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A BRIEF REVIEW ON DIGITAL MEDICATION

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ABSTRACT:-

Digital has become an important part of our daily lives. Every industry is accelerating its adaptation to the digital era. However, apart from websites, the pharmaceutical industry has failed to adopt digital marketing. In this era, more and more pharmaceutical companies are using social media sites and e-commerce sites as digital marketing platforms, which allows customers to purchase products online. Some organizations are beginning to understand the true value of digital technology, while others are integrating it into their broader marketing strategies. However, not all companies can sell their products online, as some companies manufacture prescription drugs that cannot be sold online. Pfizer, for example, actively engages with its customers through social media platforms. YouTube, Facebook, and Twitter were used to communicate with customers. Johnson & Johnson was one of the first companies to launch a YouTube channel. Northeast-based pharmaceutical companies Quantum Pharmaceuticals and The Specials Lab are offering online ordering for specialty medicines and promoting e-commerce and digital marketing.

INTRODUCTION:

While some companies have been very innovative with regards to digital advancements, the lack of good practices on digitalization in the pharmaceutical space has limited its adoption. Web marketing has not been well adapted in the pharmaceutical industry. The sector's cautious actions and uncertain regulations have held back the pharmaceutical sector, while marketers in finance, professional services, manufacturing, and business services have had a head start online.

However, online communities for experts and patients have evolved to adapt to the increasing use of mobile devices, social media, and online information by patients, healthcare professionals (HCPs), key opinion leaders (KOLs), and the larger medical fraternity. Digital pills, digital drug supply, digital supply chain, digitalization of manufacturing, digital health technologies, cloud computing, blockchain, 3D, AR, and VR technologies are encouraging pharmaceutical companies to invest in and explore digital marketing strategies aligned with industry guidelines.

Different Digital Technologies

DIGITILIZATION IN PHARMA SECTOR

1) Digital Pills

The digital pill (DP) is an innovative pharmaceutical technology that can combine traditional medications with a monitoring system that automatically records medication intake data and patients' physiological data. Although the DP is a promising innovation in the field of digital medicine, its use also raises a number of ethical concerns. However, these ethical concerns have been raised mainly from a theoretical perspective, and ethical analyses with a more empirically oriented approach are lacking. There is also uncertainty about the empirical evidence available for the use of this innovative digital medicine

2) DIGITAL PHARMACEUTICAL CARE

While some companies have been very innovative with regards to digital advancements, the lack of good case studies on digitalization in the pharmaceutical sector has limited its adoption. Web marketing has not been well adapted in the pharmaceutical industry. The industry's cautious approach and uncertain regulations have held back the pharmaceutical industry, while marketers in finance, professional services, manufacturing, and business services are rapidly moving online. However, online communities for experts and patients are evolving to adapt to the increasing use of mobile devices, social media, and online information by patients, healthcare professionals (HCPs), and key opinion leaders (KOLs), with large medical fraternities spurring the development of the pharmaceutical industry.

Companies can invest in and explore digital marketing strategies in line with industry guidelines.

3) DIGITAL SUPPLY CHAIN

Pharmaceutical supply chains serve as a critical lifeline in the healthcare ecosystem, responsible for getting life-saving medicines from manufacturing facilities to the hands of patients. Their smooth operation ensures that health challenges, from chronic diseases to sudden disease outbreaks, can be addressed in a timely and effective manner. Across the vast and diverse African continent, the importance of this link is highlighted by the range of health challenges facing the population, including endemic diseases such as malaria, emerging health threats, and the rise of non-communicable diseases. However, Africa's pharmaceutical supply chain is fraught with complexities and hurdles. In the past, its resilience has been tested by factors such as inadequate infrastructure, uneven distribution networks, lack of real-time transparency, and counterfeit medicine issues.

These obstacles are both challenges and opportunities. As the global technology industry experiences unprecedented advances in digital innovation, there is great potential to refocus and improve Africa’s pharmaceutical supply chains, making them more robust, transparent, and efficient. The aim of this study is to explore the transformative role that digital technologies can play in reshaping Africa’s pharmaceutical supply chains. More specifically, we want to understand how innovations like blockchain can help.

Artificial Intelligence (AI) and Internet of Things (IoT) can overcome existing challenges, improve traceability, optimize inventory management, and optimize distribution channels. Furthermore, through insights from the specific African context, we hope to provide a holistic overview of the realities on the ground, the successes achieved, the hurdles overcome, and the lessons learned on the path to digital transformation. Ultimately, the study aims to provide a roadmap for stakeholders and propose strategies to leverage digital innovation to achieve a resilient and efficient pharmaceutical supply chain, thereby improving healthcare outcomes across the African continent.

