple-bookkeeping by including a set of forces in its third axis. Blockchain helps the companies write their transactions directly into joint bookkeeping, creating an interlocking system of enduring accounting records in the accounting industry. Double-entry accounting has been used for a very long time now. Triple entry accounting adds clarity and honesty to bookkeeping that double-entry accounting cannot offer [10].

2.5. Cryptocurrencies

As digital finance and artificial intelligence occupy an increasingly important place in the financial services market over the last decade, cryptocurrencies appear too. Cryptocurrencies are virtual digital currencies because cryptographic techniques lie at the heart of their implementation [11]. Historically, the idea and concept of storing important information using cryptographic techniques are considered older. The term crypto is taken from an ancient Greek word Kryptos, which means hidden. World Bank classified cryptocurrencies as a subset of digital currencies, defining digital representations of value denominated in their unit of account, distinct from e-money, which is simply a digital payment mechanism representing and denominated in fiat money. In contrast to most other policymakers, the World Bank has also defined cryptocurrencies itself as digital

currencies that rely on cryptographic techniques to achieve consensus. Today, the advent of cryptocurrencies is traced to the emergence of the first cryptocurrency, bitcoin, in 2009. After the emergence of bitcoin in 2009, the experiments in cryptocurrencies started happening in 2011 with the release of SolidCoin, bitcoin, Namecoin, and others. As of August 1, 2018, more than 1,737 different cryptocurrencies are on the market. This number of cryptocurrencies breaks down into 819 coins and 918 tokens. According to CoinMarketCap data, the combined market of overall cryptocurrencies is valued at \$269 billion [4]. Central banks have started to consider whether they might issue digital currencies. Due to the advent of cryptocurrencies and blockchain technology, the central banks of major economies began to think and work on their own Central Bank's Digital Currency (CBDC) [4]. A fundamental matter raised by CBDC issuance relates to the appropriate roles – in financial intermediation and the economy at large – of private financial market participants, governments, and central banks. With CBDCs, there could be a more significant role for central banks in financial intermediation. As the demand for CBDC grows, and if cash holdings do not decline in lockstep, central banks might need to acquire (or accept as collateral) additional sovereign claims and, depending on size, private assets (e.g., securitized mortgages, exchange-traded funds, and others). If demand becomes very large, central banks may need to hold less liquid and riskier securities, thereby influencing the prices of such securities and potentially affecting market functioning. Central banks may also need to provide substantial maturity, liquidity, and credit risk transformation to both banks and markets. Since central banks could assume more critical roles, they could significantly impact lending and financial conditions.

3. Research Methodology

The present work paper is exploratory research based on investigative techniques. To achieve efficient and sustainable economic development, it aims to identify and encourage new financial methods through artificial intelligence and digital systems. The paper presents the unique approach of finance and the necessity to review and adapt the management and supervision of financial institutions, markets, and their services. This research paper shows how artificial intelligence combines financial data with tech capabilities to accelerate the digital transformation of finance to reduce human error and create a more secure business and economic environment.

4. Findings and Conclusions

4.1. New compulsory financial statements submission forms

Globally, the convergence of IFRSs and US GAAPs accounting standards allows uniformity in presenting financial statements. The business strongly requires relevant, reliable, comparable, and timely information. It becomes even more apparent when considering the increasing complexity and detailed accounting principles required. Implementing accounting principles and knowledge management to perform it is changing the accounting practices [12]. In the twentieth century, the accountants' salary was considered the main cost of an accounting department. Accountants had to spend a lot of time entering an ever-increasing amount of data in the accounting books (journal and ledger), initially papyry, then computerized, since the 90s. Since the end of the 1990s, accounting information systems [13-14] are becoming increasingly used in

