International Journal of Information technology and Computer Engineering
ISSN: 2455-5290
Vol: 02, No. 06, Oct-Nov 2022
http://journal.hmjournals.com/index.php/IJITC
DOI: https://doi.org/10.55529/ijitc.26.28.38

Technologies in the Pharmaceutical Industries and Medical Health Care

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Received: 11 July 2022 **Accepted:** 25 September 2022 **Published:** 28 October 2022

Abstract: ***This review aims to illustrate upcoming technological developments in the pharmaceutical industries and healthcare facilities may look in the near future. In order to achieve this, we examine recent technologies and advanced medical developments in healthcare as well as in the pharma industries. Such as Artificial intelligence which provides an understanding between process parameters and different formulations. Blockchain is a sophisticated database that stores data in a way that makes it impossible to alter or hack the system. Clouding Technology enhances the drug discovery process. In the Future hospitals will need room for scanning and 3D printing since they can create virtually anything, including medical devices and human body components, and also produce drugs for every individual. Robotics is widely used in surgery as well as in chemical handling in laboratories. IT (Information Technology) is a database that helps in gathering information in surgery departments, hospitals, labs, and clinics.***
Our geriatric populations' quality of life can be maintained with the aid of new, technologies and innovations in health care. To overcome these obstacles, medical technology, as well as pharma industries, as well as pharma industries must unite and promote, high-quality methods while incorporating them into many related fields.

Keywords: Artificial Intelligence, Blockchain, Clouding Technology, 3D Printing, Robotics, Information Technology.

1. INTRODUCTION

In recent tenner, Technology has significantly changed how people live in recent decades since it affects every aspect of daily life, including communication, transportation, manufacturing, business, and the pharmaceutical and medical industries [1,2]. The technological system is simple to operate and use, enabling more work to be managed in a shorter amount of time, and has a low degree of complexity and error in the working process [3]. This relevance has only

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increased as a result of trends like globalization, quick product cycles, increased competitiveness, and technology fusion. The development of new technology recognizes the fact that daily living is made more effective. New technologies Artificial intelligence, Blockchain, Clouding technology, 3D printing, Robotics, and Information Technology.

Pharmaceutical occupations have started to transition from traditional careers to advanced careers in order to produce next-generation medicines. As career opportunities improve, the range of work in pharmaceutical research is growing. Cutting-edge career options are emerging as a result of technological advancements, with the potential to considerably increase pharmaceutical industrial output and bring the next generation of medicines to market through new research. [4,5] The current trend toward sophisticated automation technology. The fusion of cutting-edge information technologies and modern industrial techniques is crucial to maintaining economic competitiveness in the current era [6].

People nowadays visit hospitals for treatment and diagnosis of various illnesses. With the aid of expensive equipment and medical procedures, doctors offer consultations to patients. However, the revolution in diagnosis and care provision will be changed in the near future by improvements in artificial intelligence (AI), information technology, 3D printing, and robotics. Future technical advancements in the pharmaceutical sector and health care are discussed in this review.

Objectives

The aim of the current study posed in this review paper is-

- The impact of new technologies in pharma industries as well as in healthcare.
- To investigate strategic perspectives on the evolution of technology in pharma industries and healthcare requirements.
- The use of new technologies has a positive effect on industries as well as on healthcare.

Significance

The current study will provide knowledge on new technologies and development in industries and in health care. Which have a positive impact on students as well as on researchers. This study can assist future scholars in recognizing the significance of new technologies.

Reason for study

The amount of data to be stored has increased.
The need to analyze generated data
The necessity of sharing and transmitting saved data

Technologies in industries and healthcare

i. Artificial Intelligence

The pharmaceutical and consumer healthcare industries have been profoundly impacted by artificial intelligence and machine learning. A subject of computer science called artificial intelligence analyses enormous amounts of data in the medical industry**.** The main advantages

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of artificial intelligence include lower costs for medication research, better returns on investment, and perhaps even lower end-user prices. [7]

