Tech-Business Analytics – a New Proposal to Improve Features and Quality of Products and Services in Various Industry Sectors – An Explorative Study

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ABSTRACT

Purpose: *Tech-business analytics is a tool that integrates data analytics and ICCT underlying techniques. To simplify or solve the industry problems starts from primary industry sector to quaternary industry sector. The purpose of Tech-Business Analytics is to use technology and data analysis to improve the features and quality of products and services in various industries. This involves using data from various sources to gain insights into customer behaviour, market trends, and other factors that can impact the success of a product or service. An explorative study of Tech-Business Analytics would involve analysing the current state of data analysis in various industries and identifying areas where advanced technologies could be used to improve the quality of products and services.*

Design/Methodology/Approach: *The methodology of Tech-Business Analytics, a proposal to improve the features and quality of products and services in various industries, would involve an explorative study using a combination of qualitative and quantitative research methods. It would involve a comprehensive approach that combines qualitative and quantitative research methods to gain a holistic understanding of the potential benefits and challenges of adopting advanced data analysis techniques in various industries.*

Findings/Result: *It is an explorative study on Tech Business Analytics – a new proposal to improve the features and quality of Products and Services in Various Industries.*

Originality/Value: *An explanation of how Tech-Business Analytics – a new Proposal to improve features and quality of Products and Services in Various Industries. A generic architecture is also available, which looks at 30 recently presented Tech-Business Analytics in Primary, Secondary, Tertiary, and Quaternary industry sector research proposals and is useful for technical purposes.*

Paper Type: *Exploratory research.*

Keywords: Business Analytics (BA), ICCT underlying technologies, Tech-Business Analytics, TBA, Industry Performance, Data Science, Big Data Analytics, Research gap in Business Analytics, ABCD Listing,

1. INTRODUCTION :

1.1 Introduction to Data Mining:

When data mining software finds previously undetected or blatant patterns that no one saw, it's possible to "discover gold" in unexpected places. In a mining analogy, massive amounts of data are shifted through in the hopes of finding something useful. Huge volumes of low-grade minerals are filtered through in a mining operation to uncover precious materials. From examples or data, the Data Mining system learns how to split or categorize data, building classification rules along the way. A bank's

customer database is an example of this. Rules that connect one relationship attribute to another. In a supermarket database, for example, 72 percent of all entries with goods A and B also have item C. The difference between sequence rules and other rules is the temporal element, which analyses collections of connected records and detects frequently occurring patterns throughout time. For example, a retailer's database can be utilized to find out certain purchases typically precede the purchase of a microwave oven.

Set-based database techniques Statistics can be used at several phases of data mining, such as data cleansing: and eliminating inaccurate or unneeded information. EDA (exploratory data analysis): frequency counts, histograms, and other visualizations of attribute re-definition of data selection and sampling: minimize computational scale Measurements of attribute connection and correlations, rule interest, categorization, and so on are all part of data analysis. Clustering and segmentation is the process of dividing a database into partitions or groups that are in some manner comparable. Clustering based on likeness is a concept that appears in a variety of fields, including chemistry, where molecules are grouped. Similarity clustering is used in data mining applications like segmenting a client/customer base. It separates a population into sub-groups for further analysis or action, which is critical when dealing with large databases. A trained neural network might be considered an "expert" in the category of data it has been given to evaluate, as it generates projections in new scenarios of interest and responds to "what if" inquiries. Because of its iterative structure, the resulting network is seen as a black box; there is no explanation of the outcomes; it is difficult for the user to interpret the results; it is difficult to include user intervention, and it is slow to train. After being trained with a set of data, decision trees are used to represent knowledge and can be used to classify new objects. An obfuscated structure that is difficult to comprehend, as well as missing data that could cause performance concerns, are all issues. When working with massive data sets, they become inconvenient [1].

By using I_OT to process the huge and ongoing data collected, a specific goal of forecasting the future should be employed, along with an explanation of the issue utilising another high-tech system and model [1].

Data mining finds and validates correlations between explanatory and criteria variables. Data mining is being used more frequently in diverse types in marketing as well as marketing research and business intelligence [2].

The generated models are regarded as a tool for supporting managerial choices, developing the business plans of high-tech firms, gauging operational performance, and assessing the success of the growth of the chosen activities. A high-tech telecoms company used the business intelligence tool to create several graphic models [3]. They are data being produced online and around the world to realise the concept of big data. Due to the difficulties involved in combining and using numerous strategies, calculations, and sophisticated programming techniques to conduct a meaningful analysis of vast amounts of information, information science is a crucial testing ground [4]. Most businesses have finished, one after the other, automating transaction processing therefore, the automation of decision-making and forecasting processes will be crucial for businesses to remain competitive in the future. Enterprise resource planning (ERP) systems lack a forecast flow to combine forecasting and decision-making flows [5].

1.2 Introduction to Data Analytics:

The term "data analytics" refers to techniques for data analysis intended to boost productivity and revenue. To pinpoint different behavioural patterns, data is taken from a variety of sources, cleaned, and classified. Depending on the firm or person, several methods and tools are employed. Iterative data mining is used to uncover hidden insights, which are subsequently evaluated considering organizational needs. Reports are prepared and sent to the appropriate teams and individuals depending on the data to achieve a high degree of business performance. To find out the advantages and disadvantages of your rivals, conduct a market study. Enhance Business Requirements - Data analysis enables businesses to meet the needs and experiences of their consumers more effectively. As the market for Data Analytics increases, a slew of new tools with varying levels of functionality have emerged to match the need. The following are the most popular open-source or user-friendly data analytics tools [1].

Traditional information research techniques cannot be used to handle enormous amounts of data successfully. Unstructured data instead necessitates detailed information illustrating apparatuses, frameworks, and approaches for separating experiences and data that vary by affiliations. Information science is a logical process that uses PC tools for preparing massive amounts of data along with

scientific and quantifiable ideas. We are all witnessing a remarkable increase in data creation both offline and online that is fostering the concept of big data right now [6].

The old statistical methodologies are now unable to handle such data floods due to the constant rise in the quality and quantity of data produced by regular corporate operations, as well as the ongoing importation of associated social data. Because of this, researchers have been forced to create extraordinarily complex and sophisticated analytics that may be used to learn important lessons that are advantageous to the commercial world. This chapter provides clear explanations of the fundamental concepts that support social big data analytics [7].

