

“Impact of Phygital on Pharmaceutical Industry”

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By

ANIMESH ROY

**IIHMR-U/02/2021-23/0288
MBA PM-13**

Under the supervision and guidance of
Mr. RAHUL SHARMA
Assistant Professor
School of Pharmaceutical Sciences
IIHMR University
Jaipur

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IIHMR UNIVERSITY
JAIPUR, RAJASTHAN**



DECLARATION BY THE STUDENT

I hereby declare that this dissertation titled **“IMPACT OF PHYGITAL ON PHARMACEUTICAL INDUSTRIES”** 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 Information derived from the published or unpublished work of others has been duly acknowledged in this text.

Date:
Place: Jaipur

Signature of Student

Animesh Roy
IIHMR-02/2021-23/0288
MBA PM-13
IIHMR University, Jaipur

**IIHMR UNIVERSITY
JAIPUR, RAJASTHAN**



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This is to certify that the dissertation titled **“IMPACT OF PHYGITAL ON PHARMACEUTICAL INDUSTRIES”** is a record of the research work undertaken by **Animesh Roy** in partial fulfillment of the requirements for the award of the degree of MBA – Pharmaceutical Management from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

Date:
Place: Jaipur

Signature of Guide

Ms. Rahul Sharma
Assistant Professor
School of Pharmaceutical Management
IIHMR University, Jaipur

**IIHMR UNIVERSITY
JAIPUR, RAJASTHAN**



ENDORSEMENT BY THE DEAN

This is to certify that the dissertation titled **“IMPACT ON PHYGITAL ON PHARMACEUTICAL INDUSTRY”** is a bonafide and genuine research work carried out by **Animesh Roy** under the guidance of **Mr.Rahul Sharma**, Assistant Professor, School of Pharmaceutical Management, IIHMR University, Jaipur.

Dat
Place: Jaipur

Signature of Dean

Dr. Saurabh Kumar
Dean and Associate Professor
School of Pharmaceutical Management
IIHMR University, Jaipur

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Date:
Place: Jaipur

Signature of the candidate
Animesh Roy

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List of Abbreviation

DTx	Digital Therapeutics
EHR	Electronic Health Record
AR	Augmented Reality
VR	Virtual Reality
HCPs	Healthcare Professionals
R & D	Research and Development
OEE	Overall Equipment Effectiveness
CMO	Contract Manufacturing Organizations

INTRODUCTION

Introduction

With the introduction of technology and the continually rising supply, customers have become more and more demanding with time. Nowadays, people have high expectations, their requirements are changing, and they are constantly integrated, which them incredibly knowledgeable. Moreover, people prefer brands which distinguish themselves from competition by offering customized, engaging, and distinctive experiences provoking emotions. ^[1]

However, consumers are developing quicker than enterprises, creating a gap between the demands of the consumers and the available supply. Hence, if companies want to thrive in today's challenging market, they need to adapt to these shifting requirements and continually reevaluate the customer journey by finding innovative ways to engage their customers. Furthermore, with the quick advancement of technology, organizations need to stay up by digitalizing the customer journey.

In 2013, Momentum, an Australian marketing firm, talked for the first time about "Phygital". They characterized it as being the reality of integrating the physical and the digital world by engaging the consumer with digital signage within the standard venue. Hence, at first sight, this may be a feasible option for businesses to reimagine the on-site experience and satisfy the expectations of their consumers.

[2]

Evolution of Phygital concept

Phygital is the fusion of two concept Physical and Digital

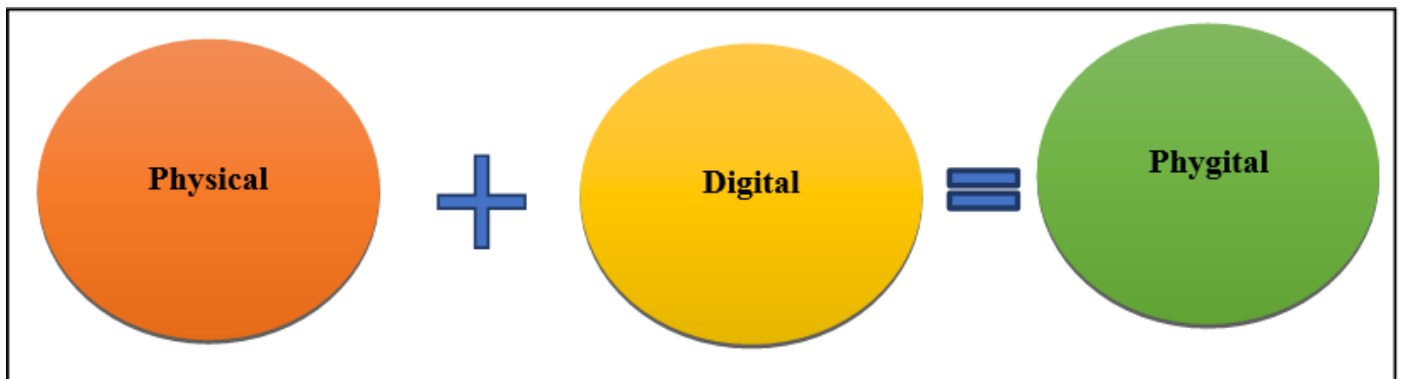


Fig 1: Phygital diagram

Source: <https://www.mathiaservyn.com/lets-get-phygital/>.

Physical

The Traditional way of physical concept in pharma focuses on 4 marketing mix. The pharma initially intended for product-focused enterprises. transformed further into 7Ps, which included people, process and physical towards the model to adapt for developments in purchasing patterns and technology, as well as to be more realistic for the rising quantity of service-based pharma-health companies. ^[3]

1. Product

In the business, the creation and utilization of the product are synchronized, and the product is deceptive and distinctive. The reason for this 'product' consolidates instantaneous personalization. This moreover demonstrates that the place where this activity is occurring turns out significant. In an optimal situation, Most professional organization's need to provide a few personalizations inside a specific circumstance a standard technique of delivery in order to assure recurrent encounters of the same quality and a consistently positive customer experience. ^[3]

2. Pricing

Because an assistance can't be estimated by how much resource factors into its development nor the genuine evident expenditure of manufacture is measurable, it very well may be hard to set a tag price on it. Around are certain assets clearly, for example, the job expenditures and direct expenses. Regardless, however, the emotion, the encounter and the brand name likewise contribute towards the end cost providing. ^[3]

3. Place

Likewise referenced, such help was made and utilized in a similar place. It can't be claimed and detracted from the area. To such purpose that moment when this exchange occurred is of essential consequence. Every area of the support arrangement is meticulously researched to enable uncomplicated access and the yearning to put forth the endeavor to get at it. Example Drive-thru restaurants and deals and administration focuses may be positioned in busy prominent avenues to let walk in clients, while a gourmet eatery might be situated in a quiet road to keep up with restrictiveness and protection. ^[3]

4. Promotion

Campaign assures a similar role as it does in some another advertising location. Some help may be more effortlessly reproduced than a physical product. To forestall a help becoming exchangeable with its rivals, it becomes essential for optimistic brand picture and name on the lookout. Separation develops into a vital aim to pull in both current and repeat clientele. ^[3]