Some analysts predict that by 2025, more than half of all global healthcare enterprises will have put AI plans into practice and that it will be fundamental to how companies run in the future. Leading pharmaceutical companies collaborate with AI suppliers on drug discovery and R&D projects and integrate AI technology into their manufacturing procedures. According to studies, 62% of healthcare organizations plan to invest in AI shortly, and 72% of companies believe AI will be indispensable to their operations in the future. [8,9]

AI based-Drug development

Drug development takes a long time since pharmaceutical chemicals must be tested biologically. In order to speed up the screening process, researchers use Learning models on pictures to identify which substances are worth further investigation. For image classification, object recognition, image reconstruction and analysis, image guidance, tumor detection, and characterization, therapeutic response and toxicity prediction, treatment decision-making, and other related activities, AI can be used in radiology and radiation therapy.[10] Hundreds of genes implicated in brain illnesses like Alzheimer's, Parkinson's, and ALS are being mapped out using an algorithm (Amyotrophic lateral sclerosis). This approach may be advantageous for drugs used to treat neurological disorders or cancer. [11]

Fig 1. Artificial intelligence in drug discovery and development

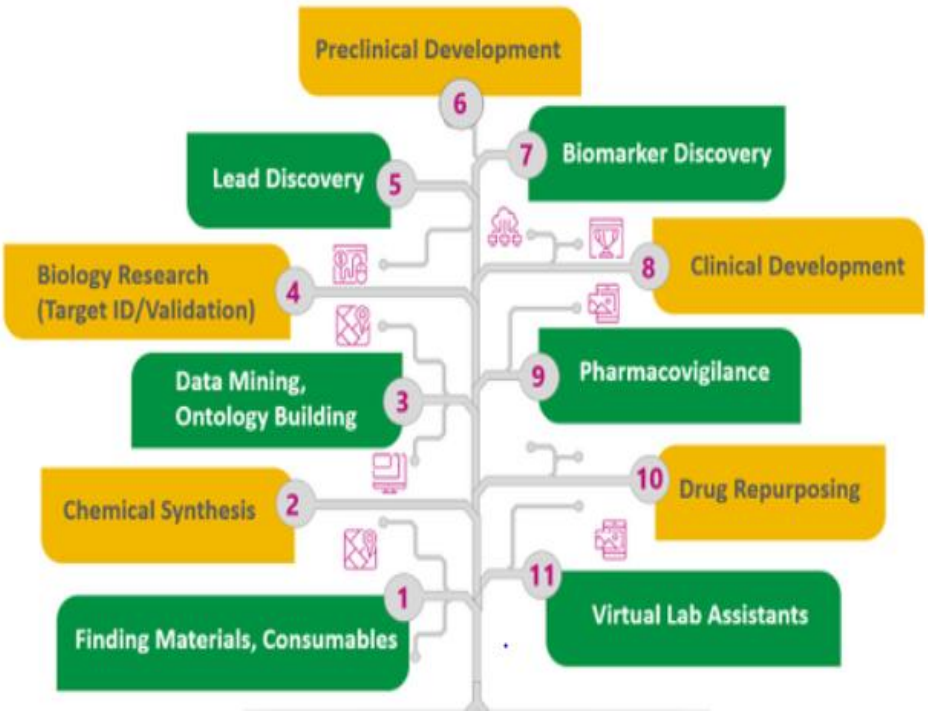

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Fig 2. Artificial intelligence in Health care

II. Blockchain

Blockchain is a sophisticated database that stores data in a way that makes it impossible to alter or hack the system. Blockchain technology has the potential to improve many aspects of health and well-being. These include medication tracing, clinical trial tracking, device tracking, and health insurance. Incorporating different network connections, the blockchain lowers the danger of single points of failure and network attacks. By timestamping entries, the decentralized platform eliminates fraud, and smart contacts allow for the storage of user data in an immutable ledger across the network. By eliminating manual procedures like ledger reconciliation across many isolated ledgers and administrative processes, blockchain helps to lower system costs. The speed of transactions and level of security is greatly increased because of the usage of several cryptographic linked chains. Researchers use blockchain technology for industry in a number of surveys.[12]

Blockchain technology can assist the pharmaceutical sector in reducing the hazards associated with unlicensed and fraudulent pharmaceuticals, which are on the rise. Identifying pill containers is achievable with an integrated Global positioning system and chain-of-custody monitoring, just like with device tracking, where smart contracts for medications are defined. [13] Blockchain offers constant validation and transparency for shared transactions between numerous supply chain partners.

