

DIGITAL HEALTH REQUIREMENTS FOR PHARMA INDUSTRY

Dissertation Submitted

to



The IIHMR University, Jaipur

For the partial fulfillment for the award of the
Degree of Master of Business Administration
(MBA)

in

Hospital and Health Management

by

Rohit Kishor Chintawar

Under the Supervision and Guidance of

Col Dr Mahender Kumar

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled “Digital Health Requirements For Pharma Industry” and submitted by Rohit Kishor Chintawar Enrollment No. IIHMR-U/01/2020-22/1179 is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

(Signature)

Name Of the student: **Rohit Kishor Chintawar**

CERTIFICATE

This is to certify that dissertation titled Digital Health Requirements For Pharma Industry is a record of the research work undertaken by Rohit Kishor Chintawar in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

Col Dr Mahender Kumar

Faculty Guide

IIHMR University, Jaipur

Date

Col Dr Mahender Kumar

School Dean

IIHMR University, Jaipur

Date

Abstract

Title:-

Digital Health Requirements for Pharma Industry.

Background :-

Healthcare is improving since last few decades over the World and it's becoming digitally robust. Pharmaceutical businesses are working day & night to keep up with the rapid changes that digital technology has brought about. The same technological advancements that have upended the finance, retailing, and the journalism industries are starting to do the same for the healthcare sector. These include sophisticated analytics, the cloud, mobile communications, and the Internet - Of - things. Pharma executives are experimenting with several digital projects because they are aware of their disruptive potential. However, because they are unaware of what will be the digital success entail in five years, many people are finding it difficult to decide which initiatives to scale up and how to do so. The goal of this essay is to remedy that predicament. Disruptive trends, in our opinion, highlight the areas in which digital technology will be most valuable for the pharmaceutical industry, and they should be leveraged to assist businesses in creating a digital strategy.

Objectives:-

To identify the digital requirements for pharma industry.

To suggest digital measures to improve customer satisfaction & processes.

Methodology:-

This study is based on secondary data collected through desk review using study conducted by various websites and reports across the globe to identify and suggest solutions for improve patient satisfaction and drug development processes. Data had been taken after thoroughly examine the different company's websites from different regions like North America, Asia, and Europe to understand the market well.

Results:-

Digitalization is a top goal for the many companies. 77% of respondents believe that digital innovation is a competitive difference for their company. The results shows that most of companies are using AI and ML to process the data for drug development and E-Prescriptions. Many companies have started using digital technologies & devices for the

clinical trials for faster clinical researchers. To improve the supply chain of pharma industry firms are using IOT and Radio frequency identification tools. In drug production sector manufactures are using the predictive analysis with the help of ML to predict demand of the products.

Conclusion:-

Artificial intelligence (AI), cloud computing, the Internet of Things (IoT), and machine learning have generally been slow to enter the operations of pharmaceutical organizations. The COVID-19 epidemic, however, forced firms to emphasize digital inventions and incorporate it into every sector of their business operations. Years-long Road maps for digital transformation were abruptly implemented in a matter of months, leading to dramatic changes in how firms run.

The industry is at a crossroads where businesses may either take advantage of the chance and increase their investments in digital innovation by leapfrogging digital innovation, or they can choose to slow down and accept digital mediocrity.

Keywords:-

“Drug Development”, “Artificial intelligence”, “Machine Learning”, “Decentralized Clinical Trials”

Acknowledgement

I'd want to thank my Guide, Col Dr. Mahender Kumar. He has taught me more than I could ever give him credit for as my teacher and mentor. He has demonstrated what a good researcher (and person) should be through his actions.

I'm grateful to everyone with whom I've had the pleasure of collaborating on this and other projects. Each member of my Dissertation Committee has given me invaluable personal and professional advice and has taught me a lot about scientific research and life in general.

Most notably, I want to express my gratitude to Manish Agarwal & Ajay S Sir for supporting me , who never cease to inspire me.