accounting departments, it facilitates quick data entry, reducing errors, improving processing time, easy adjusting entries, integration with cost accounting [15], and thus obtaining a high degree of detail. In accounting departments, the skills requirements are rapidly changing, moving towards information technology rather than accounting. However, the costs of keeping the accounts have not decreased. New costs for accounting software licenses (especially ERP software) have become essential and increased exponentially. Currently, the number of accountants is declining, and companies are looking for fewer but more qualified employees [16]. Accountants must be able to use accounting information systems perfectly and must also be able to customize them. IT knowledge is therefore now undoubtedly essential. Knowledge management [17] is increasingly oriented towards integrating IT systems with accounting departments' financial, accounting, and legal skills. It is important to create teams of people capable of understanding and applying transversal knowledge reason in flow charts, communicating with a common denominator, and communicating each other's work needs. The positive combination between IT and accounting allows an increasingly timely and reliable disclosure, leading to a uniformity of exposure. Standard setters, tax authorities, and legislators should constantly interact with software houses [18]. This will make coordination between practice and laws challenging to face accounting systems. Financial statements represent an important disclosure of the synthesis, not only among accounting, legal and fiscal rules but also among these rules and the constraints and opportunities of information technology. The challenge is not only faced by standard setters, tax authorities, and legislators but also by accounting practitioners, developers of business reporting, IT professionals, auditors, executives, bureaucrats, academics, students, politicians, and government ministers. The information summarized by the financial statement (as this is a document on which all stakeholders rely) is better to be collected, synthesized, transmitted, and analyzed with incredible rapidity and accuracy. Since XBRL is a language that companies can use to fulfill legal and accounting obligations, this is an open-source technology that contains standard tags. Still, it allows the tracking of objects to perform different types of analysis. XBRL is not the software itself, and it is a standardized language program usable by software houses to create and customize specific software for its customers. In general, free, user-friendly versions are also available and provided by governments to allow all companies, in any case, to prepare and send financial statements. Even if there is a need and a tendency towards uniformity, particularly to comply with the most widespread international accounting standards, IFRS and US GAAP, various XBRL taxonomies are constantly updated and released annually. Each country is better to customize taxonomies to consider the translation in different languages. Initially, the XBRL taxonomy included only the numerical schemes of the financial statement: statement of financial position (balance sheet), statement of comprehensive income (income statement or profit and loss statement), statement of cash flows (funds flow statement), and statement of changes in equity. Furthermore, XBRL language now also concerns the descriptive notes of the financial statements, limiting the freedom of company directors in drafting this annex. However, the taxonomy regarding the financial statement notes provides a rigidity only concerning the list of paragraphs to be included. The editor of the financial statement is then free to add comments, include further detail in each paragraph, or specify within the mandatory paragraphs that some paragraphs are not inherent and should not be drafted. Accounting and financial systems are continuously updated. Here is how in 2019, there is another update in the US GAAP

Financial Reporting Taxonomy. This one contains mainly updates for accounting standards. It includes amendments for the SEC's authoritative literature in which GAAP does not specify the underlying recognition and measurement but is implemented by XBRL codification anyway (<https://xbrl.us/home/filers/sec-reporting/taxonomies/>). The latest update for IFRS (International Financial Reporting Standards) Taxonomy was in 2018. It was required to mark up electronic IFRS financial statements. With the IFRS Taxonomy, the International Accounting Standards Board can ensure that the taxonomy used represents the International Financial Reporting Standards (IFRS Standards) accurately (<https://xbrl.us/home/filers/sec-reporting/taxonomies/>).

4.2. Impact of XBRL on Financial Analysis and Audit Effectiveness

XBRL is a technology that allows the tracking of objects. XML (Extensible Markup Language) is a metalanguage or marker language based on a syntactic mechanism to define and control elements' meaning in documents or texts. Following the browser war (the situation in the nineties in which Microsoft and Netscape introduced extensions that were proprietary to HTML), the World Wide Web Consortium (W3C) [19] was forced to follow the individual extensions to the HTML language. W3C had to decide which features to include in HTML specifications and which to leave out. In this context, the need for a markup language that offered more freedom in tagging while remaining within a standard began to emerge. "XML project," which began at the end of the nineties in the SGML Activity of W3C, sparked so much interest that the organization set up the XML Working Group, which consists of world experts in SGML technologies, as well as the XML Editorial Review Board, which drafts project specifications. In February 1998, the specifications became an official recommendation under Extensible Markup Language, version 1.0. XML was soon realized to be more than just a web-centric technology, but also an instrument capable of being used in the widest range of contexts: from the definition of document structure to the exchange of information between different systems, from the representation of images to the definition of data formats. HTML and XML serve very different purposes: HTML describes grammar for describing and formatting web pages (layouts). XML is a metalanguage used to create new languages for describing structured documents. In contrast to HTML, which has a well-defined and restricted set of tags, XML allows users to define their own. Nowadays, XML is also widely used to export data between DBMSs (Database Management Systems). The use in the configuration files of applications and operating systems is widespread. XML, like HTML, uses markers in its programming. These markers are called tags (labels) to assign semantics to the text. A tag can contain information in two ways: through parameters or by enclosing other types of information. Consequently, they can be opening tags, necessarily followed by closing tags (among which you may have content), or open and close tags. Therefore, they can provide information only through their parameters. Each label starts and ends with angle brackets <> (which would be the minor and major signs), while the closing of the tag or the closing tag is represented by the / bar. The advantages of XML can be summarized in one word: SPEED. Many companies switch to e-commerce because of its speed: faster response to customer needs, faster publishing of direct information to customers and supply chain partners, faster processing of orders received via the Internet. SPEED is also an acronym that lists the main advantages of XML: Storing, Publishing, and Exchanging Electronic Documents. XBRL, in particular, is the language based on XML programming used for communication and the exchange