It is exceedingly difficult to create worldwide regulatory frameworks that can effectively manage big data and artificial intelligence. The development of digital technology over the last 20 years has created new possibilities and the ability to digitise society and daily commercial activities. Information abundance and extraordinary interconnectedness are made possible by the info-communications sector [8].

Businesses may appropriately store, process, analyse, and report on data and processes using business intelligence (BI) solutions, which offer a versatile platform. Many literature studies have shown how BI technology may be used to manage important data and support data-driven decision making (DDD) [9].

Many modern company concepts are built around massive data gathering and processing. With the aid of modern technology, businesses can now develop highly individualised recommendation systems that aid in making precise market predictions. The management and storage of personal information, which is frequently quite sensitive, must therefore be done with the utmost care [10].

1.3 Introduction to Business informatics:

The value of economic and information technology analysis is enhanced by the focus on programming and equipment. BI is related to information systems (IS), a well-known field that developed in North America. There are a few differences, however, that set business informatics apart as a unique science. Information technology, as well as fundamental components of applied computer science, are covered by business informatics to a larger extent than information systems. In business informatics, there are a lot of construction and implementation-related factors. That is, rather than examining the consequences of business problems after the fact, one major focus is on generating solutions to business problems. IS seeks to explain real-world events through experiments. IS has been described as having an "explanation-oriented" viewpoint, as opposed to the "solution-oriented" perspective that dominates BI. Information scientists attempt to explain the phenomena of IT acceptability and influence in companies and society using an empirical method. To do this, qualitative and quantitative empirical investigations are usually conducted and evaluated. BI researchers, on the other hand, are more concerned with the design of IT solutions for problems they have observed or imagined, and hence place a higher emphasis on IT's potential future uses. In business informatics, another goal is to develop a Humboldtian-style tight integration of research and education. Because most researchers are also instructors, the lessons learned from actual research projects are promptly integrated into the curriculum. Things taught are regularly examined and altered due to the rapid rate of scientific and technological advancement in BI. The discipline of business intelligence (BI) is still in its initial stages. As a result, significant challenges must be overcome before the aim may be achieved [11].

As increased business analyses are conducted, grid computing is becoming a critical component. Data transfer between computing resources and other resources happens at the network edges in typical corporate computing infrastructures. Contrarily, most of the commercial activity are restricted by time and place. This chapter's goal is to provide an overview of how geographic information system (GIS) grids and business intelligence are used in the workplace. In conclusion, business intelligence boosts productivity by providing users with the knowledge they require at the precise moment when they are deciding [11].

This ELP includes a general overview of the current field of data analytics, an analysis of the local and national labour markets, a look at how academic institutions is addressing industry needs, and resources and guidelines to help community colleges overcome the difficulties of creating a new programme in the developing field of data analytics [12].

Geographical information system is a concept in various sectors. It is developed from around a dozen fields, some of which are new to most information system scholars. The study begins by outlining the uses of GIS in the vertical sector before outlining its advantages and disadvantages [13].
The national governments have the authority to provide it in different sectors that are both effective and affordable to everyone. Start-ups are attempting to reach the underserved market and disrupt the industry in this way [14].
In our nation, automation in the agriculture sector of the economy was low until recently. At this point, it is conscious requirement to digitalize and automate many agricultural procedures. To minimise losses, boost agricultural business efficiency, and ensure efficient resource management, it is necessary to automate as much of the production cycle as possible [15].

1.4 ICCT Underlying Technologies with special emphasis on IoT:

Our daily lives are significantly impacted by ICCT underlying technologies (Table 1). With the ability to connect heterogeneous devices in several ways, it has developed into a crucial part of our vital infrastructure. The Internet is a live system that is always evolving and bringing about modern technology, applications, protocols, and algorithms. There has been a surge in Internet access and mobile broadband innovation because of the quick development of wireless communication technologies. Infrastructure-free communication devices are becoming more common, more intelligent, powerful, networked, compact, affordable, and simple to deploy and set up. The information communications and computation technology (ICCT) sector's new future direction are the Internet of Things (IoT). Machine-to-machine (M2M) interactions, sometimes referred to as the Internet of Things (IoT), have grown in importance in recent years in the ICT sector and among researchers. It offers a thorough analysis of the concepts, guiding principles, and advantages of the Internet of Things paradigm. We concentrate on key IoT technologies, innovative protocols, and widely used applications. This overview might be useful for people just starting started on the Internet of Things (IoT) industry and want to learn more and get involved in its growth [2]. The Internet of Things (IoT), which consists of devices, intelligent systems, and services, is a foundational component of the future Internet.

Table 1: List of 12 ICCT underlying technologies [19]

S. No.	ICCT Underlying Technologies
1	Artificial Intelligence & machine learning
2	Big Data
3	Blockchain Technology
4	Cloud Computing Technology
5	Cyber Security Technology
6	Digital Marketing Technology
7	3D Printing Technology
8	Internet of Things Technology
9	Information Storage Technology
10	Quantum Computing Technology
11	Ubiquitous Online Education Technology
12	Virtual and Augmented Reality Technology

These ICCT-based technologies are regarded as emerging technologies of the 21st century and are anticipated to transform the existing human generation into a tech-generation by altering the current approaches to a variety of issues in industries and society [16-24].
Several techniques for resolving environmental issues can be implemented with the help of technology. Nanotechnology (NT) and (ICCT) are two new, emerging technologies with the potential to address a wide range of societal issues creatively and effectively. These technological advancements hold the promise of managing the earth's ecological and natural environment in order to support resilient living things. To preserve sustainable living systems on Earth, we undertook a thorough investigation of the role of the ICCT's underlying technologies in this chapter's discussion of environmental and ecological management [16-24].