4) DIGITALIZATION OF MANUFACTURING

Digitalization of any manufacturing industry is a key step in the advancement of production processes. Digitalization processes include the increased use of robots, automation solutions, and computerization, which reduce costs, increase efficiency and productivity, and allow flexibility for change. However, the pharmaceutical industry (PI) has resisted digitalization, primarily due to inexperience and the complexity of the development and manufacturing processes involved. Nevertheless, the need for PI to digitize is clear as demand for both traditional and novel medicines continues to grow. Contract development and manufacturing organizations (CDMOs) face special challenges when it comes to digitalization. Digitalization of PI, and especially CDMOs, must go hand in hand with key aspects of Good Manufacturing Practices (GMP). Successful digitalization of PI requires a constant focus on GMP. Close collaboration with constantly changing stakeholders is another key focus of CDMO digitalization. This document provides an overview of the key aspects of CDMO digitalization and discusses both opportunities and challenges in the process, focusing on practical solutions for a step-by-step digital implementation.

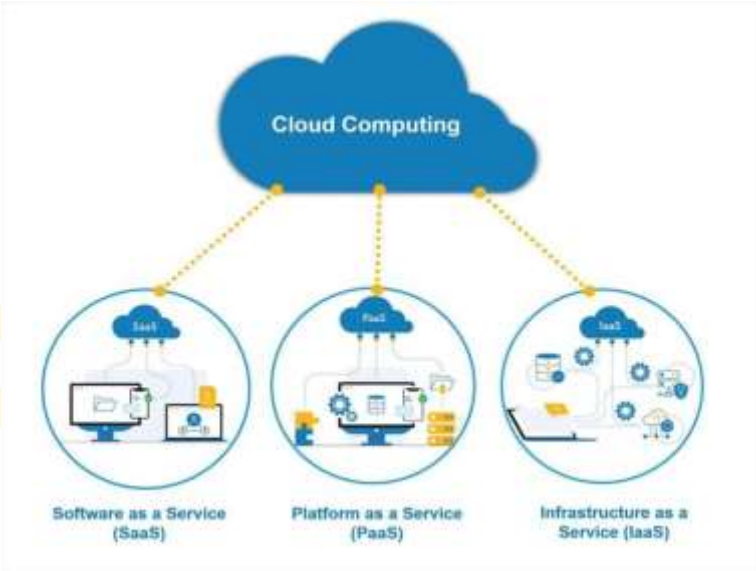
5) DIGITAL HEALTH TECHNOLOGIES

The introduction of digital health technologies increases the accessibility and flexibility of healthcare. This includes the availability of open information about health, treatment, complications, and current advances in biomedical research. Diagnostic and medical services are now becoming more accessible and available, even in low-income countries. However, many issues surrounding digital health technologies remain unresolved, including reliability, security, testing, and ethical issues. Purpose. The aim of this review is to discuss and analyze recent advances in the application of big data, artificial intelligence, telemedicine, blockchain platforms and smart devices in healthcare and medical education. Basic design. Publication searches were conducted using Google Scholar, PubMed, Web of Sciences, Medline, Wiley Online Library and CrossRef databases. This review focuses on the application of artificial intelligence, big data, telemedicine, blockchain technology and smart devices (Internet of Things) to solve real problems in healthcare and medical education. Key insights. We found 252 articles related to digital health; however, exclusion criteria limited the number of papers reviewed to 152. The literature review revealed that recent pandemics, including COVID-19, have increased the demand for digital health technologies. As COVID-19 has spread devastatingly across all continents, there was a need for fast and effective solutions to locate, manage, and treat viral infections. In this regard, the use of telemedicine and other e-health technologies could help reduce pressure on healthcare systems. Summary: Digital platforms can help optimize patient diagnosis, advice and treatment. However, due to the lack of official regulations and recommendations, stakeholders, including private organizations and government agencies, face the problem of properly validating and approving new digital health technologies. In this regard, proper scientific research is necessary before using digital products in the healthcare sector.

6) CLOUD COMPUTING

Cloud technology is remarkable and has dramatically changed the entire world since its emergence. It has transformed our world through its unique capabilities. This technology has fundamentally changed data storage and data analytics. Historically, the pharmaceutical industry has been slow to adopt innovative technologies. But today, pharmaceutical companies are under pressure to find solutions that can help them optimize complex processes and reduce costs. Cloud computing is a very attractive solution that offers a variety of benefits without requiring large upfront investments.

Cloud computing technology allows users to access storage, files, software, and servers through internet-connected devices (computers, smartphones, tablets, wearables). Cloud computing providers store and process data in a location away from the end user. Essentially, cloud computing means the ability to store and access data and programs over the internet instead of on a hard drive. This means businesses of all sizes can leverage powerful software and IT infrastructure to grow bigger, leaner, and more agile and compete with much larger companies. Unlike traditional hardware and software, cloud computing allows businesses to stay at the forefront of technology without making large investments in purchasing, servicing, and maintaining equipment. Learn how the world's smartest CRM, born in the cloud, powered by Einstein, guides salespeople, empowers customer service representatives, and helps marketers predict.