of financial and accounting data in electronic format [20-21]. The auditing and auditing standards legislation does not provide the auditor with new controls concerning the codification of the financial statements compliant with the XBRL format. Therefore, the auditor must not carry out specific checks on the XBRL format and submit the financial statements in the XBRL format. In this regard, pointing out by the Auditing and Assurance Standards Board (IAASB), an international body responsible for ruling the principles and rules of the revision), in the document entitled IAASB Staff questions and answers – XBRL: The emerging landscape that the auditor is not required to implement verification procedures on the conversion of the financial statements in XBRL format. The auditor cannot be assigned a role about the new discipline concerning the XBRL format and the fact that the XBRL format is not included in the other information required by the auditor under the ISA 720 international audit principle. Therefore, the auditor is not required to assess any inconsistencies between the financial statements he has made a judgment and the one submitted in the XBRL format [22-23]. Since it is a standardized language, XBRL provides an efficient and consistent system to define an application's data model for analyzing financial documents. It applies standard methodologies, such as a historical analysis of financial statements through reclassification and analysis of the financial statement indices and prospective analysis through preparing pro forma financial statements. A complaint with the specifications XBRL taxonomy provides an effective environment for defining: the data dictionary of the elements used by financial models as input variables and the layout and logic of calculating the reclassified statements. XBRL can be used as an input data format, which feeds analysis modules, or as an output format, which allows the export of data processed by the model. We can, for instance, export a forecast income statement to an accounting package with modules for planning and budgeting or produce a financial statement for publication on a web portal for reporting to senior management. XBRL data models, both in taxonomies and in instances, offer compelling functionalities in this context.

4.3. Blockchain and Accounting Bookkeeping

The blockchain is distinguished by the absence of an intermediary entity that must guarantee the authenticity of the data. Participants themselves perform this task on the blockchain, using an authentication system. Furthermore, every transaction stored in the chain cannot be deleted or modified and can be consulted by network members [24]. Blockchain technology is ideal for transactions involving the following subjects: payments, management of information linked to contracts (such as smart contracts), and transactions involving exchanges of goods and services, among others. There is the potential for all business sectors to be affected (from banking to insurance, from energy to healthcare, without excluding telecommunications). Despite the many benefits it brings to both individuals and businesses, the Blockchain phenomenon is not exempt from some concerns. However, it is expected to allow a safer and faster data and information transmission flow. In contrast, creating databases with the same characteristics as the ledgers will simplify and speed up the necessary processes, for example, the assessment and the payment of taxes. As a result of its main feature, decentralization, operations can be carried out without a certification intermediary, which puts all those professions such as notaries, lawyers, auditors, and accountants, who have always dealt at different levels with certifying data and information. The spread and impact of blockchain are growing