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Abbreviation :-

AI – Artificial Intelligence
ML – Machine Learning
IT – Information Technology
NLP - Natural Language Processing
IoT - Internet of Things
HTS - High-Throughput Screening
ADR - Adverse Drug Response
DCT – Decentralized Clinical Trials
SMB – Small & Midsize Business
ERP – Enterprise Resource Planning
RFID - Radio Frequency Identification
EMR – Electronic Medical Record
HER – Electronic Health Record

Introduction

Pharmaceutical companies are under more pressure than ever to show the benefit of their products outside of randomized controlled trials if they want to keep access to the market and premium pricing. Payors and institutions are more focused on lowering costs while enhancing patient outcomes. Technology-enabled solutions, which contain not only medicines but also devices that collect information and do analyses to track a patient's health between visits to a medical facility professional, are going to be more important in this context for meeting the interests of both parties. These technologies help payors and governments get the treatment adherence and outcomes they want, while also providing data for pharmaceutical companies to substantiate their drugs' efficacy.

Patients are far less reliant on their clinicians for advice in the digital world and are more equipped and able to take reasonable care for the health. The abundance of health information available online and through applications, as well as the variety of health and wellness resources, gave them a sense of empowerment. exercise equipment that was available, including Fitbit, Apple Watch, other devices, and IOT. As they cover an increasing portion of the costs, patients are also becoming more interested in evaluating various healthcare products and services. The success of a pharmaceutical company's business strategy in the digital age may depend on its ability to interact with patients as they perform these assessments.

Pharmaceutical companies have long had total control over the creation and distribution of information about their products. Traditional authority has been undermined by digital technology, which has led to the development of numerous new, independent communication mediums. Patients can share and discuss their experiences in online forums, utilize sensors and apps to track how therapy is affecting their real lives, and integrate diverse, complicated data sets utilizing modern batch processing and analysis to learn new things about the efficacy and safety of drugs. To continue to be the primary supreme authority on the efficacy of their medications, pharmaceutical corporations will need to develop the skills necessary to foresee or respond rapidly to these new sources of data.

Aim

To study, analyze, and evaluate the impact of digital health in the pharma industry, and to identify new digital health requirements for pharma industry in India.

Objectives

- To identify the digital requirements for pharma industry in India.
- To suggest digital measures to improve customer satisfaction & processes in India.

Review Of Literature

Title	Authors	Salient Features
The Road to Digital success in Pharma	David Champagne Amy Hung Olivier Leclerc 2015	We've determined four areas where we think digital health can benefit pharma organizations the most. The fields employ digital innovation to customize goods and services, include doctors and patients, increase the data-direness of product evidence and decisions, and quicken business operations. Each business must assess how the digital changes are likely to affect its operations in order to gain this value, and then set its own route in response. Understanding what digital success looks like can help pharma businesses innovate and commercialize their products better, which will lead to better patient care.
Biopharma digital transformation: Gain an edge with leapfrog digital innovation	Adam Israel Wendell Miranda Todd Konersmann Aditya Kudumala 2021	Coordination between IT, business, and innovation partners is required to weave digital innovation into the fabric of the organization. This needs a business model based on the chose innovation archetype. Many big firms have built operational structures in which dedicated digital innovation resources are in a center of excellence between business and IT. This has aided in the translation of corporate goals into technological requirements, as well as the flexible management of investment portfolios and speedy collaboration with external partners. To assure appropriate funding for digital innovation while simultaneously reinventing old IT budgeting methods, organizations could need to take crucial trade-offs on business goals.
Digital Transformation in the Pharmaceutical Industry From Drug Discovery to	Igor Kruglyak 2021	People have been searching for chemicals that can treat ailments and infections since very long. Extracts made from plants and animal cells were once utilized as medicine

Pharmaceutical Manufacturing		for illness, and their innovations was based on empirical evidence. Digital technology, on the other hand, has drastically altered the new pharmaceuticals drugs are developed. By automating formerly laborious processes and drastically accelerating drug discovery, evolutionary algorithms, neural networks, natural language processing (NLP), machine learning (ML), wearables, and the Internet of Things (IoT) assist pharmaceutical businesses in streamlining their workflows.
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Methodology

Research Question :-

What are the new digital health requirements for pharma industry in India?

Research Design :-

Secondary Research/ Narrative Literature Review

Type Of Research :-

- ❖ Observational Study.