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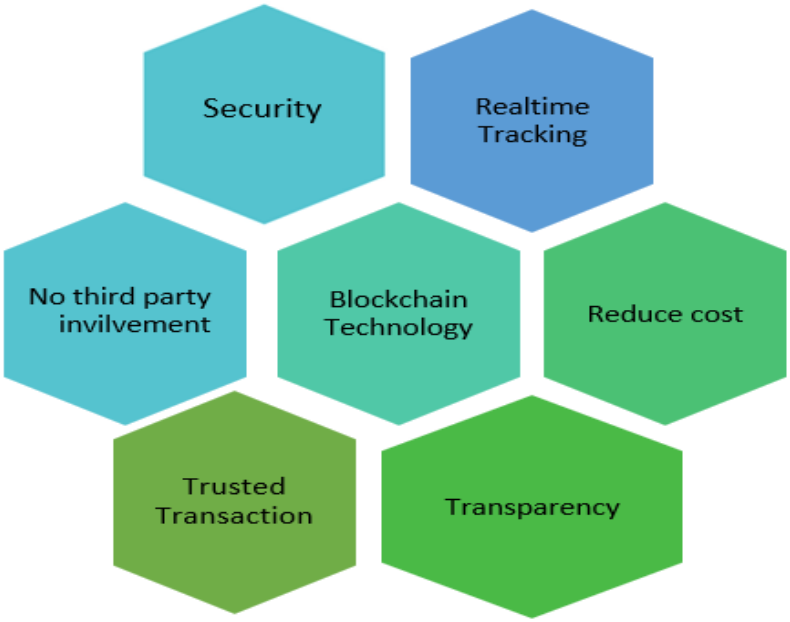

Fig 3. Blockchain Technology

III. Clouding Technology

Cloud computing is the general concept for Internet-based IT services for computers and other devices that offer shared, always-on computer resources. Studies on cloud computing-based applications and services in the sector of health services may be found in the literature. Concerns about the security and privacy of patient data and data management arising from the transmission of all data over the internet. Studies in this area are still ongoing. The power of cloud computing can be applied to healthcare decision-support systems. It is simpler to process big data analyses in the health sector by implementing cloud computing.[14]