To better understand how the manufacturing and service sectors prioritise technologies and public research and development (R&D) roles within the context of the Fourth Industrial Revolution, this study compares how these sectors prioritise technologies and public R&D roles in both sectors [25].
To improve urban sustainability, we offer several considerations that should be made in lieu of any larger-scale Smart City implementation. We argue that social sustainability analysis for urban people must be improved upon in the literature on smart cities. Health concerns and a more critical examination of who the Smart City is for should be the initial points of emphasis here [26].
IoT is anticipated to deliver accelerating, inventive, and energising clarifications in a variety of disciplines, including business and management. It enables devices to communicate with humans effectively and complete tasks using software on other devices. The IoT fosters changing industries, prudent money management, and corporate culture [27].

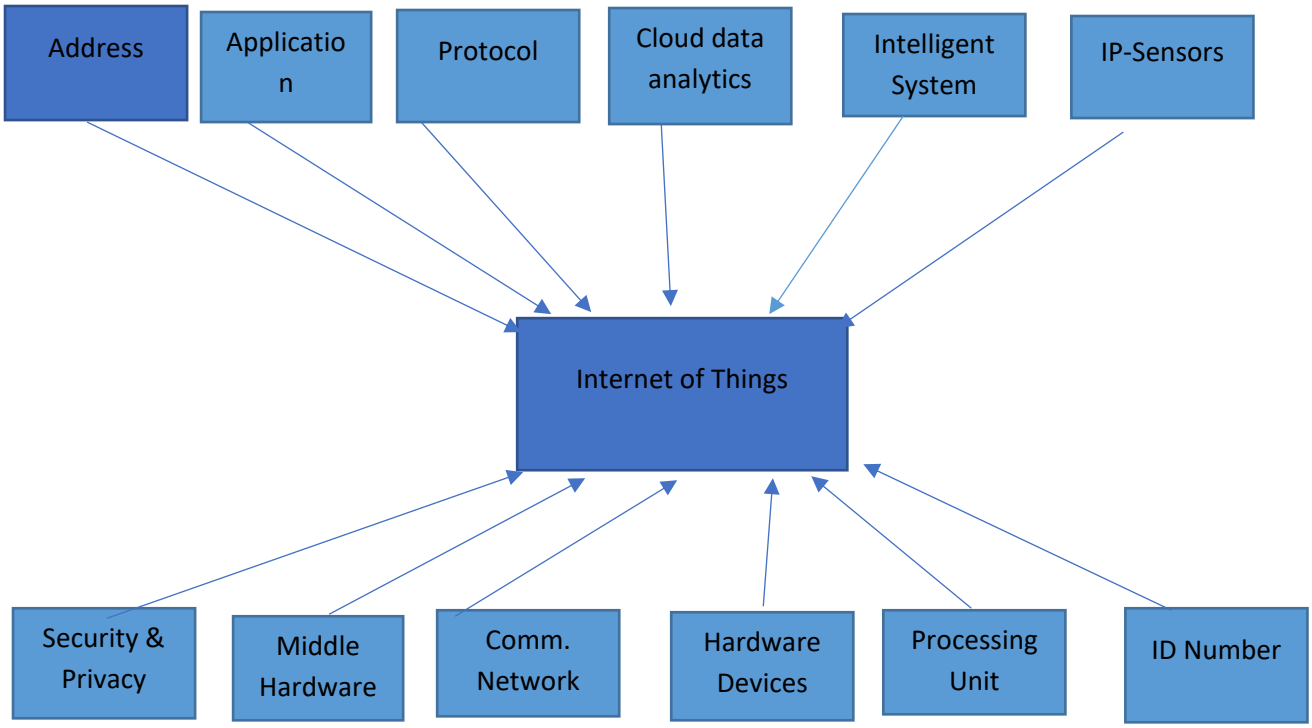

Fig. 1: IoT 's key technologies

2. OBJECTIVE OF THE REVIEW :

(1) To review the importance of data analytics & IoT in futuristic decision-making models & processes, data analytics & AI in futuristic automated production models, data analytics & cloud computing in futuristic IT resource management models and data analytics & virtual & augmented reality in futuristic demonstration models.
(2) To search the use of data analytics and IoT in various business processes of production and service industries.
(3) To evaluate the use of data analytics & AI in futuristic automated production models.
(4) To extract the use of data analytics & cloud computing in futuristic IT resource management models.
(5) To judge use of data analytics & virtual & augmented reality in future demonstration models.
(6) To identify tech-business analytics – an integrated system to provide futuristic business information.
(7) To analyse the possible applications of the tech-business analytics model and methods in various industry sectors.
(8) To determine tech-business analytics model on future business informatics.
(9) To evaluate the strengths, weaknesses, opportunities, and constraints of Tech-Business Analytics using a qualitative SWOC analysis framework to propose the importance of integrating BA with ICCT underlying technologies.

3. IMPORTANCE OF DATA ANALYTICS & IoT IN FUTURISTIC DECISION-MAKING MODELS & PROCESSES :

Since the 1960s, the industry has used data analytics as a tool for operational assistance. It has been a very long time since data analytics became a discipline. Over the past 10 years, a dependable taxonomy of the many types of data analytics has developed because of much scholarly discussion on how data analytics is evolving and what it means for the end user. It is known as descriptive analytics to analyze data or information to ascertain "what happened" (or "what is occurring"). Traditional business intelligence (BI) and graphics such as pie charts, bar graphs, line graphs, tables, or narratives are their defining characteristics. Diagnostic analytics is a more advanced kind of analytics that assesses data or content to ascertain "why did it happen?" using methods like drill-down, data discovery, data mining, and correlations. You can see how this type of analytics still significantly depends on human input. Prescriptive analytics, the most advanced form of this method, makes use of the data to enhance decision-making. It is also clear that this kind of analytics corresponds to the decentralized decision-making tenet of Industry 4.0 by totally automating decision-making and eliminating the need for any human input.

Businesses use the data to get a better understanding, progressing from hindsight to insight and then from insight to foresight. The Manufacturer released research findings from a study looking at how big data and analytics might affect high-value manufacturing last year. Over 50 senior industrial executives from high-value, global manufacturing companies with a predominance of UK-based operations contributed their perspectives to the investigation, which Warwick Analytics prepared for The Alan Turing Institute (ATI).
(1) Enhancing calibre.
(2) Increasing output.
(3) Enhancing customer and warranty services.
(4) Increasing the rate of production.
(5) Speeding the time to start up.
(6) Predicting &/or avoiding maintenance.
(7) Keeping up with or enhancing supply chain operations.
The study concluded that "taken together, these factors suggest that sophisticated analytics may become a potent, strategic weapon for supply chain optimization [28]."