Source Of Data :-

- ❖ Consulting Reports
- ❖ Google Scholar
- ❖ Government Publications
- ❖ Articles provided by TATA ELXSI

SETTING :-

- ❖ Tata Elxsi

Limitations :-

- ❖ EMR & EHR data has been excluded because it is very hard to extract the useful data which will be later used for analytics in pharmaceutical industry.
- ❖ Current digital operationalization platforms for pharma industry have been excluded owing to their negating and not full proof effects on better efficiency for small scale industries as with low workload, the effects can be dubious.

Strengths :-

- ❖ The strength of the study is, this study includes various digital techniques like AI, ML, Blockchain etc.
- ❖ The effects on large scale industries have been included.
- ❖ Literature Review on the enhanced future gives us an insight on how digitalization will also help with better supply chain management.

Research Approach :-

This research is based on secondary data gathered through a desk analysis of studies conducted by various websites and reports around the world to discover and recommend strategies for improving patient satisfaction and medication development processes. Data was gathered following a thorough examination of many company websites from various locations, including North America, Asia, and Europe, to have a thorough understanding of the market.

Results & Discussion

Digital Trends in Indian Pharmaceutical industry

As per the David Champagne, industry was ready for the digital change as his article was published in 2015 and talks about the digitization in the pharma industry. Now after the pandemic they realized the importance of the digitization and started working on that. Nowadays the industry has adapted many new technologies for the better customer satisfaction. There are many new trends which are helping the companies to increase their revenues. Companies delivering the medicines directly at me in minutes with the help of E-Pharmacy. Companies know that which customer needs what and when with the help of ML. Following mentioned new trends are the one which is driving industry toward the new digital success.

E-Pharmacy:

In remote places, an E-pharmacy is a benefit because it is efficient and responsible. It delivers simple and economical drugs to people houses with just one click, as well as providing information about the medicinal remedies' knowledge to the buyer. “API Holdings Private Limited” (PharmEasy), “Tata Digital Limited” (1mg Technologies Pvt.ltd), “Apollo Pharmacy Pvt. Ltd”, “Netmeds Marketplace Ltd” (Reliance Retail), “Practo Technologies Private Limited”, “Lybrate, Inc”, “Docprime Technologies Private Limited”, “Care On Go”, “mChemist Global Pvt. Ltd”, and “Medsonway Solutions Pvt Ltd” are some examples.

Digitization using Artificial Intelligence and Machine Learning:

The usage of Artificial Intelligence and Machine Learning has revolutionized the entire consumer behavior, allowing customers to have real-life shopping experiences/medical consultations from the comfort of their own homes.

Digital Records:

Digital procedures have been used for a long time and continue to be used in 2022. Because digital processes allow pharmaceutical companies to closely track data, they are particularly beneficial in promoting compliance requirements.

Cloud Computing:

To evaluate complicated data in clinical research, pharmaceutical corporations rely on cloud

security and central access. Thousands of remotely monitored patients' records are kept on the cloud's scalability.

Digital Trainings:

Virtual learning courses may be delivered at any time, from any location, and can be tailored to the specific needs of each user, making them very cost-effective. In order to improve operations and compliance, online training courses for new technologies in the pharmaceutical business will be increased in 2022.

Blockchain Technology and Big Data:

In 2022, blockchain technology will help the pharmaceutical business safeguard data while also increasing visibility, compliance, enhanced drug traceability, and simpler transactions.

Key Elements driving the need of digital health in Pharmaceutical Industry

According to Biopharma digital transformation: Gain an edge with leapfrog digital innovation study talks about the digital drivers which are reshaping the industry & how these drivers improving the customer satisfaction. Companies are identifying the need of the customers, making personalize drugs, launching new drugs in market in very less time with help of the digital health.

Telehealth, Telemedicine & E-detailing :-

Telehealth has the potential to help address patient non-adherence, which has consequences for patient treatment responses as well as business operations. According to studies, non-adherence is a widespread condition that affects up to 50% of patients to varied degrees. Early data suggest that telehealth services such as smartphone applications, emails, or e-health platforms can provide usage guidance and notifications to remind patients to take their prescription, and that such features boost compliance. Given the detrimental effects of poor adherence on treatment outcomes, telehealth treatments could enhance patient health outcomes and boost product positioning in the market.