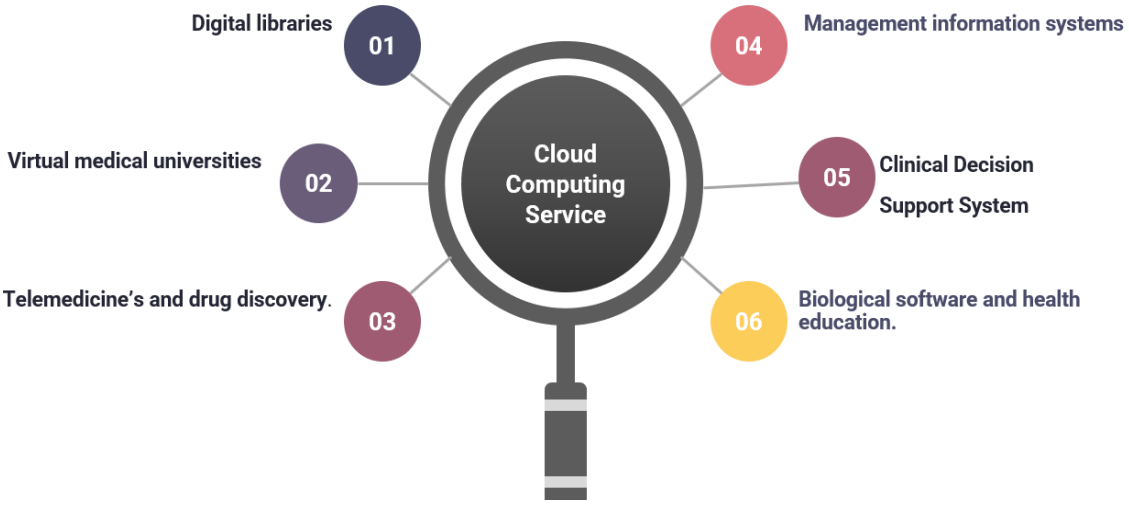

Fig 4. Cloud Computing Service

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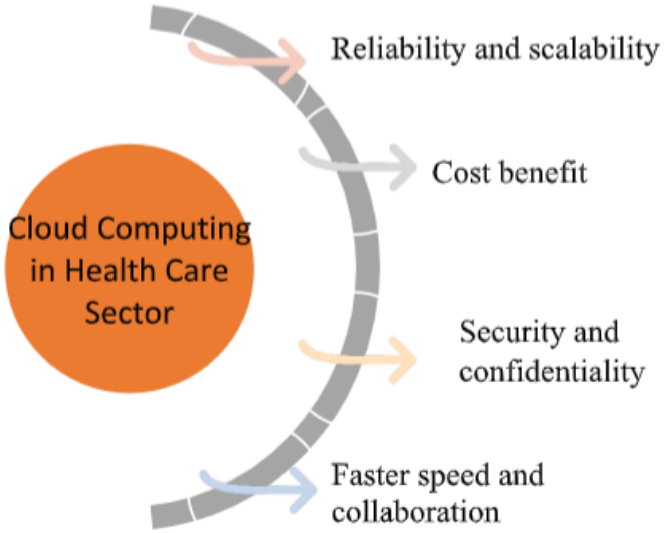

Fig 5. Cloud Computing in Health Care Sector

IV. 3D printing

3D printing is another technology that has already significantly altered all other areas of our existence. It appears to have the power to significantly alter healthcare and medicine as well. Making care more accessible, personalized, and inexpensive might make this transition a reality. A new era could start if 3D printers become more advanced, printing biomaterials is safely controlled, and the public welcomes this new technology. [15] In the Future hospitals will need room for scanning and 3D printing since they can create virtually anything, including medical devices and human body components, and also produce drugs for every individual. The primary uses of 3D printing in the healthcare

- ✓ Preparing 3D models of tumors
- ✓ Generating medical equipment
- ✓ Replicating human parts
- ✓ Preparing artificial heart valves