together with the increase in the volume of data produced every day. However, according to Gartner and Deloitte (well-known research and advisory companies), it will be necessary to wait until at least till 2025 to witness the emergence of its most disruptive and highly transformative effects. Currently, we are in the first phase of experimenting with and utilizing technology. The main application of the Distributed Ledger [25], above all by leveraging the peculiarities of smart contracts, is the reconciliation of the administrative documents of the companies in a decentralized manner, thus delegating this activity to the decentralized consent of the blockchain. Three-way reconciliations (orders, transport documents and invoices) and two-way reconciliations (such as orders and invoices) can be performed inside the blockchain. Therefore, it would no longer be necessary to issue the documents as they are already produced in the system and therefore accessible by the parties, store them (because they are already stored in the system), and show them (accessible by anyone authorized and therefore distributable). In addition to its application to electronic invoicing, Blockchain technology also has the potential to transform the way invoices are issued and payments are made. By combining decentralization and electronic billing, the system will provide a transparent and tamper-proof structure and minimize the risk of human error and fraud. Each record or block, linked and secured using cryptography, is also visible to all parties, removing the need for an intermediary.

4.4. Artificial intelligence-based knowledge management on XBRL and Blockchain for business accuracy

The future of accounting practices will be characterized, developed, and determined by the combination of XBRL language, artificial intelligence, and Blockchain technology as the expression of triple entry bookkeeping and electronic invoicing. The knowledge management associated with accounting reflects the needs of the historical context. Still, using new technologies and combining accounting with information technology can solve long-standing challenges . While some problems, such as reliability of the information and the lack of cross-comparison, have always existed, other issues like the need for standardization, comparability, rapidity of registration, and extensive data analysis have also recently emerged. Integrating all these advanced tools has too many benefits and opportunities. Accounting faces numerous challenges in the modern world, including globalization, which exponentially increases competition in every industry, and the lack of trust caused by the depersonalization of relationships.