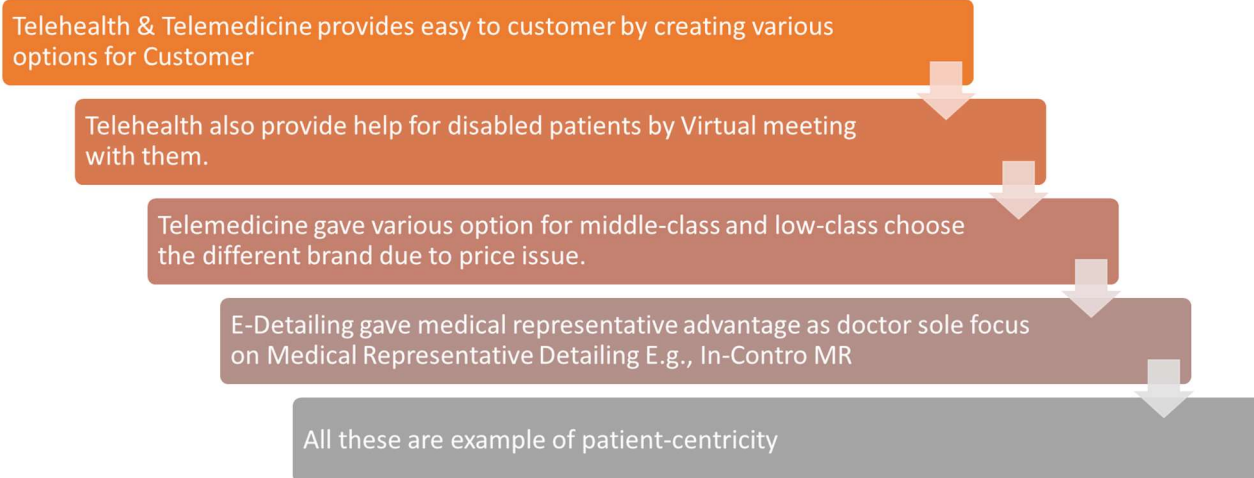


Fig: Telehealth & E-Detailing

Drug Discovery :-

The evaluation of hundreds and even thousands of compounds is a multi-step, iterative process in the creation of new chemical compounds, depending on how well each one works against unique disease-related targets. A funnel can be used to represent the drug development process, with only a select few molecules moving on to the following phase.

The search for the appropriate chemicals with the desired therapeutic effects makes use of a few technological technologies and methodologies. For drug discovery, greater screen (HTS), evolutionary programming, and genetic programming, among them, are neurons and knowledge graphs.

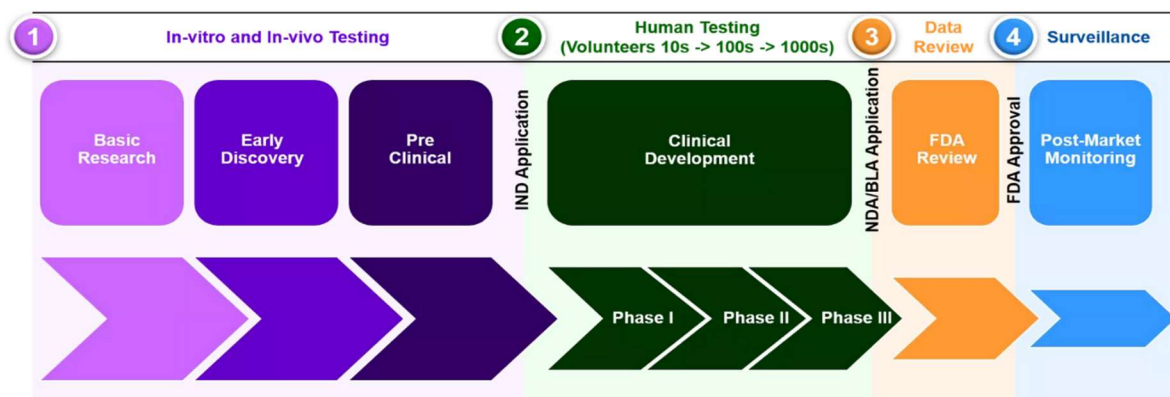


Fig: Drug Discovery

Decentralized Clinical Trials :-

Clinical trial sponsors are always looking for ways to help clinical trials go faster and better for participants and clinicians. Decentralization of trials has emerged as a significant element in this effort. Rather than taking patients to a study site, it includes delivering an increasing part of a trial's operations to the patients.