4. IMPORTANCE OF DATA ANALYTICS & AI IN FUTURISTIC AUTOMATED PRODUCTION MODELS :

By utilizing AI/ML-based computer approaches, data analytics automation entails automating the complete data analytics life cycle. Data analytics automation enables the quick discovery of new insights and decision-making by empowering individuals to independently monitor and analyse big data sets. Automation, simplification, and acceleration of the data preparation and insight-generating processes may be achieved by businesses with the use of AI. These systems can automatically evaluate vast amounts of streaming data, instantly spot trends, and produce insights for useful action. Data analytics automation enables firms to swiftly transform unreliable data into trustworthy insights and power business transformation initiatives. Customer interaction, predictive analytics, and product optimization are just a few of the high-value use cases for AI-enabled data analytics automation. By 2030, it is predicted that AI would have a $15.7 trillion global economic impact.
All members of the company are now able to make data-driven choices thanks to augmented analytics, also known as AI-enabled analytics, which automates the development of insights and reports and speeds up the data preparation process. Enterprises may gain from analytics automation in a variety of ways, and it also makes it simple to distribute the results throughout the company. The following are some of the major commercial advantages of automated analytics:
(1) Quicker insights for successful choices: **-** Speed is essential in an aggressive market. Real-time data insights are crucial for the effective rollout of new services and the enhancement of current offerings. Understanding data measurements and variables from several sources is a difficult undertaking. Users may obtain timely insights from unstructured data to take lucrative decisions by automating the whole data value chain. You may use it to professionally manage marketing campaigns or enhance items.

(2) Increased output: **-** It makes it simple for users to understand their data, spot minute abnormalities, uncover hidden patterns, and unearth intricate insights that are not obtained by conventional manual procedures. It also reduces the complexity of monitoring quickly changing variables.
(3) Cut expenses: **-** Data analytics automation helps the company save money overall by reducing the number of time employees spend on data preparation, modelling, and analysis. Without making a significant investment in developing and maintaining internal AI capabilities, businesses may grow their AI and data analytics operations fast with SaaS-based AI platforms. The organization's lack of access to data science and coding expertise is one of the main obstacles to integrating corporate AI and data analytics. Businesses are aware of the advantages of AI, but the lack of skilled workers makes implementation difficult. Enterprises are finding it simpler to use data analytics and automation to get more business value thanks to the introduction of modern AI-driven analytics solutions [29].

5. IMPORTANCE OF DATA ANALYTICS & CLOUD COMPUTING IN FUTURISTIC IT RESOURCE MANAGEMENT MODELS :

For both large and small enterprises, analysis and storage are the two main concerns. First, the production of Big Data has increased dramatically. One of an organization's primary concerns is to store this data affordably and securely, which is where the cloud comes into play. Hiring qualified data analysts, engineers, and data scientists has become popular because of this. A data scientist is required to work on newer systems where the company maintains data in addition to having a variety of talents including analysis, analytics, and programming. Cloud computing and data science practically go hand in hand. A data scientist often examines various kinds of cloud-stored data. Large data sets are being stored online by organizations more often because of the growth of Big Data, necessitating the employment of data scientists. It may enroll in a live Edureka Data Science Course with lifetime access and 24/7 assistance to learn more about data science in-depth. Look at different collections of data, regardless of their size, format, etc., and analyse them to derive insights. Look at structured, semi-structured, and unstructured data. However, the issue with such data is that it frequently resides in many silos. The cloud is crucial because storage is now much more affordable and data scientists have access to open-source platforms and tools. The usage of platforms like Windows Azure, which may give users access to programming languages, tools, and frameworks for free as well as for a charge, can be facilitated by cloud computing for data scientists. Hadoop's Map Reduce tools and retrieval tools like Pig and Hive are commonly used by data scientists since they are familiar with these techniques. Programs are also written in other languages, such as Python and Java [30].

6. IMPORTANCE OF DATA ANALYTICS & VIRTUAL & AUGMENTED REALITY IN FUTURISTIC DEMONSTRATION MODELS :

New superb materials have been made possible by technological advancements. supporting materials for the enterprise. Additionally, a wide variety of uses for these technologies are often found. But the amount of stuff is expanding daily. One such technological advancement that helps society is augmented reality or AR. Additionally, this invention may be used in a variety of ways, and the firm may benefit from having it because of some factors. Unlike virtual reality, where the environment is completely altered. A few things in the current world are altered by augmented reality. Three things make this change unique. Realism and exact three-dimensional identification of both worlds are among these features, as is real-time integration of the digital environment. In the actual world, gear for augmented reality is also commonly accessible. A CPU, input devices, and display displays are also included in most modern mobile phones, which have all the components needed for augmented reality. The most crucial tools are cameras, motion sensors, GPS, and solid-state compasses. We will discuss the advantages of augmented reality now, as well as its potential, in this piece.

(1) The equipment costs for training using augmented reality might be high. Most people already have technology in the form of a smartphone, and the equipment is recyclable. Applications and AR headsets may be able to do away with the requirement for pricey training and lectures.

(2) There is some truth to the notion that learning occurs simply via experience. But we must not overlook the fact that augmented reality makes it possible for interactive, hands-on learning. Students can simulate employment duties in real-time. Using linked technology, at their own pace, without interruption from clients, superiors, or objectives.

(3) According to specialists in augmented reality, it can help lessen employee dependence. Additionally, it enables them to carry out their primary duties more often.

(4) Additional learning opportunities exist, even for seasoned experts. Another choice is education on demand.

(5) Some activities are dangerous by nature, and getting ready for them might be just as dangerous. These tasks can be completed by new employees using augmented reality without running the risk of harm or endangering themselves [31].

7. OBJECTIVES OF USE OF DATA ANALYTICS AND I_OT IN VARIOUS BUSINESS PROCESSES OF PRODUCTION AND SERVICE INDUSTRIES :

A revolution in business has been sparked by connecting devices. Because of IoT, which have made machines smarter, organizations may now produce more value. All kinds of things, including phones, watches, workplaces, and buildings, can now connect to the Internet and carry out extraordinary tasks that were previously unimaginable. Many sectors have begun incorporating IoT technology into their company operations and goods because of the business world's bright future. IoT is the constantly expanding web of gadgets connected to the Internet [32-33]. It is an organization of linked machines that can speak to one another and carry out a variety of tasks.