5. People

This is a crucially integral part about service marketing mix. Whenever some help has been usually provided, any individual conveying this isn't extraordinary from the actual assistance. Thus, several firms devote resources into describing the suitable kind of individual to complete their administrative position and thereafter put forth efforts to acquire or prepare people to meet this description.^[3]

6. Process

Whenever management arrangement needs to discover equilibrium amid personalization and normalization, various procedures engaged with the activity take special attention and thought. A procedure should be properly specified for the specialized organization. This key technique ought to guarantee a comparable degree of administration conveyance to each customer, anytime of day, on fast. Inside this method, there need to be recognized locations where a client inclination might be required to supply unique encounter.^[3]

7. Physical Evidence

The place of much of the assistance conveyance additionally takes on importance. The degree of consolation and beauty of an assistance location may have a ton of effect on the consumer experience. A peaceful and lowering environment with intelligent soothing strategies may give a notion that everything is alright to another customer, making them return.^[3]

Digital

When it comes to using digital technology to enhance production and supply chain processes, the pharmaceutical and life sciences industries have been hesitant. As the pharmaceutical business faces difficult challenges, digitalization has enormous potential to help businesses adapt to much more visibility into their distribution network operations to make quicker and smarter decisions by implementing software, such as internationalization, supply chain intricacy, prices and price stress, and tailored therapy, among many others. Companies may completely link their distribution networks and enhance operational procedures as an outcome of digitization, making them more adaptable and efficient. Planning efficiency, industrial performance and effectiveness, stock levels, and quality of service all increase substantially. Establishing a modern distribution network infrastructure, which comprises virtualized inventory control capabilities, cloud-based user experience, as well as an innovative digital physical distribution network, is necessary to exploit such opportunity. Individuals, equipment, and materials interact as a web system when such components come together simultaneously, leading in advancements in all phases of the operational product lifecycle: planning, supply, manufacturing process, then deploy.

For the pharma business, digitalization helps altogether change supply chain tasks, on an extremely basic level further developing cycles and supporting efficiency. Digitalizing the supply chain permits organizations to address the significant difficulties by empowering the accompanying: ^[4]

1. Continuous permeability and quicker direction:

Motion sensors through the supply chain can send information on continuous reason, giving continuous encounters across the value chain and engaging deals and tasks pioneers go with dynamic decisions considering advancing circumstances. This licenses more restricted lead times - days rather than weeks or months. Coordinated with better orchestrating accuracy, this will diminish stock outs, and finally save patients' lives. ^[4]

2. New functioning processes and maintenance:

Pharma facilities normally suffer substantial amounts of downtime. This individual time may be reduced by 30 to 40% through digitization and assessment, significantly enhancing the overall effectiveness of the equipment (OEE). Creative programming courses of action and assessment can arrange data, through digitization, individual time in pharma plants can be lessened by 30 to 40 percent. ⁸ Strategy & changing information into critical estimations. Machine-to machine correspondence and machine-learning estimations consider predictable cycles, perceptive upkeep, and customized therapeutic exercises. ^[4]

3. Start to finish supply chain mix:

Pharma associations have supply chain activities, such as vendors of raw materials (from vibrant pharmaceutical manufacturing to packaging material), Contract Manufacturing Organizations (CMOs), third-party organized actions vendors, distributors, and resellers to infrastructure, drug stores, governing specialists, and care recipients. With digitalization, especially scattered processes, alliances may enhance linked distribution network affiliations. Utilising online solutions makes it less difficult and more efficient to integrate all parties. solitary assisted system, including those with distinct Technology displays or Enterprise software, additionally makes systems more diverse. ^[4]

4. Producing competencies and proficiency benefits:

Automation and digitalization may impart key collecting economies throughout key areas like stocking, piling, re-energizing, and scrutinizing. Mechanical progressions, for instance, 3D manufacturing may enable distributed creation ability even at modest numbers. Advanced developed mechanics plus extended realism will supply a phase shift in human-technology cooperative effort and automation. ^[4]

Digitalizing the supply chain helps pharma associations generally further foster their supply chain and undertakings execution and at last strengthen their money related viewpoint. When completed,

digitization of the supply chain gives pharma associations an authentic wellspring of high ground. ^[4] However, both physical and digital concept have limitation which cannot meet customer expectations. Therefore, the concept of phygital took place and is being adapted by pharma companies.

Phygital

Companies now a days are shifting to advance approaches that is phygital experiences. The term "phygital" purchasing experiences is a modern concept, highlighting the uniqueness of the digitalization. ^[5,6] Integrating cashless money transfers, dynamic tap panels, smooth digitized money transfers, and wearable technology into the user experience seem to be just a few samples of prominent phygital ideas ^[8,9]. Finally, such tactics have a wide range of applications across sectors (e.g., education, healthcare, life sciences, pharma, etc). The growth of Phygital branding in increasing long term future of business is creating a lot of attention ^[10,11]. This area seems to be presently in very initial phases of advancement, initial research has revealed that Phygital can be designed to give a distinctive & consistent experience which consumers prefer, improving customer perceptions of brand worth while enhancing trust and decreasing misunderstanding ^[12].

Let's use the case of pharmacies as an example of Phygital for Pharma and Life Science. Pharmacies are now the foundation of a creative and digitalizing activity that has a significant influence on customers. It is untrue, however, to think that turning to mobile technology to order prescription drugs (in the manner of convenience stores restaurants) automatically turns the buying process into Phygital. On the other side, consumers fail to even want to be aware of it. This suggests that the client experience will be more "human-like" and fluid the more "invisible" and well-integrated technology is in it. This procedure is particularly important because it sparks a number of behaviours, including referrals from friends and family and, consequently, customer loyalty. ^[13]

As offline marketing is no longer the golden standard of advanced healthcare consultant interaction, pharmaceutical companies are seeking phygital (physical-digital) connections to ensure a healthy relationship with physicians in order to strengthen their businesses, with a particular focus on patient care. Traditionally, pharmaceutical companies have used a large field force to engage doctors, but owing to doctors' hectic schedules, the field force is unable to attract their full attention. As a result, many businesses are adjusting their traditional marketing strategies and mixing them with the best of digital. ^[14]

Digital technologies have the ability to significantly increase a customer's profit. The digital solution will be critical in allowing pharmaceutical firms and doctors to communicate more often. During medical representative meetings, doctors are unable to obtain complete information. The use of digital connect can help physicians and MRs communicate more effectively. It allows clinicians to ingest medical

information in a variety of ways. This will not replace medical representatives but will supplement them and decrease their trips to doctors in order to keep them informed about pharmaceutical company advancements. Medical professionals have a crucial role in the rebranding of pharma firms. ^[15]

Several health-tech companies offer technological services to pharmaceutical companies. It provides pharmaceutical businesses with a custom solution for establishing long-term partnerships with doctors. Furthermore, the pharmaceutical sector is working with tech and medical software businesses to include Phygital into their business strategy such as patient experience, drug discovery, marketing etc.

For example

a. Patients' Perspectives

To boost patient satisfaction and enhance their professional reputation, they are increasing their usage of telemedicine and conducting virtual visits in their ambulatories at any time and from anywhere utilizing smartphones or applications.