While most clinical trials will not be totally virtual, they will have one or more decentralized features based on their end points, patient demographics, and treatment options.

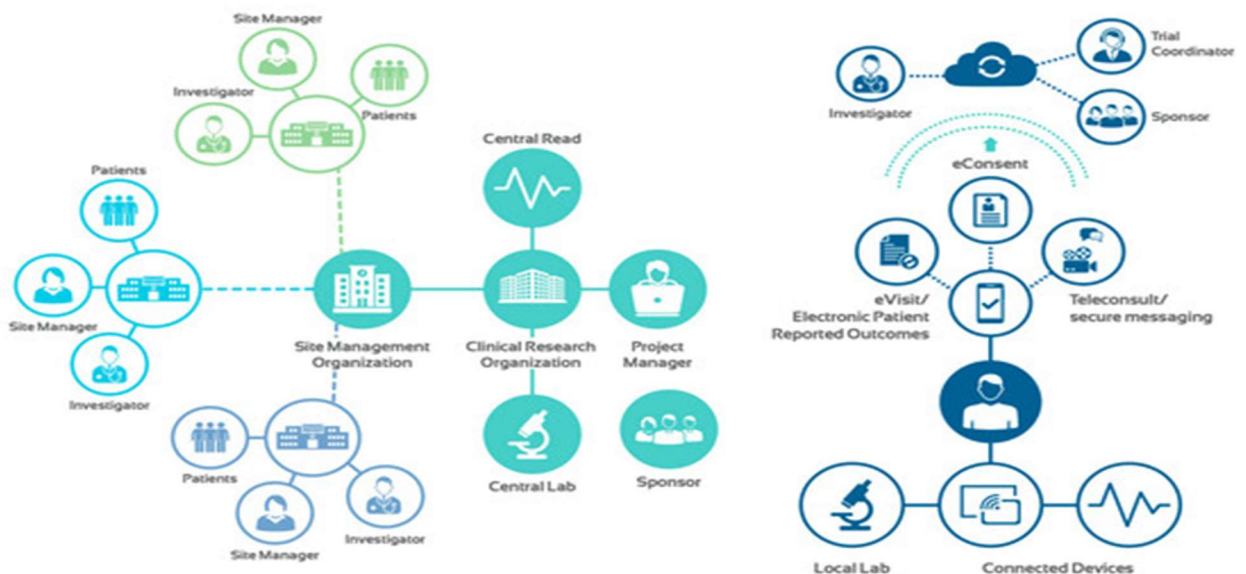


Fig: Traditional & Decentralized Clinical Trials

Digital Supply chain :-

End-to-end visibility of the pharma supply chain is a huge challenge, especially because it frequently involves negotiating with trading partners across the world. The pharmaceutical supply chain has struggled to fully embrace digital technologies.

Data must be collected from both inside and outside the sources to implement a digital supply chain schema. This entails not just the use of modern technology, but also the dismantling of organizational and enterprise silos, as well as those that exist across trading partners, entire networks, and beyond. Gathering and combining all this data, which includes information on operations, processes, regulations, supply chain hazards, social media, patient health patterns, and much more, allows for a more unified image, a more accurate and impactful perspective.

How Pharmaceutical Companies using Digital Technology

Till now we have talked about the new trends & key elements drivers for the industry. Now we will be talking about how these companies are using the digital technologies to improve the customer satisfaction. As mentioned earlier industry is using AI, ML, DCT, E-Pharmacy and many more technologies.

Acceleration of Drug Discovery And Drug Development:-

Because the patents on blockbuster drugs are about to expire and because the cost of bringing a new drug to market is rising, the pharmaceutical industry is working to speed up the process. Pharmaceutical analytics can assist businesses in making better decisions by sifting through big datasets of data from control groups, academic research papers, and scientific publications. These sizable datasets are then subjected to predictive algorithms. To improve financial performance, drug research innovation will be a key strategy.

Increasing The Efficacy Of Clinical Trials :-

By identifying and analyzing a range of data points, such as participant demographic and historical information, patient monitoring information, and information on previous clinical research events, big data analytics in manufacturers can assist pharmaceutical companies in lowering the cost and accelerating clinical trials.

Pharma businesses can use pharmaceutical analytics to streamline the disease diagnostic process and create control groups and clinical trials that are more effective by streamlining the entire process and choosing test locations with a large patient pool.