(1) Enhance customer support and satisfaction: - When properly linked with the IoT, everyday tools and gadgets used by your consumers may become spectacular. Businesses should assess their goods and services to see if the Internet of Things can enhance them.

(2) Expanding Commercial and Financial Opportunities: - IoT gives additional channels via which a firm may communicate with its clientele and manage its operations, creating new business prospects.

(3) Boost the security and safety of businesses: - IoT devices can monitor workplaces and buildings to maintain user security and defend against physical threats.

(4) Boost Productivity and Skill: - Smart IoT devices may be used in businesses to perform repetitive activities, and they will undoubtedly perform better than humans because they don't need breaks, meals, sleep, or breaks to deal with mood swings or become sick.

(5) Reduce operational expenses: - Increased productivity, process effectiveness, and asset utilization all contribute to cost savings.

(6) Gather Information to Aid Business Decisions: - Businesses may use IoT to measure and collect key sets of data that will help them enhance their services and products. This information can offer vital insights for corporate analysis and decision-making.

(7) Make your business more flexible and agile: - Thanks to the Internet of things technologies, organizations may empower employees to work anywhere. Since office leases are costly, many businesses stand to benefit from this flexibility by hiring many remote workers and saving money [34].

8. OBJECTIVES OF USE OF DATA ALYTICSICS & AI IN FUTURISTIC AUTOMATED PRODUCTION MODELS :

The most recent developments in artificial intelligence significantly contribute to the automation of commercial operations to increase their effectiveness and power. Because of AI, analytics is also becoming more widely available and automated. Here are some ways that AI is advancing analytics. By utilizing Natural Language Query (NLQ), artificial intelligence (AI) improves data literacy while giving data scientists more time to work on other projects. AI facilitates BI through quicker delivery of insights and value by automating data analyses. By obtaining and processing data, business intelligence may aid in bettering business choices and increasing ROI. An effective BI solution gathers crucial data from internal and external sources and offers insights that can be used. Business intelligence is simply improved by augmented analytics, which benefits organizations in the following ways:

(1) Improves data preparation speed: - Most of the a data analyst's time is often spent extracting and cleansing data.

(2) Generates insights automatically: - Augmented analytics leverages the data to generate insights automatically once it has been processed and is ready for processing. While data scientists and analysts

would need days or months to complete, it employs machine learning algorithms to automate analyses and produce insights rapidly.

(3) Enables data querying: - Users may engage with data and pose inquiries with ease thanks to augmented analytics. It receives questions in normal language, converts them into machine language with the aid of NLQ and NLG, and then generates insightful results in understandable language [35].

9. OBJECTIVES OF USE OF DATA ANALYTICS & CLOUD COMPUTING IN FUTURISTIC IT RESOURCE MANAGEMENT MODELS :

(1) Flink failed to finish custom reduced-size JVM dataset tasks because of ineffective memory management on the part of the Flink memory manager. In these pertinent literature reviews, we were unable to locate any published proof of this particular use case. Most performance assessment studies used common benchmarking test sets with noticeably big dataset sizes; as a result, this specific use case has not been mentioned in this research. To clarify the underlying precise circumstances underpinning this occurrence, more investigation is needed.

(2) Large-scale data is typically used in big data applications. Although it has been observed that Apache Spark crashes when dealing with bigger datasets, it offers essential fault tolerance mechanisms. Which was chosen for consistency with past studies, broke many times throughout our experiments.

(3) Flink employs the Gelly library, which offers native closed-loop iteration operators for graph processing algorithms like PageRank, reduced-size making it an appropriate platform for large-scale graph analytics. When compared to Apache Flink, Spark performs poorly utilises the GraphX library, whose preparation time for building graphs and other data structures is greater [36].

10. OBJECTIVES OF USE OF DATA ANALYTICS & VIRTUAL & AUGMENTED REALITY IN FUTURE DEMONSTRATION MODELS :

An average user's comprehension of the preselected information can be improved by visualizing the data. Humans begin utilizing their visual senses to investigate the environment at birth. In comparison to words, images are frequently more intuitive to understand. Today's world has evolved toward visual data representation and imaging experiences. Additionally, visualization software is becoming widely used and accessible to the general population. Due to the widespread distribution of visual objects in everything from social media to scientific publications, it is important to re-evaluate the function of visualization when working with enormous amounts of data. In this part, we outline significant issues and potential answers about the future agenda for using AR and VR in big data visualization:

(1) Scaling, moving in depicted three-dimensional space, choosing objects, groupings of visual components (flow/path elements), and views, as well as modifying and putting, designing routes of view, and producing, extracting, and gathering data, are some of the tasks it should allow (based on the reviewed visualized data). To be more user-friendly for users, a new system should provide multimodal control via speech and/or gestures. The fact that it takes work to establish efficient gestural and speech interaction, however, is one of the key concerns with this line of development.

(2) Virtual interface and equipment for the practical use of such an interactive system, specific equipment is required. Currently, there are head-mounted displays (HMD) with optical and video see-throughs that integrate virtual objects into the view of the actual scene. Both have the following problems: engineering and financial considerations; distortion and resolution of the real scene; system latency; perspective matching. Regarding the issue of interaction, it is necessary to develop a framework that would provide interaction with natural gestures to provide suitable haptic feedback in an MR environment.

(3) System of tracking and identification Virtual space tracking is necessary for tools and objects. During display, it is necessary to reassess the location and orientation values of virtual objects since they are dynamic. Another substantial difficulty is tracking head movement. The mismatch between the real-view scenario and the computer-generated objects is what it seeks to prevent. Using more adaptable software platforms may help to overcome this problem.