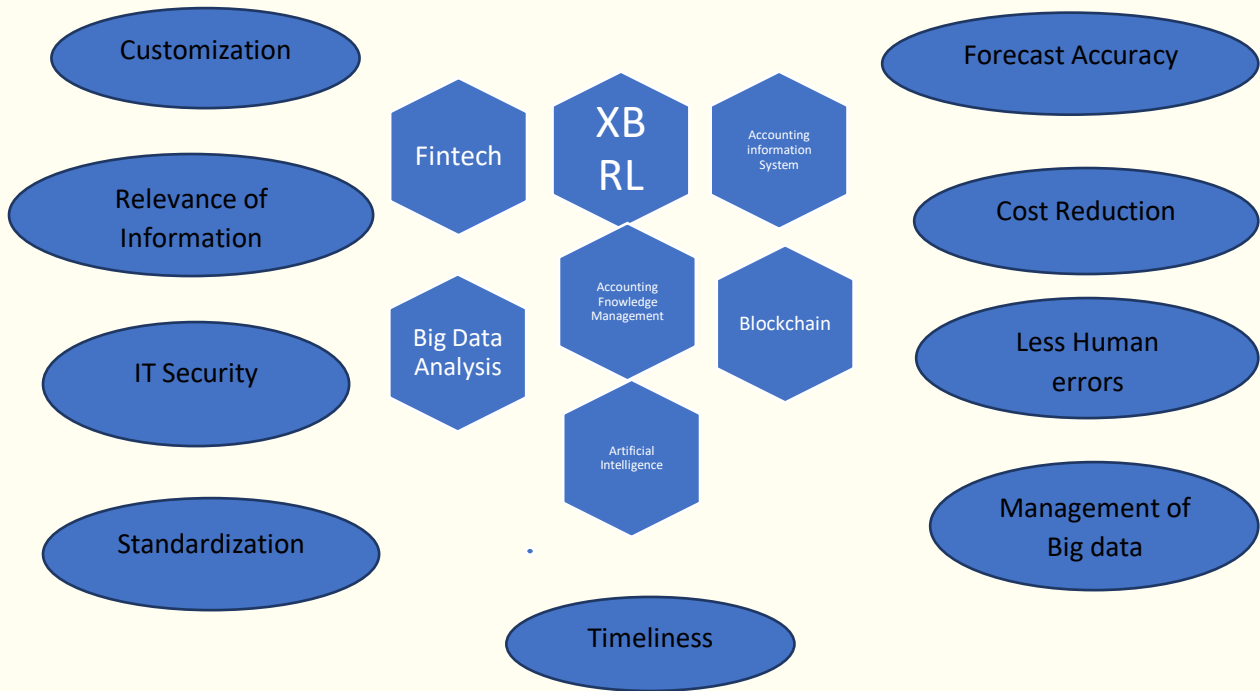


Figure 1. Challenges in Accounting Knowledge Management

Figure 1 presents all the challenges accounting knowledge management faces in the digital era. As shown, reasoning on the opportunities and advantages offered by each technology, each tool, integrated with the others, will provide a complete shield against all these problems, providing an immediate and effective solution. Positive answers to challenges are often found through the combination of different technologies (for example, the reduction of human error can occur with the use, at the same time, of electronic invoicing, Accounting Information Systems [26], Artificial Intelligence, and Blockchain), A single digital tool can solve problems afflicting the accounting system since its inception (for example, the blockchain is an expression of the triple entry bookkeeping system that solves reliability and trust problems).

4.5. Need for a new approach to supervision and management of Financial Institutions

As a result of the global financial and economic crisis, public trust and confidence in governing and financial institutions and the principles and concept of a market economy have been eroded to a great extent. As a result of the global meltdown of 2008, governments and other regulatory agencies failed to monitor and steer unrestrained speculative and harmful financial activities, contributing to economic unease [27]. Historically, financial crises have led to the emergence of new national and international institutions. Financial digitalization has led to new responsibilities for financial supervisors. As a result of the recent global financial crisis, we have a unique opportunity to go beyond economic data and capture cross-border financial data and other information that could help national and international institutions measure and manage financial risks better [28]. Globalization will only be possible through a fully integrated financial system, and FinTech technologies such as Blockchain, cryptocurrencies, XBRL,

AI, and robot advisors have revolutionized the entire financial services industry. These new economic technologies can restructure and improve financial services' efficiency, quality, and effectiveness by cutting human errors and processing time. Central banks are the leading authorities responsible for macroprudential policy in most jurisdictions. Most jurisdictions have strengthened their frameworks for monitoring financial stability [29], typically by setting up public authorities. The involvement of central banks is a crucial feature of any financial supervisory architecture. This is also a source of synergies and conflicts of interest. Synergies stem from the links between financial and economic stability and the connection between monitoring the overall liquidity of the system – the role of central banks – and the oversight of financial system solvency, which is the role of the prudential supervisory function. As monetary policy decisions regarding interest rates can affect banks' profitability and solvency, conflicts of interest may arise. The central bank's responsibility for prudential regulation also raises concerns about a political economy effect. In light of the above observations, XBRL, Fintech, Bigdata, and Artificial intelligence are strongly recommended for managing finance in an economy.

5. Conflict of Interest

There is no conflict of interest in this work.

References

- [1] Lokova MY, Khanova M., Azamatova GK, Vindizheva AO, Reshetnikova NN. Social Consequences of the Impact of Information Technologies on the Values of Modern Youth in the Conditions of the Global Financial and Economic Crisis. In International Conference Project “The future of the Global Financial System: Downfall of Harmony, Springer, Cham; 176-182.
- [2]. Moşteanu NR, AlGhaddaf C. Smart economic development by Using Foreign Direct Investments – UAE case study. Journal of Information Systems and Operations. 2019; 13[1].
- [3]. Economic Corporate Network. The Future of Digital Finance. Retrieved from: https://www.corporatetwork.com/media/1617/the-future-of-digital-finance_web.pdf, 2016.
- [4] Mohamed H, Ali H. (2019). Block chain, Fintech and Islamic Finance. CPI books GmbH, Leck. <https://doi.org/10.1515/9781547400966>.
- [5] Solis B, Littleton A. The 2017 State of Digital Transformation. Research Report. Altimeter Group. https://www.prophet.com/wp-content/uploads/2018/04/Altimeter_-_2017-State-of-DT.pdf.
- [6] Zhao H. Assessing the Economic Impact of Artificial Intelligence. Emerging Trends in ICTs. Issue no.1, September, 2018. <http://handle.itu.int/11.1002/pub/81202956-en>
- [7] Moşteanu NR. Regional development and Economic Growth approach in Europe and GCC. Eco forum Journal 2019; 8(2):25-34