Personalize & Creating Targeted Medications:-

Theoretically, since each person has a distinct genomic profile, each patient should receive a customized course of treatment. However, it is difficult to organize complicated data and make the proper decisions with existing biology and technology.

By combining gene based, patient health sensor data (a device that can be worn to track physical changes in a person while taking medication), and electronic health records, big data analytics in the pharmaceutical sector can address this problem.

Pharma businesses can more successfully use big data techniques to filter through fragmented genomic data, resulting in the development of more effective and tailored therapies for their patients.

Reduction in Cost And Advancement Drug Utilization:-

The need to increase operational efficiency is greater than ever as the pressure on pharmacy operating margins grows. By finely analyzing critical metrics like average excipient price per

medication, rebate as a proportion of the overall drug expenditure, and drug utilization overview efficiencies per user per financial year, pharmaceutical analytics will be assisting pharmaceutical firms in making better decisions to boost revenue and cut costs.

Drive Effective Sales & Marketing Operations:-

Pharma business analytics can assist in the identification of emerging businesses and the analysis of the efficacy of multiple sales channels to more efforts and earn a competitive edge by accumulating crucial data points. This will enable better and quicker decision-making by facilitating the knowledge of sales rep performance.

You can use this to help you allocate resources and money wisely. The pharmaceutical sector is leveraging big data analytics, embracing cutting-edge technologies, and pharmaceutical company research to find new markets and increase the effectiveness of their sales and marketing activities.

Improving Operations & Employee Training:-

By utilizing pharmaceutical data analysis and data insights to enhance their current operations and processes, pharmaceutical companies can significantly reduce costs. Advanced analytics can be used by pharmaceutical corporations to predict the effects of machine settings, operator skill levels, and feedstock inputs on output quality.

It will assist pharmaceutical businesses in making decisions about how to optimize and enhance the overall procedure. Forecast and big data analysis in the pharmaceutical industry can be used to forecast external signs, such as problems with quality, equipment failures, or substantial changes in demand.

SWOT Analysis:

STRENGTHS	WEAKNESS
Value : Pharma companies have moved away from traditional product and clinical value to a more • Outcome based values for patients and providers Example : the Delaware Health Innovation plan allows this and many payers (like AETNA, united healthcare) are following this to help implement the same. The fixed fee payment is being slowly transitioned out and in the coming years this will become the defacto standards for outcome-based payments. • Value added tools and services for patients. • Superior customer experience	• Customers : Pharma companies are still lagging behind on moving away from engaging with traditional providers (Health care providers(doctors, hospitals). • Ability to emphasize and consolidate the various system of care and its interconnections and networks around patients. Example : Patients are now being engaged with their doctors, specialists, nurses, home health aides, lab technician and pharma companies patient hub service employees to ensure complete care. It is important to learn this web of interconnections using latest technologies to provide quality level of care to all patients. • Lack of integrated systems which allows users to get a 360 degree views.
OPPORTUNITIES	THREATS
• Data & Innovation • Use of real-world data (RW)to enable real world evidence(RWE) • Leverage AI/ML to bring about improvements in data quality Example : assign tags or categories to text according to content using Name Entity Recognition(NER) such as symptoms, side effects.	• Talent and skilled resources are a major challenge • Lack of rules governing privacy policies and how it should be handled due to various laws governing this data is a threat to the industry. Example : The GDPR act in Europe prevents the use of personal patient data for any marketing efforts and leveraging digital assets to maximize benefits is becoming a bottleneck. • Difficult to get the tech stack right

Digital Solutions From Some Big Companies in the Market

LivingWith App	Mabu (Robot)	Beyond the Pill	Watson Health platform	Belysa	REACH	Roche (CDS)
Pfizer	Pfizer	UCSF	Apple-IBM	Merck	Roche	Roche
Oncology Patients	Everyone	Women	Companies	Analysts	Healthcare Workers	Doctors
• Gives Support • Gives Updates	• Tracking	• Covers all areas of healthcare	• Uses new technologies	• Multi-analyte views • Curve fit optimization • Auto flagging & Data hygiene	• Multilingual Counseling • Available on all platforms	• Use AI & ML • Value based support
Gives reminders	Emergency Updates	Helps to find gaps and Improve process	Helps to make robust system	Testing parallelism & curves	Improve well being Mental Support	Provide decision support to doctors

Predictive Analytics in Pharmaceutical Industry

As per Igor Kruglyak, Predictive analytics, as the name suggests, uses historical data to create predictions about future outcomes.