(4) Sensation and thought Even with neural networks, computer operation is rather advanced but still falls short of the capabilities of the human brain. Human vision and cognition have unique traits and qualities, as was discussed before in the section on integration with augmented and virtual reality. Developers must take this problem into account when designing the hardware and user interface for

AR. Another important concern is the user's capacity to perceive and comprehend the data. A certain level of cognitive activity is needed for tasks like surfing and searching.
(5) Education It is necessary to define the value of data visualization and how it affects the work of the users because this idea is still relatively fresh. Because the benefits cannot be immediately apparent, engaging showcase cases and freely accessible tutorials can explain how AR and VR can be used for visual analytics. Additionally, people need to be prepared for their impending engagement with this developing technology by receiving training and education. To perform well while working with items that can be pictured, visual literacy ability must be enhanced [37-38].

11. PROPOSAL OF TECH-BUSINESS ANALYTICS – AN INTEGRATED SYSTEM TO PROVIDE FUTURISTIC BUSINESS INFORMATION :

The vendors are the same, but the options and principles are the same as in the past. It is no longer sufficient to rely solely on hardware. Every piece of equipment, including those that were formerly simply mechanical, now has sensors and Internet connections. Pre-installed software packages are no longer available. It is a cloud-based platform that can be subscribed to, automatically upgraded, and reprogrammed.
Despite this, some of the most important aspects have not altered. To sustain their competitive advantage, businesses must maintain a laser-like focus. Modernization efforts must bring value to the company. Investors and other stakeholders have raised their expectations to new heights. It is vital to understand what you need to get right in your IT system to meet your goals. It is also crucial to know how to accomplish it properly - how to plan, sequence, invest, design, and engage the organization in your technology modernization. Some campaigns are more successful than others.

11.1 Tech-Business Analytics Model:

Based on the research and the above technology model, we propose Tech-Business Analytics Model as working in primary to quaternary industry sectors and compare them with subsets of big data, ICCT underlying technologies. It is the advanced version of all the recent technology models on which future technology trends will be coming [39].

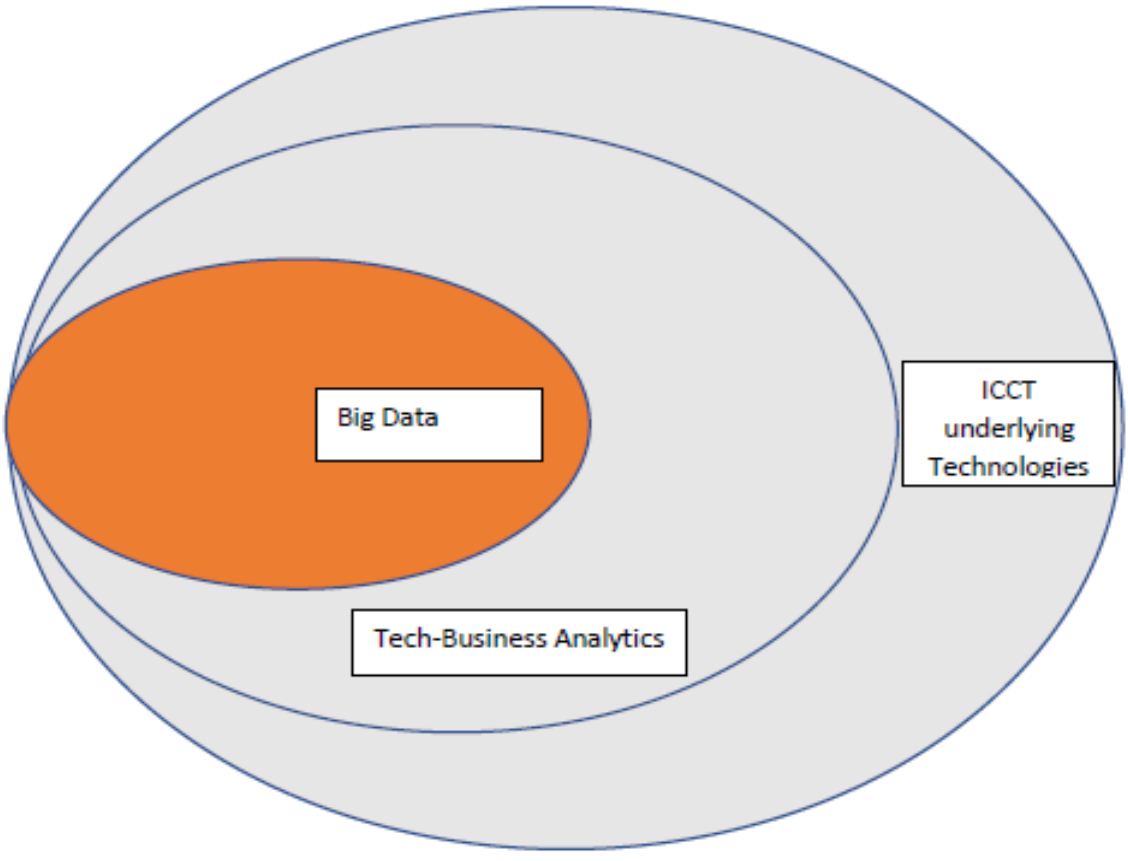

Fig. 2: Research Model based on Business Analytics [39]

12. TECH-BUSINESS ANALYTICS METHODS :

By completely modifying a company's rules, internal processes, and information systems, a business analyst analyses, comprehends, and secures the requirements for growth. A business analyst's responsibilities include identifying business problems, providing solutions, and enhancing project ROI. It will help the company to modify processes, items, services, and software to accomplish its goals. It also helps to discover and solve business problems, business analysis necessitates a large amount of knowledge, skill, and information.

The integration of Big Data and other ICCT underlying technologies in the form of Tech-Business Analytics can provide better platform to solve industrial problems in better way. This will further help to understand the industrial problems and analyse the data generated in industrial processes to develop optimum solutions within the data processing and environmental constraints. (i) Use of artificial intelligence with big data, (ii) Use of Blockchain technology with big data, (iii) Use of Cloud computing with big data, (iv) Use of Cyber security technology with big data, (v) Use of IoT with big data, (vi) Use of 3D Printing with big data, (vii) Use of Quantum Computing with big data, (viii) Use of Digital Marketing technologies with big data, (ix) Use of Data Storage technology with big data, (x) Use of Ubiquitous education technology with big data, and (xi) Use of Virtual reality with big data. The resultant technology which supports effective business analysis & interpretation is named here as Tech-Business Analytics model. It is expected that this newly proposed integrated technology model enhances the possibility of data analysis and interpretation in all industry sectors including primary industry sector, secondary or production industry sector, tertiary or service industry sector, and quaternary or IT & ITES industry sector.