- Personal data is monitored via wearable devices such as smart watches.
- The ability to send personalized appointment reminders through text message or email.
- Send or change doctor's appointments
- Manage the ordering and replenishment of prescription and over-the-counter pharmaceuticals drug over the internet (including home delivery) ^[15]

b. Marketing

Retail Order Management encompasses the middle of the complete order gathering process,. In reality, it comprises the most up-to-date information on data, customer information, and contacts, as well as information linked with the business and other market data resources. The ability to get real-time advice on both company strategy and compliance with commercial criteria helps medical representatives to have a comprehensive understanding of their customers. ^[15]

c. Drug development

Phygital technology is used to find new molecules in a short amount of time by understanding their complicated structure, which reduces research costs and time. ^[15]

This is exactly an integrated approach can enhance the overall experience, with the essential things to consider being simplicity of use, speed, and personalization. ^[15]

Literature Review

Literature Review

1. Types of consumers

To understand the present context, and the position of digital in the customer experience, it is vital to study the various players that comprise today's context. Three distinct generations will be considered to understand line of thought, habits, hopes, requirements, and buying behaviour of all different generation.

- ✓ The X- Generation
- ✓ The Y- Generation
- ✓ The Z- Generation

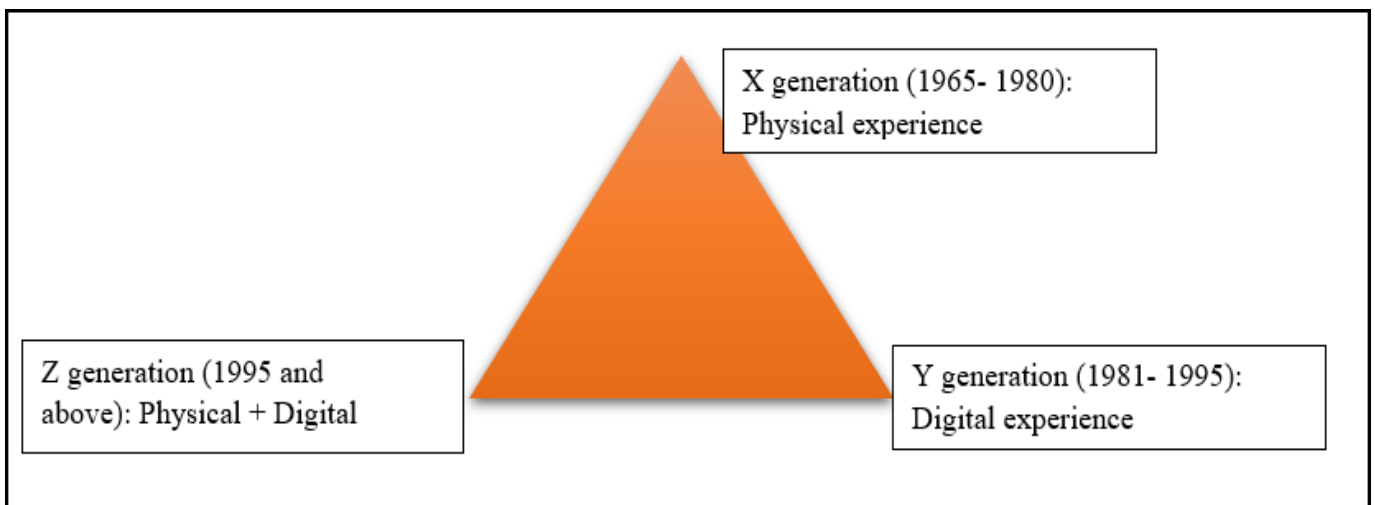


Fig 2: Types of customers with their preferences

Source: <https://www.pc-freak.net/blog/baby-boomers-generation-generation-x-y-z-stereotypes-people-marketing-trait/>

1.1. The X- Generation

The X-Generation (likewise called Gen-X) addresses all individuals who were born somewhere between the year 1965 and 1980. They have known troublesome monetary times with the different emergencies they have needed to confront. Gen-X expects to offer personalized products/services tailored to their lifestyle. ^[16]

1.2. The Y- Generation or Millennials

The Y-Generation or Millennials include all people born approximately between 1981 and 1995. Since they were born during the emergence of internet, they are also called “digital pioneers”. First, millennials attach more importance to price than any other generation. They would rather save their money than spend it. The millennial no longer carries much cash; instead, they prefer to pay with a credit card, and if an organization does not respond, they will simply switch to a rival. ^[17]

1.3. The Z- Generation

Finally, the Z- Generation represents all people born after 1995. With respect to purchasing conduct, Z-age has disparate way of behaving contrasted with its ancestors. 75% of Z- Generation incline toward shopping in physical stores instead of online because it gives a superior shopping experience. ^[18]

2. Types of customers in Pharma

2.1. Patient: Individuals who are main customer of pharma industry they are direct or indirect buyers of pharma products. ^[19]

2.2. Physician: These are the backbone of pharma industry they directly influence the buying behaviour of end consumer.

2.3. Pharmacist: They are indirect influencer in pharma industry in influencing end consumer purchase.

2.4. Payors: They pay the large amount of money of end consumer to drug manufacture. ^[20] Payors in India are patient, health insurance companies which settles claims of medicines and other health expenditure when need. While payors in US market are insurance companies, Medicare and Medicaid.

3. Patient Centricity

3.1. Outside-in consumer centricity: Physicians who give prescription for the pills have the role of the decision maker. That means they give the deeper insight regarding the patient mental health, need, motivation and behaviour. According to this information the pharmaceutical company pays more attention towards consumer centricity.

3.2. Inside-out consumer centricity: In this pharmaceutical companies focus on selling the product without looking to patient needs and focus on another consumer like pharmacist.

3.3. Patient interaction: When it comes to pharmaceutical medications, the patient is actually the buyer. ^[21]

The following diagram show the patient centricity:

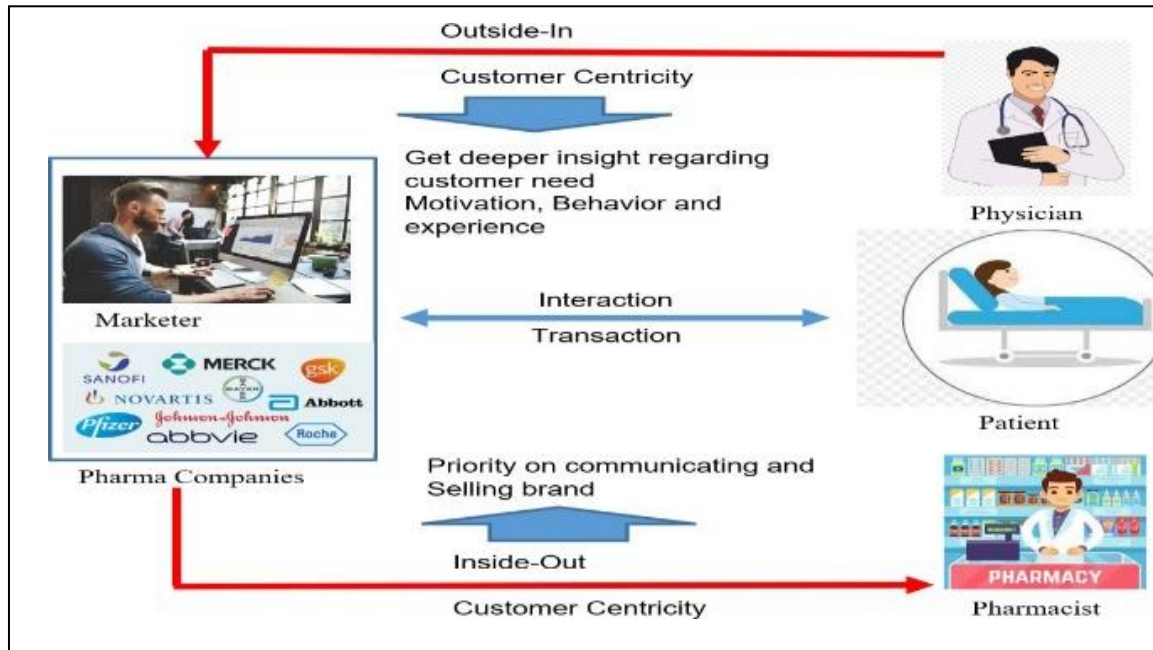


Fig 3: Patient Centricity

Source: <https://syngymaxim.com/a-patient-centric-approach-in-healthcare- and-its-importance/>

4. Different Marketing Strategies

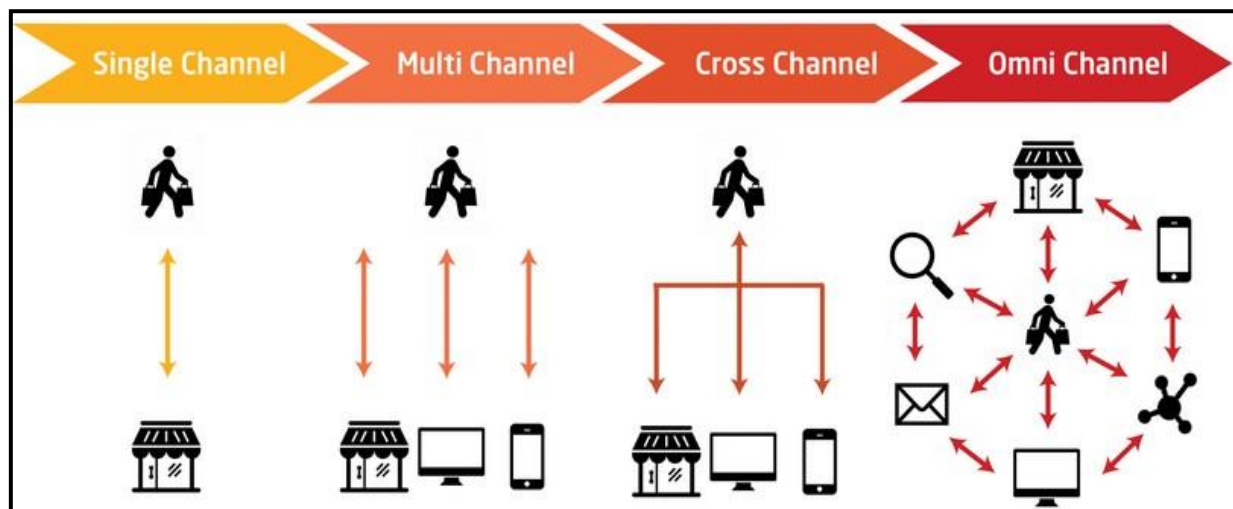


Fig 4: Different marketing strategies

Source: <https://morethandigital.info/en/multi-channel-omni-channel-or-personalization-what-is- that/>

An omnichannel customer experience is comprised of individual customer contact focuses, over an assortment of channels that consistently interface, permitting customers to get back on track on one channel and proceed with the experience on another. ^[22]

These days, brands need to contend in an exceptionally competitive retail setting in which clients are associated and very much educated. Moreover, the client purchasing process has definitely changed on the grounds that of customization, clients are looking for brands which expect their necessities and can serve them when, how and at whatever point they need. To stay away from consumer changing to con-

tenders, many brands comprehended they expected to execute procedures which empowered them to reach and to be reached by their clients through various channels. A channel can be defined as follows: “A channel is a customer contact point or a medium through which the company and the customer interact” [23]

Before the emergence of internet, brands could only reach customers visiting a store, by phone or mail. The arrival of internet drastically increased the number of possible channels. Nowadays, some brands implement strategies via many different channels while others choose strategies with less channels but more synergy. This choice is made on the size and structure of the company but also the type of industry, and so on. Aside from multiple contact points, today’s customer expects brands to create a synergy between their different channels in order to be aware of their activity on the different channels of the brand. [24]

5. Integration of Phygital in Omnichannel Strategy

To be considered as “Phygital”, the experience must necessarily satisfy four criteria.

- The experience should occur in an actual area.
- It must engage the customer.
- At least one of the subsequent methods, or a combination of them, must be used in the course of the activity: Tap technology mobile phone technology, item, face, speech recognition, motion technology and AR, VR.
- The experience should customize the client/guest experience. [25]

Need for Integration of Phygital in Omnichannel

Omnichannel maintain client experience for clients at every point of contact had this while been viewed as a notable tactic to develop. The pharma industry is focusing more on customer centricity thus phygital adoption in omnichannel gives the advantage in gaining more customers. This coming wave is merging experience and presenting by turning out to be more significant for customers and retailers. [26]

6. Technologies Available to create Phygital Experience

There are many Phygital strategy for any company. Keep in mind, however, that in order to stay relevant, businesses must always come up with innovative methods to employ technology in order to provide value to customers. A Phygital approach that capitalizes on technology's sensible application is always a solid idea. These are some innovations that will aid in the effective implementation of the Phygital

approach by bridging the physical and digital divide.



Fig 5: Technologies to create Phygital Experience

Source: <https://blog.aspire-sys.com/category/retail/phygital-store-solutions/page/2/>.

6.1. **Mobile Technology**

Growing mobile technology allows phygital experience more accessible. Nearly everybody has a cell phone in their pocket today and notably twenty- to thirty-year-old and Gen-Z. Brands need to use every one of these cell phones to bring in their clientele and communicate with them.