- [8] Koistinen A.-K. The (care) robot in science fiction: A monster or a tool for the future?. *Confero*. 2016; 4(2):97-109.
- [9] Schultebracks L. A short history of Artificial Intelligence. 2018. Retrieved from <https://dev.to/schultebracks/a-short-history-of-artificialintelligence-7hm>.
- [10] Faccia A, Moşteanu NR. Accounting and Blockchain technology from double-entry to triple-entry. *Proceedings of 8th International Conference on Business and Economic Development (ICBED)*, April, 2019, New York, USA.
- [11] He, D., Habermeier, K.F., Leckow, R.B., Haksar, V., Almeida, Y., Kashima, M., and Kyriakos-Saad, N. (2016). *Virtual Currencies and Beyond: Initial Considerations*. IMF Staff n Discussion Note. <http://www.imf.org/external/pubs/cat/longres.aspx?sk=43618>.
- [12] Richards R, Stevens R, Silver L, Metts S.. Overcoming employer perceptions of online accounting education with knowledge. *Administrative Issues Journal: Connecting Education, Practice, and Research*.2019; 8(2):70-80.
- [13] Amat O, Amat N . Evolution of financial information and management control over the last 150 years. The case of Bodegas Torres. *Economics Working Paper Series. Working Paper No.1633.2019* Retrieved from: <https://econ-papers.upf.edu/papers/1633.pdf>
- [14] Gofwan H. Effect of accounting information system on financial performance of firms: A review of literature. Department of Accounting (BINGHAM UNIVERSITY)-2nd Departmental Seminar Series with the Theme–History of Accounting Thoughts: A Methodological Approach. Vol. 2, No. 1.
- [15] Astuty W. An Analysis of the Effects on Application of Management Accounting Information Systems and Quality Management Accounting Information. *Kumpulan Jurnal Dosen Universitas Muhammadiyah Sumatera Utara*,2019; 7(3):27-34 .
- [16] Jasinska-Biliczak A. Blockchain-the new instrument of safe knowledge transfer.2018.
- [17] O’Leary D.E. Big Data and Knowledge Management with Applications in Accounting and Auditing: The Case of Watson. *SSRN Electronic Journal*. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3203842
- [18] Turney PD. Thumbs up or thumbs down?: semantic orientation applied to unsupervised classification of reviews. *Proceedings of the 40th Annual Meeting on Association for Computational Linguistics. ACL ’02*, Stroudsburg, PA, USA, 2002; 417–424.
- [19] Clark J, DeRose S. XML path language (XPath) version 1.0. W3C recommendation, 1999. World Wide Web Consortium. Retrieved from <http://w3c.org/TR/XPath> 2017.
- [20] Radu, F. XBRL–The business Language in the Digital Age. *Ovidius University Annals, Economic Sciences Series*. 2016; 16(2): 589- 594.

- [21] Wang B,Wang D. A Process Model for XBRL Taxonomy Development. Journal of Signal Processing Systems.2018; 90(8-9): 1213- 1220.
- [22] Abdolmohammadi MJ, DeSimone SM, Hsieh TS, Wang Z. Factors associated with internal audit function involvement with XBRL implementation in public companies: An international study. International Journal of Accounting Information Systems.2017; 25: 45-56.
- [23] Mao Y, Zhang L. The influence of XBRL to audit and countermeasure research. Proceedings of 3rd International Conference on Economics, Social Science, Arts, Education and Management Engineering (ESSAEME 2017). Atlantis Press, <https://doi.org/10.2991/essaeme-17.2017.454>
- [24] Mishra RK.. Blockchain Technology-an Exploratory Study on its Applications. SSRN Journal 2018. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3194522.
- [25] Yu T, Lin Z, Tang Q. Blockchain : the introduction and its application in financial accounting. Journal Of Corporate Accounting And Finance.2018; 29(4): 37-47.
- [26] Zaki ., Khayyam H, Erfan N, Abdelmounaam R. Wisdom extraction in knowledge-based information systems. Journal of Knowledge Management.2019; 23(1):23-45.
- [27] Scardovi, C. Digital Transformation in Financial Services. Springer International Publishing.Chem,2017 Retrieved from: [//www.springer.com/gp/book/9783319669441](http://www.springer.com/gp/book/9783319669441)
- [28] Wang B, Wang, D. A Process Model for XBRL Taxonomy Development. Journal of Signal Processing Systems. 2018; 90(8-9): 1213- 1220.
- [29] Schueffel P. Taming the Beast: A Scientific Definition of FinTech. Journal of Innovation Management.2016: 4(4): 32-54.