13. SWOC ANALYSIS OF THE MODEL:

SWOC analysis is a strategic planning technique used to investigate internal and external elements that depends on organizations success & expansion which identify its advantages, disadvantages, opportunities, and challenges facing their business, goods, and competitors, businesses employ SWOC analysis. The SWOT analysis is pertinent to the SWOC study [40-41].

13.1 Strengths of TBA Model:

(1) Aids in tracking mission progress.
(2) Promotes efficiency.
(3) Keeps you informed.
(4) Aids in decision-making for organizations through data analytics.
(5) Boost productivity.
(6) The analytics keeps you informed of changes in client behaviour.
(7) Customizing goods and services.
(8) Improving product and service quality.

13.2 Weaknesses of TBA Model:

(1) Lack of alignment, accessibility, and trust.
(2) Lack of Commitment.
(3) Low quality of underlying transactional data.
(4) Lack of alignment between teams.
(5) Lack of commitment and patience.
(6) Low quality of data.
(7) Privacy issues.
(8) Complexity and Bias.

13.3 Opportunities of TBA Model:

(1) Examine data obtained from various sources.
(2) Use sophisticated analytics and statistics to look for trends in datasets.
(3) Track real-time trends and Key Performance Indicators changes.
(4) Encourage the implementation of judgments based on the most recent data.

13.4 Challenges of TBA Model:

(1) Combining information from many source systems.
(2) Problems with data quality.
(3) Information-poor data silos.
(4) End-user training.
(5) Managing the Use of Self-Service BI Tools.
(6) Few BI Tools Are Used.
(7) Good Dashboard Design Techniques.

14. POSSIBLE APPLICATIONS OF TECH-BUSINESS ANALYTICS MODEL AND METHODS IN VARIOUS INDUSTRY SECTORS:

The integrated version of big data technology with other ICCT underlying technologies gives rise to new model of Tech-business analytics and is expected to improve the Features and Quality of Products and Services in Various Industry Sectors:

14.1 Primary Industry Sector:

Primary industry sector involves use of natural materials into raw materials for further processing. Use of Tech business analytics in this sector helps to optimise the extraction/production processes. For this example, the job of the business analyst in several domains is shown using an index of industrial applications [20-21].

(1) Predictive Maintenance: The tech-business analytics model can be used to forecast when equipment in the primary industry sector is likely to fail by utilising data obtained from sensors and other sources. This enables periodic preventative maintenance, saving downtime and lowering repair costs.

(2) Inventory Management: The main industry sector can apply the tech-business analytics paradigm to optimise inventory levels of raw materials and finished items. The model is able to forecast future demand and ensure that the appropriate level of inventory is kept to satisfy that need by examining historical demand patterns, seasonality, and other factors.

(3) Supply Chain Optimization: From acquiring raw materials to delivering completed items to customers, the tech-business analytics paradigm may be used to optimise the whole supply chain in the primary industry sector. The model can spot bottlenecks, inefficiencies, and other problems by analysing data from a variety of sources, enabling better supply chain decision-making and improvement.

(4) Quality Control: The main industry sector can use the tech-business analytics paradigm to track and enhance product quality. The model can identify possible quality concerns before they become serious ones, enabling corrective action to be conducted in real-time, by analysing data from sensors and other sources.

(5) Energy Management: Energy usage in the primary industries sector can be optimised using the tech-business analytics paradigm. The model can find chances to lower energy use by reviewing data from sensors and other sources, such as optimising production schedules or changing equipment settings. Overall, the tech-business analytics approach has the potential to be a potent instrument for streamlining processes and boosting output in the primary industries sector [42-44].

14.2 Secondary Industry Sector:

The segment of the economy that is engaged in the production and manufacture of goods is referred to as the secondary industry sector, often referred to as the industrial sector or the manufacturing sector. Via a variety of mechanical, chemical, or physical processes, raw materials are converted into final goods. Manufacturing, building, and energy generation are a few examples of sectors under secondary industry. These sectors frequently engage in large-scale manufacturing, and the goods they produce are either consumed by consumers or used as raw materials by other sectors. Given that it creates employment opportunities and promotes economic growth and development, the secondary industry sector is a vital component of most economies [20–21].

(1) Predictive Maintenance: Similar to the primary industry sector, the secondary industry sector's equipment can also be predicted to fail using the tech-business analytics paradigm. Preventive maintenance can thus be planned, limiting downtime and lowering repair costs.

(2) Quality Control: The secondary industrial sector can evaluate and enhance product quality using the tech-business analytics methodology. The model can identify possible quality concerns before they become serious ones, enabling corrective action to be conducted in real-time, by analysing data from sensors and other sources.
(3) Supply Chain Optimization: The tech-business analytics approach can be applied in the secondary industry sector, just like the main industry sector, to optimise the entire supply chain. The model may pinpoint bottlenecks, inefficiencies, and other problems through the analysis of data from numerous sources, enabling better supply chain decision-making and improvement.
(4) Inventory Management: Inventory levels of raw materials and finished items in the secondary industry sector can be optimised using the tech-business analytics model. The model can forecast future demand and make sure that the appropriate quantity of inventory is kept to meet that need by examining historical demand trends, seasonality, and other factors.
(5) Production Planning: Production planning in the secondary industry sector can be improved using the tech-business analytics paradigm. The model can find ways to enhance production schedules, shorten lead times, and boost throughput by analysing data from numerous sources. Overall, the tech-business analytics model can be a potent instrument for boosting the efficiency, cutting expenses, and general performance of businesses in the secondary industrial sector [42-44]..