Clients demand a blend of the physical store and the digitised retail experience, employing both mobile devices and in-store technology to make purchases fun, fulfilling, helpful, and painless. Retailers must work on improving the Phygital skills in order to maintain current consumers and acquire new customers. Customers are extensively depending on their devices while in visits for tasks such as cashless checkout, detecting QR codes for selected items, checking constraints and coupons, and collecting electronic vouchers. According to a model presented by Lampertius, iRobot sent a QR program built in partnership with Chase Design to retail facilities throughout the world, which connects clients to particular Roomba Robotic vacuum and Brava Mop item records or exhibitions. QR codes are indeed a quick and easy method to share information. ^[27]

Application of Mobile Technology for Phygital experience in Pharmaceutical Industry

- Digital Therapeutics (DTx)
- Electronic Health record

6.1.1. Digital Therapeutics (DTx)

DTx, a subcategory in health, is a healthcare domain & care alternative that harnesses a modern and often digital care services technology to solve a physical or emotional condition. They are also known as Software as Medical Devices (SaMD). ^[28]

Domains of digital therapeutics and brand representations as per International Medical Devices forum ^[28]

1. Identify a health condition.
2. Monitor as well as treat a chronic condition.
3. Enhance drugs.
4. Treat any health issue or disorder. ^[28]

The prerequisites for employing each form of DTx good or service in line with the product's goal (to support product claim, clinical proof production, client availability of an item, and connection to concurrent medicines). Direct-to-consumer sales are allowed for a Domain 1 DTx solution treating a health emergency, but prescriptions are required in order to provide patients with a Domain 4 DTx. The following table lists the various categories under which DTx is offered in the market. ^[29]

Sl. No	Vendor name	Product name	Therapeutic area	Domains
1.	Pear Therapeutics	reSET [®] reSET-O [™]	CNS	4
2.	Propeller Health & Boehringer Ingelheim	RESPIMAT [®]	Respiratory	3
3.	Akili Interactive	AKL-T01	CNS	4
4.	Dthera Sciences	DTHR-ALZ	CNS	4
5.	Big Health	Spleepio [™]	CNS	2
6.	Cognoa	various	CNS, pediatrics	2
7.	KAIA	Motion coach	Musculoskeletal	2
8.	Glooko	MIDS	Metabolism	3

9.	WellDoc	BlueStar®	Metabo- lism	2
10.	Omada Health, Noom, Etc		Metabo- lism	2
11.	MedRhythms		CNS	2

Domain: 1 = Identify a health condition, 2 = Monitor as well as treat a chronic condition, 3 = Enhance drugs, and 4 = Treat any health issue or disorder. CNS = Central Nervous System. ^[30]

Some of the recently collaborated pharma and DTx companies for patient care:

a) Eli Lilly collaborated with Welldoc:

Eli Lilly collaborated with Welldoc Bluestar app for diabetes management. With the new version of the app patient can monitor their insulin pen of Eli Lilly. ^[31] The BlueStar app from Welldoc is a digital health solution for persons with diabetes which has been passed by the US Food and Drug Administration (FDA). The new app will integrate insulin dosing data for several Lilly insulins.

b) Novo Nordisk and Noom partnered to digital health solutions for helping patients to break the partnership between obesity and diabetes:

With the objective of key component of the support encouraging, Novo Nordisk, a worldwide healthcare business, and Noom, a leading behavior change firm, cooperated on digital health answers concentrating on weight supervision and training. ^[32,33] Noom's proven, In a fruitful 8-month experiment, With more than 95 years of experience helping those with chronic conditions, Novo Nordisk were combined with proven behaviour modification methods. ^[32,31] People with obesity in the United States will have access to solutions for behavior modification and education as a result of this collaboration, which is one of several methods Novo Nordisk collaborate improve care. ^[35,36]

c) Abbott and Omada Health affiliated to recommend integrated digital health and training knowledge for individuals with Type 2 Diabetes:

FreeStyle Libre system, a continuous glucose monitoring (CGM) device, with Omada Health's unique digital care program, seeks to develop a new approach for patients with diabetes. And over

30,000,000 Americans are struggling with diabetes – over 95 percent of persons living diabetes – and looking for straightforward solutions to better control their condition and general health. ^[37, 38]

"The purpose of Omada Health was always to induce meaningful, sustainable behavioral change for those persons living with Type 2 diabetes and other chronic conditions. "

To achieve those goals, working with Abbott to provide dual access to Freestyle Libre as part of the Omada programme will deliver a special blend of focused human assistance and technologically enhanced care. [39]

With this additional scan, which places a mobile device on top of the FreeStyle Libre sensing device on the top of the shoulder, users may obtain accurate readings every minute, historical trends and patterns, and pointers that indicate the direction of their blood sugar without having to stick their fingers. Omada's integrated platform enables users to receive individualised guidance from their instructors as well as real-time measurements and actionable insights for managing their diabetes. [40]

Electronic Health Record (EHR)

An Electronic Health Record (EHR) is a digital copy of patient medical information. The EHR enables doctors the ability to access their patient's information compactly and has changed into a location for them to gain easy data regarding authorized therapies that line up with their forte and their patient's requirements. Sermo reports that claims 80 percent of physicians prefer that pharmaceutical and healthcare corporations provide product updates to their office via EHR.

Through EHR aggregators, businesses have enhanced reach to doctors in all strengths as pharma corporations have been gradually utilizing the EHR to impart messages to its customer. EHRs constitute the following move that could improve communication between patients and doctors in the healthcare industry. The information, as well as the speed and accessibility of it, would assist physicians to improve choices and deliver good care. [41]

Following are the examples:

- Lowering the emergence of misdiagnosis through enhancing precision as well as clarification of health records.
- Creating either medical datum accessible, decreasing repetition of experiments, lowering patient discomfort, and sick people well madere to make a better decidecisions²¹
- As healthcare professionals (HCPs) keep an eye on patients, EHR stages catch the information that can improve their patient's health results. This bears the cost of drugs and healthcare marks the amazing chance to get more perseverance on understanding records at the place of care. Along these lines, the information driven bits of knowledge empower pharma marketers to convey tailored inter- changes which will improve train HCPs when diagnosing and suggesting medications to patients tobetter develop their health outcomes. Along these lines, its accentuation of EHR information mightadvance overall adequacy of connections amid clinical work procedures to push the digital healthcare class. [43]

➤ **Best Practices in EHR Advertising**

At present, drug organizations are effectively publicizing in EHR stages and reusing digital banner advertisements. Since these platforms are not webpages, unique content should be changed depending on best practices in the industry. Most favourite messaging by doctor's incline to improving their work process most effective and offering some benefit in the cooperation's with patients ^[44]

➤ **Aim on Doctor of medicine and Patient Needs**

EHR publicizing should be unique and distinct from different channels so as not to turn doctors off to commercial messaging. Relevance needs to be given to physicians and patients using clinical data and assets. Zooming in on the necessities of the doctor and patient rather than exclusively on special informing will at last build the view of the brand with doctors. While creating imaginative to be used here, brands ought to think about tone, curtness, dynamic voice, and visual allure. Stay away from uncertainty, claims without supporting information, abbreviations, and requests. ^[44]

➤ **Integrates Strategic Partners**

In combination with the reception of EHRs proceeding to the development, consumer medicine information making vital associations to best serve HCPs as the scene keeps on advancing. By making further projects with a couple of key accomplices, the brand can benefit in more than one way.

- Make the most of first mover open doors, for example, couponing and patient role schooling
- Advantage from added esteem open doors as an benefit of the more profound association
- For establishment approaches inside a similar sign, section key crowds to keep away from cross-over
- Expanded size of estimation is competent with a bigger crowd and expanded impressions.

Some of the recently collaborated pharma and Tech companies for EHR:

a) AstraZeneca partners with Docon to digitise 1,000 clinics across India

AstraZeneca Pharma India Ltd. has inked a deal with India healthcare technology start-up Docon Technologies for digitalizing 1,000 clinics throughout the nation. Under the agreement, Docon will supply the shortlisted clinics with tailored Electronic Medical Record (EMR) systems allowing physicians to obtain entire patient data, per a joint declaration. ^[45]

b) Geisinger, Merck Partner to Launch EHR-Integrated FHIR Apps

Merck and Geisinger Health System have partnered to launch two new web-based, EHR-integrated health IT solutions that make use of FHIR to access health data from a range of EHR systems from various manufacturers. The two apps were developed as a result of the ongoing partnership between

Geisinger and Merck and are intended to integrate directly into provider workflows to boost clinical effectiveness.