7) BLOCKCHAIN

Blockchain technology is a decentralized and impenetrable digital accounting system. It is made up of a series of interconnected blocks, each of which contains a set of transactions. Once recorded in a block, data cannot be changed, ensuring transparency and security.

Blockchain is decentralized, meaning it is managed by a network of computers rather than a single authority.

As well as enabling cryptocurrencies like Bitcoin, this technology has a wide range of applications beyond finance, including elections, supply chain management, healthcare etc. It provides trust, immutability and accountability in data management, making it a disruptive force in industries looking to increase transparency, traceability and efficiency. Blockchain technology has many potential applications in the pharmaceutical sector, including improving transparency, security, and traceability throughout the supply chain. However, several challenges must be overcome, including regulatory restrictions, interoperability issues, and the need for industry-wide standards. However, technological advances have the potential to completely change the way medicines are manufactured, distributed, and treated, benefiting all involved and increasing patient safety.

Blockchain technology has the potential to revolutionize several industries, including the pharmaceutical industry. Blockchain technology has the potential to have a major impact on the pharmaceutical industry.

8) 3D, AR, and VR technologies

Three-dimensional printing (3DP) is a method of creating 3D objects from digital models by fusing or depositing materials in successive layers, allowing the creation of objects with different shapes in a layer-by-layer process. This process is also known as additive manufacturing, rapid prototyping, or solid freeform manufacturing (Goole and Amighi 2016). 3DP technology has been available since the late 1980s and is used in engineering and various non-medical manufacturing fields, including automotive, aerospace, and consumer products. However, rapid advances in 3DP methods in recent years and the emergence of versatile biocompatible materials are facilitating the pharmaceutical application of 3DP technology.

Companies around the world are focusing on the clever implementation of modern IT systems and AR/VR technologies that can transform their existing operations into innovative factories of the future faster and more efficiently. Industry 4.0 offers a wealth of interesting solutions that support the functioning of companies from the organizational, technological and information technology perspectives, allowing them to find goods faster, transmit information and reduce time- and labor-intensive activities of employees.

CONCLUSION:

Digitalization has the potential to fundamentally transform the pharmaceutical industry and open the door to incremental performance improvements. Pharmaceutical companies must embark on this journey by taking immediate steps and developing a strategy and roadmap to digitalize their operations and supply chains. Working more flexibly, more cost-effectively and more controlled will ultimately ensure better patient care. The information contained in the study offers few insights into how interventions can best be organized, implemented and delivered at the pharmacy site. We focus on intellectual property that is publicly available in the traditional sense and on the societal and personal impacts that arise from the everyday use of information infrastructures. Three technological trends -- the ubiquity of digital information, the proliferation of computer networks, and the rapid expansion of the World Wide Web -- are having a profound effect on how intellectual property is created, distributed, and accessed by nearly all segments of society. There is much at stake, both ideologically and economically.

REFERENCE:

1. Parekh, Dhara, Pankaj Kapupara, and Ketan Shah: Digital Pharmaceutical Marketing: A Review", Research Journal of Pharmacy and Technology, 9.1 (2016), 108-12.

2. Friend, Simon, Steve Arlington, Todd Evans, Joseph Palo, and Anthony Farino, Pharma 2020: Marketing the Future', PricewaterhouseCoopers, 2009, 32.

3. Kumar, Manoj, and Prof Bhausaheb Londhe, Relevance and Impact of Digital Marketing in Indian Pharmaceutical Industry with Specific Reference to Super Specialists Doctors', 7.2 (2019), 1-7.

4. Tata Consultancy Services. Integrated Digital Marketing- The Key to Understanding Customer. Available from: URL: http://www.tcs.com/SiteCollectionDocuments/White%20Papers/In tegrated-Digital- Marketing-Understanding-Customer.

5. Digital marketing to play greater role in the promotion of pharmaceutical companies and products? Available from: URL: http://www.nigelwright.com/media/1036/imagine- magazine-issue-12.pdf.

6. Digital Strategy Consulting. Web strategies for pharma brands. Available from: URL: http://www.digitalstrategyconsulting.com/ documents/DIR_Pharmaceutical-marketing- strategies.pdf.

7. Maria Pinto "Abstracting/abstract adaptation to digital environments: research trends", Journal of Documentation, 2003; 59(5):581-608. https://doi.org/10.1108/00220410310499609.

8. Sharma A. Kaur J, Singh 1. Internet of Things (IoT) in Pharmaceutical Manufacturing, Warehousing, and Supply Chain

9. Management. SN Computer Science. 2020;1. DOI: 10.1007/s42979-020-00248-2. 20. Prashant, Vipula N. Artificial Intelligence (AI), Internet of Things (loT), and Machine Learning (ML) in Healthcare - A Way.

10. International Journal of Creative Research Thoughts. 2020:8(7). Available at: www.ijcrt.org 21. Thoben K-D, Wiesner S. Wuest T. "Industrie 4.0" and Smart Manufacturing-A Review of Research Issues and Application Examples.