14.3 Tertiary Industry Sector:

The service sector, or tertiary industry sector, refers to the area of the economy that deals with offering services to both businesses and individuals. This industry focuses on offering information, skills, and experiences as intangible commodities and services. Health care, education, banking, tourism, and professional services like accountancy and law are a few examples of industries that belong under the Tertiary Industrial Sector. These fields often demand a high level of skill and knowledge and need a lot of labour. The generation of jobs and economic growth are mostly attributed to the tertiary industry sector, which has grown in significance in the contemporary world economy [20–21].
(1) Customer Segmentation: Customer segments based on demographics, tastes, and behaviors can be created using the tech-business analytics paradigm. Companies can adjust their products and services to fit the wants of particular client segments by understanding the needs and preferences of their customers.
(2) Marketing Optimization: The tertiary industry sector's marketing strategies can be optimized using the tech-business analytics methodology. The model can determine the most efficient marketing channels, messages, and promotions to draw in and keep clients by analyzing data from numerous sources.
(3) Fraud Detection: In the tertiary industrial sector, fraud can be found and prevented using the tech-business analytics model. The model is able to spot patterns of questionable behavior and warn businesses about possible fraud by evaluating data from a variety of sources.
(4) Personalization: The tertiary industry sector can leverage the tech-business analytics paradigm to customize products and services. The model may customize recommendations and offerings to certain clients by accessing data from several sources, improving the overall customer experience.
(5) Operational Efficiency: The tertiary industry sector can have its company operations optimized by using the tech-business analytics paradigm. The model can discover inefficiencies, cut expenses, and streamline operations while improving overall corporate performance by analyzing data from numerous sources. Overall, the tech-business analytics approach has the potential to be an effective instrument for optimizing the customer experience, boosting organizational performance, and establishing a competitive edge in the tertiary industry sector [42-44].

14.4 Quaternary Industry Sector:

The Quaternary Industrial Sector is the area of the economy that deals with the production, administration, and transmission of information and knowledge-based services. It is often referred to as the knowledge sector or the information sector. Research and development, information technology, scientific research, consulting, and education are some examples of sectors under the Quaternary Industrial Sector. The utilisation of cutting-edge technology, intensive research and development, and an emphasis on creativity and innovation are frequently traits of these businesses. Because knowledge and information are becoming increasingly important in the contemporary global economy, a relatively

new sector of the economy called the "quaternary industry sector" has formed. In industrialised nations, where knowledge-based businesses are becoming more significant, it is regarded as a major force behind economic progress [20–21].

(1) Knowledge Management: Knowledge management in the quaternary industry sector is possible using the tech-business analytics methodology. The model can detect knowledge gaps and suggest training or development opportunities for staff members to fill those gaps by analysing data from numerous sources.

(2) Research and Development: Research and development initiatives in the quaternary industry sector can be optimised using the tech-business analytics methodology. The algorithm can pinpoint areas of research with the greatest chance of success and suggest areas for additional study by accessing data from numerous sources.

(3) Innovation Management: Innovation management in the quaternary industry sector is possible using the tech-business analytics methodology. The model is able to find chances for innovation and suggest methods for launching new goods and services by analysing data from a variety of sources.

(4) Intellectual Property Management: In the quaternary industry sector, intellectual property can be managed using the tech-business analytics model. The model can identify potential infractions and suggest methods for intellectual property protection by analysing data from multiple sources.

(5) Strategic Decision-making: To assist in making strategic decisions in the quaternary industry sector, the tech-business analytics approach might be applied. The model can spot trends, opportunities, and hazards that can help guide strategic decision-making by analysing data from diverse sources. Overall, the tech-business analytics paradigm can be a potent instrument for enhancing knowledge production, strengthening decision-making, and optimising operations in the quaternary industry sector [42-44].

15. IMPLICATIONS TECH-BUSINESS ANALYTICS MODEL ON FUTURE BUSINESS INFORMATICS:

The implications of the Tech-Business Analytics model on future business informatics are significant. The use of advanced technologies and data analysis techniques has the potential to transform the way businesses operate and make decisions, leading to more efficient and effective processes, as well as better products and services. One implication of this model is the increasing. As businesses continue to collect more data from various sources, they will need to develop the skills and tools to analyze this data effectively. This will require a shift in mind-set, as businesses will need to move away from relying on intuition and experience, and instead use data to inform their decisions. Another implication is the potential for increased automation in business processes. As businesses adopt advanced technologies, they will be able to automate more processes and tasks, freeing up time and resources for other areas of the business. The Tech-Business Analytics model also has implications for the skills required of future business informatics professionals. As businesses adopt more advanced technologies and data analysis techniques, they will need employees with the skills to manage and analyze data effectively. This will require a new breed of business informatics professionals with a combination of technical and business skills, as well as the ability to communicate effectively with stakeholders across the organization. Overall, the Tech-Business Analytics model has the potential to transform the way businesses operate and make decisions in the future. By leveraging advanced technologies and data analysis techniques, businesses can gain a competitive advantage in their respective industries, and drive growth and success in the marketplace. Tech-business analytics model on future business informatics have a great role because tech - business is a collective technology between big data and ICCT underlying technologies. Fortunately, the ability to use collective intelligence has become a reality. Companies can use collective intelligence to produce innovative ideas, solve problems, disaggregate, and distribute tasks in new and imaginative ways, and make better, more informed future decisions. Tech- Business analytics has advanced beyond examining information generated by a business intelligence (BI) system to make decisions for you using an algorithm. According to the current trend, massive amounts of data are currently being sent. Businesses must start at the bottom of the pyramid and work their way up by synthesizing aggregate intelligence from all available sources to get the most out of tech-business analytics [38-39].

16. CONCLUSION :

In conclusion, Tech-Business Analytics is a proposal to improve the features and quality of products and services in various industries by leveraging advanced technologies and data analysis techniques. The explorative study proposed here would involve a comprehensive approach that combines qualitative and quantitative research methods to gain a holistic understanding of the potential benefits and challenges of adopting these techniques. The study would involve conducting a literature review, case studies, surveys, and interviews to gather information from businesses in different sectors. Through these methods, the study would identify common themes and trends across industries and provide recommendations for businesses looking to improve the quality of their offerings through advanced data analysis techniques. The potential benefits of Tech-Business Analytics are significant. By leveraging technology and data analysis, businesses can gain insights into customer behaviour, market trends, and other factors that can impact the success of their products and services. This knowledge can then be used to make data-driven decisions that improve the quality and features of these offerings, and drive business growth and success. Overall, the proposed explorative study of Tech-Business Analytics is a major step in advancing the use of data analysis and technology in various industries.

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