The Family Carer Application and MedTrue are among the apps. While MedTrue incorporates medication data, the Family Carer app allows two-way communication with doctors and carers to improve coordinated care. into diagnostic practice to allow best medical decision. MedTrue is aimed to ease medication management and commitment for a patient and vendor medicine list.

The health IT systems are accessible to both doctors and patients and may be accessed with internet access from a patient's residence. The apps employ Substitutable Medical Applications and Reusable Technologies (SMART) on FHIR to allow patients and doctors to access patient information from varied EHR systems throughout health systems via the accessible, benchmarks platform. ^[46]

6.2. Augmented Reality (AR) and Virtual Reality (VR)

The utilization of AR (Augmented Reality) and VR (Virtual Reality) innovation is additionally on the ascent. ^[47]

There is a reasonable distinction between these two advances. With VR, the customer is immersed in a simulated atmosphere utilizing a headset. Though with AR, the vision of the client isn't supplanted, yet virtual things are added to it.

The fame of AR is continually expanding because individuals love this converging of the genuine also, virtual world. Regarding VR, this technology is more used to completely immerse people in an environment. ^[47]

6.2.1. Application of Virtual Reality (VR)

Following are few uses or applications of Virtual reality in pharma industry

6.2.1.1. Virtual Reality in Pharma Sales and HCP Education:

Giving the opportunity to enchant connect with others is crucial with regard to pharmaceutical advertising and sales. ^[48]

VR permits the representative to have enduring contact to resp HCPs and permits the science . conveyed precisely and effectively, with key features worked into the VR understanding so they never again must be rolled out in a conventional attempt to sell something. The infield utilization of VR by salespeople and clinical deals contacts inside the healthcare industry has been incredibly useful. Contrasted and exemplary deals help, a VR show expanded how much time the salesperson had with medical care proficiency by 200%. It is an unimaginable forward climb for the business.[49]

Involving a VR application live life in a 3D world is an astonishing idea that numerous drug organizations are consistently carrying out. The innovation permits 360° viewings of medications, and gadgets as well as illness examination and understanding. ^[50]

6.2.1.2. Virtual Reality Product and Device Demonstrations:

VR offers an extraordinary answer for exhibiting a product through virtual showings and 360° perspective reproductions. It has decisively expanded commitment stages about product showcasing. VR technology permits the watcher to see products or gadgets from all points. The client can likewise communicate with the substance, which increases the commitment levels and helps comprehension of how an item/gadget functions in the body and the component by which it works. Utilizing VR, a basic gadget demonstration can be transformed into a really energizing encounter that resounds with the watcher and permits them to get how the product works. Instead of moving around tests and huge models to exhibit an item or idea, a little VR headset is everything necessary. ^[51]

6.2.1.3. Virtual Reality for Brand Awareness:

All pharma and biotech companies, big and small, rely on brand awareness to succeed. If purchasers, financial backers, and HCPs perceive an organization by name, items, and administrations, there we have an expanded opportunity to make more deals or assemble an enduring relationship. Utilizing VR is a clever and inventive step used to elevate brand attention to an assortment of partners. Advertising an item or administration in such an effective and vital manner is bound to make an enduring impact than a talk, PPT, or print. VR encounters have the sensation that companies are on the quest for. ^[52]

6.2.1.4. Virtual Reality for Patient Education and Treatment:

The utility of VR in health care extends a great amount than pharmaceutical marketing. VR is turning into an incredibly important device for teaching patients about their circumstances, meds, medicines, and surgeries. As patients become more curious and inquisitive about their circumstances, medicines, and infection venture, HCPs should be exceptional to assist patients with understanding their sickness and set them straight. One more progressive utilization of VR is its help in diagnosing different illnesses.

^[53]

6.2.1.5. Virtual Reality for Research and Drug Discovery:

A great utilization in pharma studies is its execution for drug-targeted association studies the results of a medication's impact on the body. Utilizing VR innovation to perceive how molecules interface and move rapidly quickly around the body gainful for further developing medication disclosure and initial research stages. This is on the grounds that the research researchers can see these collaborations and components, which go a long way past the human inventive mind alone. This helps researchers to redesign molecules and pharmaceuticals. ^[54]

6.2.1.6. Virtual Reality for Pharmaceutical Manufacturing:

Pharmaceutical production is an extremely accurate cycle that requires an exceptionally raised degree of monitoring. Pharmaceutical organizations normally require complex machines and hardware in their creation lines. This includes exceptionally talented experts who are prepared to accurately work with hardware. VR has been embraced as a significant preparation apparatus for such administrators. The experts can make sense of and pictured utilizing VR. Administrators can acquire a pivotal comprehension of how the gear functions prior to entering a lab or plant.

This earlier information and knowledge diminish the risks of mishaps and errors, altogether working on the nature of preparing and in general activities. ^[55]

6.2.2. Application of Augmented Reality (AR)

Following are few uses or application of Augmented reality in pharma industry

6.2.2.1 AR in Drug Discovery:

AR can be conveyed for information perception in drug discovery. Physically checking the hereditary information connected with explicit organisms takes a load of time. Utilizing AR by specialists and researchers can assist save time since information representation with AR assists the R&D with joining to concentrate on the qualities of such particles and helps in drug disclosure to battle the microorganisms be it microbes or infections. Likewise, the data gathered by AR devices can be imparted to different researchers working from far off areas. Consequently, disclosures made in one region of the planet can be partaken in the blink of an eye to one more area of the planet, accordingly, expanding coordination inside the worldwide pharmaceutical local area. ^[56]

6.2.2.2 AR for patient education:

The number of knowledgeable patients is greater now days, and they could wish to grasp the complexities of their therapy. Patients are restless about the systems they would be going through throughout their treatment. Thus, AR is the ideal apparatus as teaching patients has turned into a fundamental un- detaching nowadays. Patients can be given a essential comprehension of their ailment remembering the activity of prescriptions for their body utilizing AR. The 3D perception can pass on a striking comprehension of these fundamentals as opposed to a composed archive or a brief of the treatment by the specialists. ^[57]

6.2.2.3 Innovative drug Information:

AR helps a patient investigate how a medication functions in his/her body rather than the long portrayal put in the jug. ^[58]

6.2.2.4 AR in Product Demonstration:

When new medication is created by a pharma organization after broad examination, its use should be exhibited in a reasonable manner to the emergency clinics, administrative bodies, and purchasers. AR becomes possibly the most important factor during this time. Deals gatherings can be improved with AR-based instruments. ^[59]

Some of the recently collaborated pharma and Tech companies for VR and AR:

a) Terumo a Japanese medical device company have introduced the Phygital model in their business in India for Medical Training and assistance.