A numerical equation or model that depicts important patterns in a broader sense is created using historical data. When it comes to leveraging data, predictive analytics and predicting are two different things because the first heavily relies on historical data insights. The development of predictive models is based on actual observations of the factors and processes that enclose those events, which can include anything from weather changes to industry trends to equipment failures to higher-level business decisions like what to open new locations in particular regions. The next step is to assess future patterns and suggest the best approach using a predictive model.

Predictive Analytics for Drug Discovery and Development:-

Predictive analytics is becoming increasingly important in medication development and research. Through the use of this technique, pharmaceutical corporations (and their research collaborators) can find and choose promising medicinal compounds with the therapeutic properties particular ailments. Pharmaceutical research predictive models take into account a range of data points about every target, including historical data on how that target communicates with other proteins, information as to how that target acted in prior research, and what kinds of drugs worked or won't help in the past.

Predictive Analytics for Pharmacovigilance and Drug Safety:-

Drug safety is a top concern for many pharmaceutical companies, and it may be quite expensive, especially if it results in the need to recall entire batches of medication. Additionally, an adverse drug reaction (ADR) could have detrimental legal repercussions. By identifying particular patient populations who might have trouble tolerating particular medicines or are more likely to acquire an ADR, predictive analytics can help to reduce these risks.

Predictive Analytics for Clinical Trials :-

Two of the biggest issues in clinical research are the length of time and expense involved in patient recruitment. It is possible to apply predictive analytics to ascertain whether patients have distinctive characteristics that suggest they might make suitable candidates for clinical trial types. This is just one illustration of How making predictions about the future can assist cut down on the number of test subjects needed for research while also ensuring that those who will fit remain committed throughout the entire experiment. As a result, there will be fewer overall resources wasted, more effective results, and a reduced time to market again

for developed drug.

Predictive Analytics for Pharma Supply Chain :-

Having pharmaceuticals available for patients when they need them is one of the most important parts of the pharmaceutical industry. Predictive analytics models assist pharmaceutical companies in better understanding how various factors, such as regional demography or financial environment, will affect demand. This improves patient access to life-saving medications and enables supply chain operations to be more effectively managed.

Predictive Analytics Drug Distribution and Sales:-

Modern artificial intelligence techniques and predictive analytics models can be used by the pharmaceutical industry to correctly forecast potential drug sales. Better inventory management makes it possible for a more efficient distribution process overall, which lowers the risk of overstocking and having too few medications available to meet demand. These mathematical models are integrated with historical information on past sales trends in different regions by different client categories (for example, hospitals vs. pharmacies), as well as any other relevant factors that can have an impact on future sales forecasts.

Predictive analytics can be used by pharmaceutical companies to identify and priorities new sales prospects. This helps a business concentrate more on customers who have the highest possible return on investment, which is especially useful when identifying the most lucrative consumer segments for a certain therapy or drug.

Challenges in Digital Health

As per Igor Kruglyak, following are challenges for the Pharma industry while taking digital steps. Security Remains a Focus in Healthcare.

Cybersecurity is a major risk for healthcare organizations. Malicious attacks can cause care to be disrupted, resulting in patient injury and negative medical outcomes. Hence, the current findings are that when it comes to cyber dangers in healthcare, ransomware is the most common. Hackers infiltrate IT systems with malware or digital viruses in order to encrypt important files.

Also, the likelihood of a ransomware attack on a hospital database via a patient-connected device, for example, may be low simply because the database is on a private network. However, such an attack might severely harm the hospital's reputation and compromise patient privacy. Such problems necessitate regular monitoring and countermeasures.

Regulating adaptive A.I. algorithms:-

An adaptable artificial intelligence (A.I.) is one that can change its behavior in response to new knowledge. We frequently read about an A.I.'s tremendous prowess in the healthcare

setting in the news. However, in many cases, these results come from laboratories that use selected datasets or ideal circumstances that aren't entirely representative of real-world clinical settings. Google had to learn the hard way.