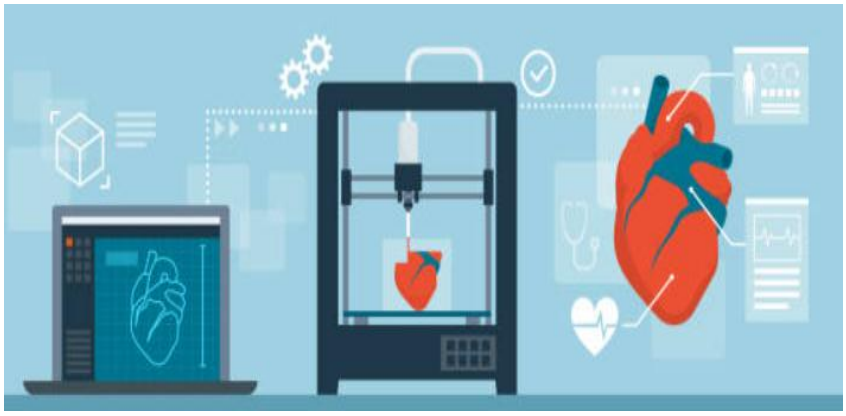

Fig 6. 3D printing in Health Care sector

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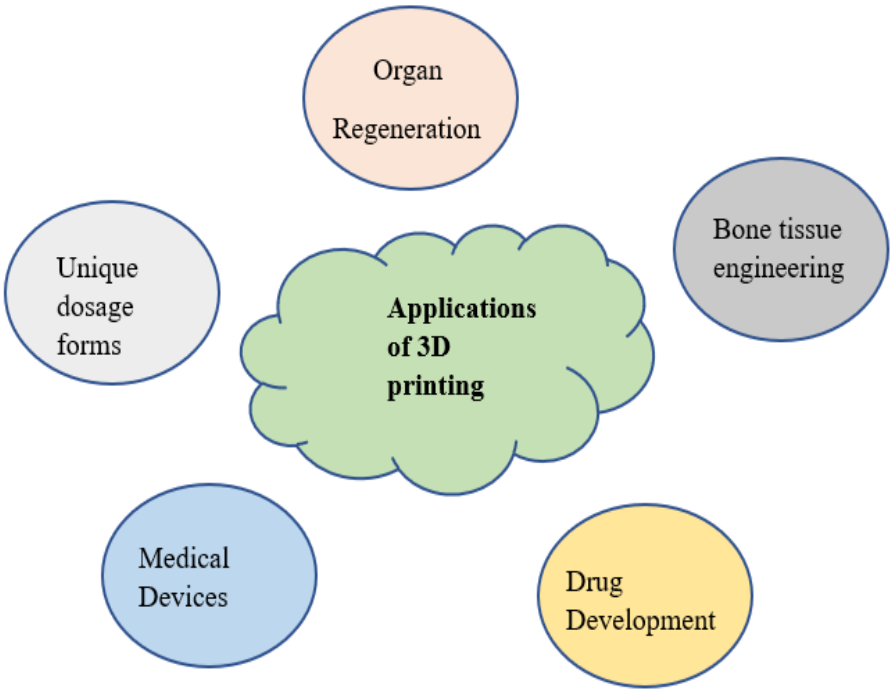

Fig7. Applications of 3D printing

V. Robotics

Robotics is essential to the pharmaceutical industry's complex R&D, production, and packaging processes. There are many reasons to use robots in this industry, from increased worker safety to better product quality. Another advantage of robotic drug product manufacturing is the acceleration of the drug development process. There is a huge potential for the use of robotics systems in the pharmaceutical industry, and pharmaceutical companies are gradually incorporating more robotic systems into their operations. Pharmaceutical companies, like other industries, require higher speed and accuracy devices such as syringes, inhalers, and diabetic testing kits, which are made with the help of robotics. Robotics is widely used in surgery as well as in chemical handling in laboratories.[16] Challenges of Robotics

- Expense
- Dangers and fears
- Expertise
- Return on investment
- Safety

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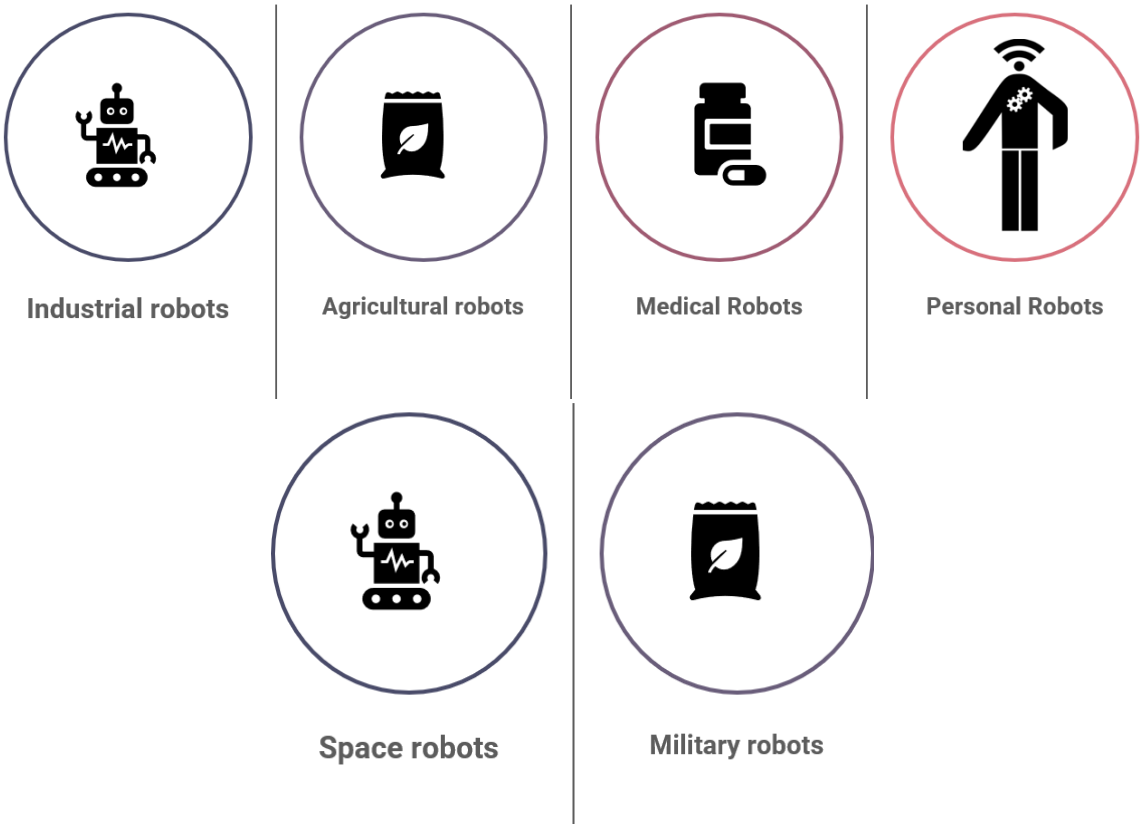