Terumo India, a subsidiary of Terumo Corporation, a global leader in healthcare technology, eTISL, a "phygital" version of their wildly popular Terumo India Skill Lab programme (TISL), was recommended for release. eTISL aims to improve medical training for cardio-vascular healthcare professionals (physicians and other healthcare providers) in India by combining physical and digital platforms. Over 7000 healthcare professionals (HCPs) have benefited from TISL's high-quality programmes, which have been taught by 175 faculty on a variety of issues related to cardiovascular health. ^[60]

b) Philips have collaborated with Microsoft to introduce augmented reality through the HoloLens 2 for 3D visualization.

The HoloLens 2 augmented technology solution from Philips and Microsoft combines creating a 3D visual augmented reality experience that can incorporate real-time imaging and other necessary information that is typically displayed on enormous 2D displays made available to the surgeon in a cost-effective, easy, and transparent.

manner. The concept is being used to gather substantial treatment findings in order to develop potentially cost-effective augmented reality systems for use in graphics operations. ^[61]

OBJECTIVES

OBJECTIVES:

The objective of study includes:

- To explore scope of phygital platform used across healthcare sector
- To understand market scenario of phygital technologies in healthcare sector.
- Analyzing the impact of phygital in pharma healthcare sector.

RESEARCH METHODOLOGY

Research Methodology

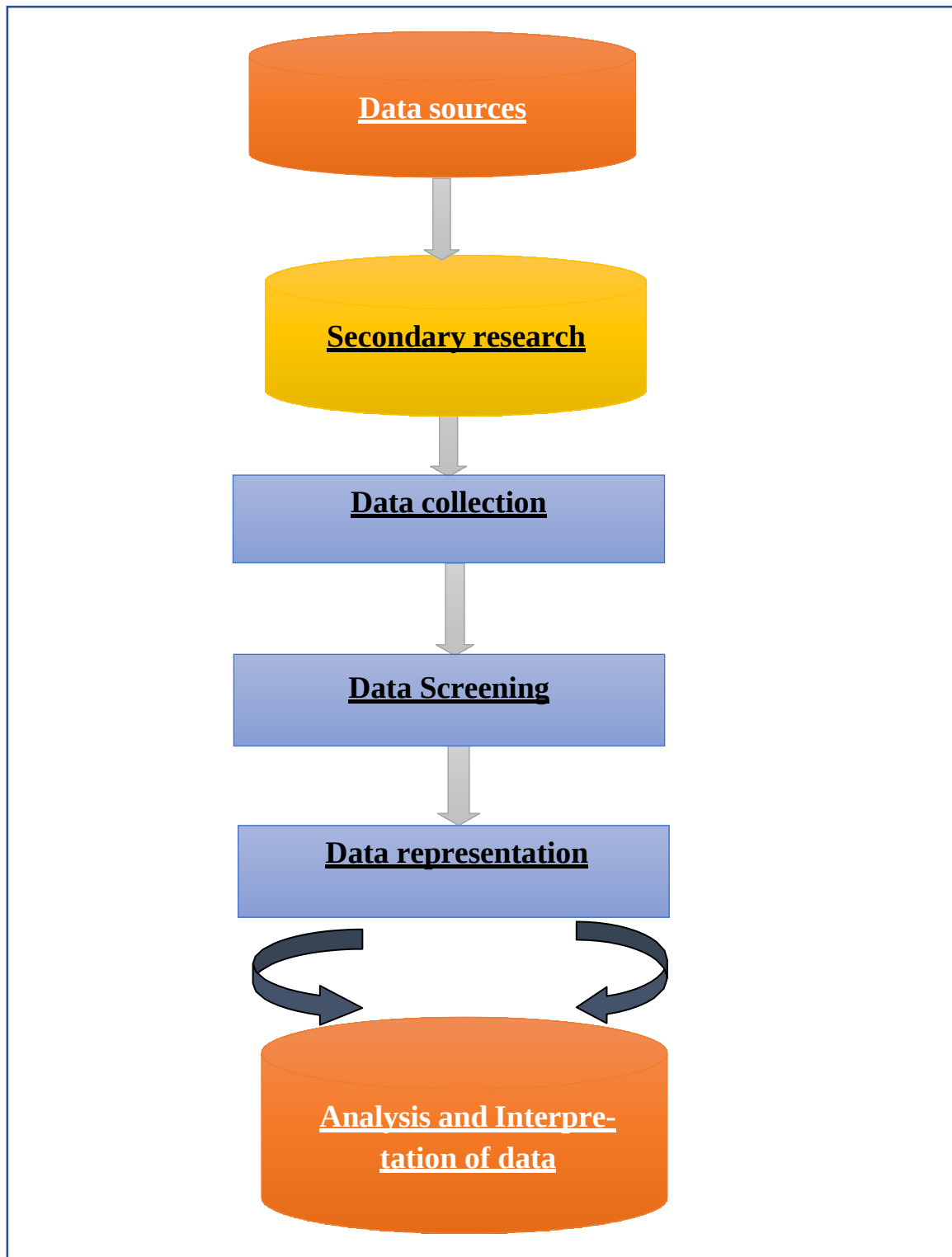


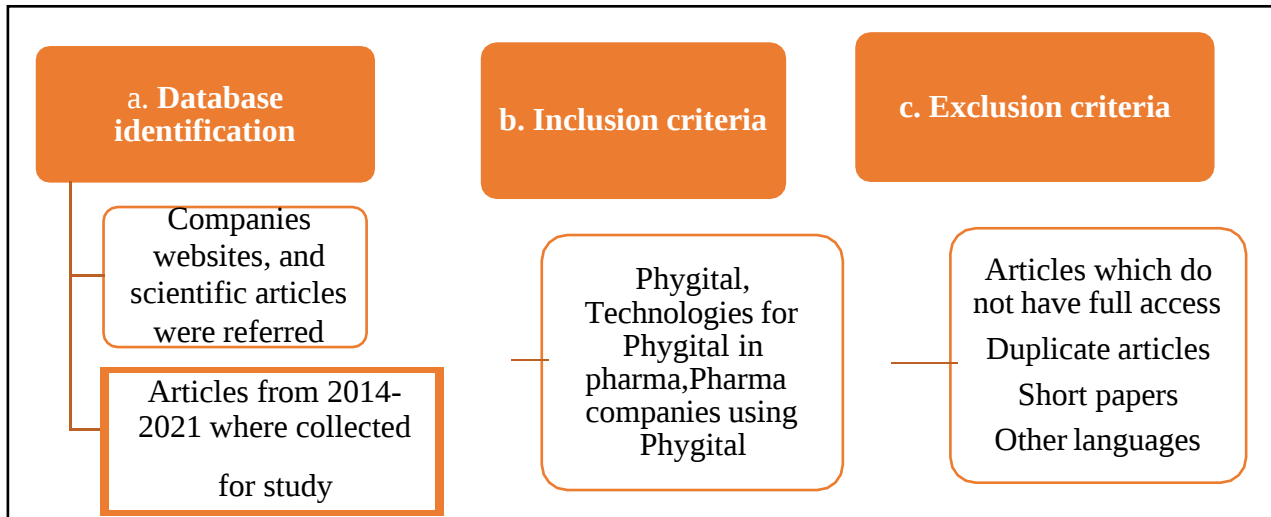
Fig 6: Research Methodology

Research methodology

The literature search was carried out on impact of Phygital in pharmaceutical industry in which secondary data resources was collected.