The company's medical researchers praised the A.I. tool's capacity to screen patients for diabetic retinopathy (DR) from photographs with 90% accuracy. DR is a leading cause of vision loss around the world and catching it early will help you avoid consequences. However, Google's artificial intelligence didn't perform as well in practice as it did on paper. When used by nurses in a Thai hospital, they ran into several problems. They had internet connection issues at times, and the scan quality didn't meet a particular threshold at other times, so the A.I. just didn't respond. Nurses had to spend extra time altering some of the photographs that the algorithm didn't want to analyze on occasion.

Initial Investment :-

The bandwidth required to embrace new digital solutions is often found in large business enterprises. SMB manufacturers, on the other hand, frequently lack the resources to achieve the same goals. These businesses may decide to continue with old technology, especially if there are no obvious drawbacks. SMB manufacturers can also make strategic investments in modern technology that can yield quantifiable benefits if they have the proper plan.

Lack of experience in manufacturing:-

Manufacturing had been growing faster, more streamlined, and more automated than it has ever been. This industry, on the other hand, is still relatively new to the digital game. Many industrial executives may be unaware of the inner workings of some of the most recent innovations. Although a lack of direct information can stymie development, it should not be used as an excuse to forego digital transformation altogether. Additionally, manufacturers who lack critical technical competence can seek advice from Pharmaceutical ERP partners who have complete control over their industry and technical understanding to help them make technology purchases.

Recommendations

- Integration of AI and ML in drug discovery and E-prescription.
- Using digital technologies and devices in Clinical trials.
- Using of Blockchain, AI, ML, IoT, RFID (Radio Frequency Identification) in Supply Chain Management.
- Need to concentrate on patient centricity in case of PAPs/PSPs.
- Using of Predictive Analytics in Production & Maintenance
- With the help of Technologies like Advanced Analytics, AI to monitor the quality levels, Cloud based platforms enables Real-time Tracking & ML to address drug Safety in Pharmacovigilance.
- Create a shared understanding of general digital capabilities requirements across business functional areas, north stars, and value streams.
- Develops internal organizational capacity for digital innovation (either from center level or from the functional level) to take new creative ideas from conception to full-scale execution.
- To connect with creative stakeholders in specially technological, medical, and geographic sectors, develop an ecosystem engagement plan.
- Examine innovation archetypes, their benefits and drawbacks, and their consequences for business strategy.

Conclusion

According to the research done, the below conclusions are made.

- ❖ Firms should address fundamental concerns such as money, strategy, and talent before attempting to leapfrog digital innovation. Budgets for functional areas, innovation groups, or the leadership of the organization combination of these sources provide money for digital breakthroughs today. Only incremental innovation will be fueled by investing in individual initiatives or maintaining existing investments. To enable leapfrogging digital innovation, it is necessary to modify old ways of thinking and implement new budgetary methods.
- ❖ The covid-19 compelled pharma businesses to prioritize technological invention, integrate it into each & every element of their operations, and utilize it to improve patient and partner experiences. The momentum and relevance of digital innovation, on the other hand, is not slowing down; rather, it is speeding up to give firms a new competitive edge.
- ❖ The market is at a turning point where enterprises may either seize the chance and increase their investments in digital innovation by leapfrogging digital innovation, or they can choose to slow down and run the danger of being digitally inferior.
- ❖ Many successful firms have built operational structures in which dedicated digital innovation resources are in a center of excellence between business and IT. This has aided in the translation of corporate goals into technological requirements, as well as the flexible management of investment portfolios and speedy collaboration with external partners. To assure appropriate funding for digital innovation while simultaneously reinventing old IT budgeting methods, firms may need to take serious trade-offs on business goals.
- ❖ Startups, academic institutions, large technology firms, and consultancies nurture most of the technologies and talent behind the most recent digital advancements. Biopharmaceutical businesses should reconsider their IT strategy to obtain innovation directly. The execution pace and scale could be influenced by any one of the characteristics.
- ❖ Every aspiration for a north & west star is unique. To build a successful portfolio of digital innovation investments, it's Understanding the variety of operational, economic, and technical factors at play is essential. Our research suggests that rather than a series of haphazard acts of new creation that produce so many proofs of concept, successful portfolios are composed of a queue of intentional securities that created on one another to produce innovative thoughts and value to realize.

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