Fig 7 Applications of Robotics

VI. Information Technology

IT (Information Technology) is a database that helps in gathering information in surgery departments, hospitals, labs, and clinics. "The healthcare industry relies heavily on information." Managing the enormous amount of data that is gathered in hospitals, labs, clinics, and surgery departments is an essential duty. Sharing that knowledge is crucial because it helps the patient feel more in control and more engaged. Information technology (IT) has emerged as a key tool for enhancing an organization's dynamic capabilities. Information and communication technology (ICT) is a broad phrase that refers to any product that electronically and digitally stores, retrieves, manipulates, transmits, or receives information. Health information technology (HIT), or the application of ICT in healthcare, refers to a number of technologies that are used to gather, transmit, display, or retain patient data electronically. 1 HIT is a term that also refers to the use of computerized systems by patients, healthcare professionals, insurance providers, and other governmental organizations to obtain healthcare information.[17]

✓ **Telemedicine**: Telemedicine is the provision of quick access to information sharing over distance for the provision of medical expertise and healthcare services. Numerous research has stressed that telemedicine can offer patients and families a quick and reliable solution.[18]

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✓ **Telecare**: Telecare gives elderly and physically disabled people the care and security they need to remain in their homes while still receiving care.[19] For persons who are at risk of falling or who have conditions like dementia, using sensors can be helpful and supportive.

✓ **M-Healthcare:** Mobile communications and network technology for healthcare systems are known as m-healthcare. With this description in mind, it appears that the development of e-health systems—which are the result of advancements in biomedicine, wireless and information technology, and computing—has led to the development of M-healthcare. [19] Nanotechnologies, tiny biosensors, and wearable, pervasive, and ubiquitous computing systems must be employed in this area in order to create next-generation m-health systems. All of these technologies are part of the future of healthcare delivery services that are empowering healthcare on the move. [20]



Fig 8 Applications of IT in healthcare

2. CONCLUSION

This study concludes that new technology plays a significant role in the pharmaceutical industry and in the healthcare sector. the effect of technologies in industries and medical healthcare facilities can be summarised as with the introduction of artificial intelligence and powerful sensors technology future factories will be digital factories, Blockchain is a sophisticated database that stores data in a way that makes it impossible to alter or hack the system, future hospitals will be fully robotics, and the use of 3D printers will be placed in hospitals to produce almost everything from medical equipment to human body parts, Clouding technology is simpler to process big data analyses in the health sector by implementing cloud computing tele medicine will be used as an appropriate alternative for the first post-operation visit and there is a lot scope in this field for research.

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Acknowledgment
I would like to acknowledge and give my warmest thanks to my teachers for their guidance and advice who made this work possible. I would also like to thank my Friends for their brilliant comments and suggestion.

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