The study was carried out using secondary data involving following steps

1. Step 1- Data collection



1. Database identification: Company websites, and scientific articles were referred to collect information on use of Phygital in Pharma sector. The following are some of the databases accessed for the study

Sl. No	Database name	Website
1	Grandview research	https://www.grandviewresearch.com/
2.	TCP	https://tcpfarm.org/
3.	SCI Journal	https://www.scijournal.org/
4..	EJM	https://www.emerald.com/insight/publication/

Table 2: Sources of Information

- After searching for specific keywords such as Phygital, Phygital for pharma, technologies to create Phygital in pharma, pharma companies using Phygital only from 2014-2021 there are significant no. of articles published related to specified objectives in the study.

1. **Data Screening**

The screening procedure consists of two following steps:

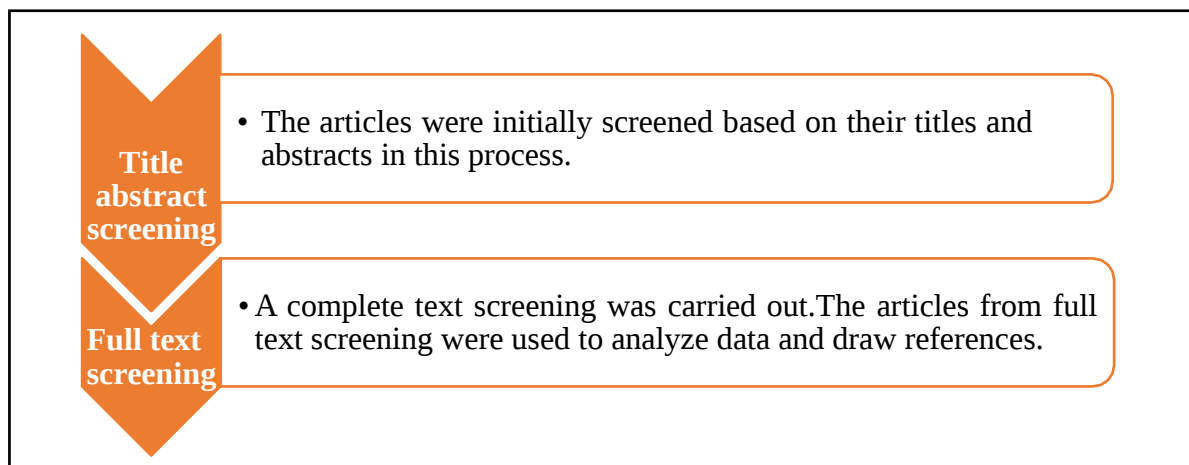


Fig 8: Data Screening

2. **Duration of the study**

The study was carried out over a period of 3 months from March 2023 to May 2023

3. **Data representation**

Tables, bar diagrams etc.

4. **Data analysis and interpretation**

The data retrieved after screening was used to make interpretation and analysis of the use of Phygital in pharmaceutical company. The analysis is presented as results and discussion in the next section.

Results and Discussion

In pharmaceutical industry, Phygital based application have emerged as futuristic approach. Phygital in Pharma companies' frameworks can possibly offer information driven answers for various issues. Phygital is helping the pharma business in driving more noteworthy efficiencies and offering an extra lift to development by further advanced innovation. This additionally reduces timelines and further develops information investigation and decreases human mistake. Phygital-based advancements are assisting pharma with diminishing expenses of marketing, manufacturing by decreasing the requirement for manual intercession on a wide scale.

Phygital has made gains into how these associations provide their brands and utilise information analysis to equip clientele with advanced offerings. In the Pharmaceutical company, Phygital aids with chipping away at the pace and capabilities.

Pharma and Tech Companies Collaborating

- Pharma companies and Tech companies are working together and creating a cutting-edge digital approach which is a difficult challenge that is going to and will necessitates a wide range of specialized abilities. It will become apparent that each one has complementary strength. Collaborations of tech and pharma companies are becoming a top trend, which is lately attracting massivedata.
- Technology based company are probably the most transformative advancement in the field to date and they provide enormous potential for creativity such as newly developed Phygital experience. However, most pharmaceutical firms lack the internal expertise to develop digital technologies but can often outsource or hire outside consultants to assist with digital health programmes. This is an interesting opportunity for the industry, rather than a roadblock to success.^[62]

Reasons for need of collaboration

Pharmaceutical company has considerable scientific experience and a comprehensive knowledge of disease biology. Individual pharmaceutical companies have developed good understanding of how their drugs work. However, data, insights, and technologies are poised to be critical to the pharmaceutical industry's long-term growth, so there is a need for pharma to tap into technical skills to remain competitive.

Collaborations work across in number of therapeutic areas and over the course of a commercial drug's life cycle, which is equally applicable to start-ups launching their first product. Relationships provide for the novel ideas that companies need, and they can also help to democratise the pharmaceutical technology industry more broadly, allowing small firms that cannot invest as the big pharmaceutical companies can participate.^[62]

Pharma and tech companies working together bring out the best, ensuring technological innovations which will boost consumer and treatment output while also giving retail offerings a strategic advantage.

Sl. No	Year	Pharma Companies	DTx Companies	Particulars
1.	2021	Eli Lilly and Company.	Welldoc Software Pvt Ltd	Diabetes Management
2.	2021	AstraZeneca Company.	Docon Technologies	Digitising 1,000 clinics
3.	2020	Terumo India Company.	-	eTISL
4.	2019	Abbott.	Omada Health Inc.	Type 2 Diabetes
5.	2019	Ironwood Pharmaceuticals, Inc.	Pear Therapeutics, Inc.	Gastrointestinal Space
6.	2019	Astellas Pharma Inc.	Welldoc Software Pvt Ltd	Type 1 or type 2 diabetes
7.	2019	Novo Nordisk A/S	Noom	Obesity Management
8.	2019	Boston Scientific	VR Labs	Patient education
9.	2019	Philips	Microsoft	HoloLens
10.	2018	Merck	Geisinger Health System	FHR Apps

Table 3: List of Pharma Companies and Tech Companies collaborated.

Source: <https://www.kbvresearch.com/digital-therapeutics-market/>

1. Market size, Market share and insights of Digital Therapeutics (DTx)

The global market for digital therapies, which was valued at US\$3.23 billion in 2021, is expected to rise at a CAGR of 20.5 percent from 2022 to 2030, when it is expected to reach US\$17.34 billion. ^[63]



Fig 9: Market Size of Digital Therapeutics (2022-2030) US\$ billion

Source: <https://www.precedenceresearch.com/digital-therapeutics-market>

1.1. Growth Drivers

The market is expected to be driven by the increased availability of mobile technology in developed and developing countries, the affordability of Digital Therapeutics innovation for suppliers and patients, and rising interest in integrated healthcare system frameworks and patient-directed care. ^[64]

1.2. Application insight

The DTx application in diabetes management represented the biggest portion of over 28.5% of the worldwide income in 2021. Factors driving the fragment development incorporate the rising pervasiveness of diabetes and other chronic illnesses. Digital therapeutics can help medical care suppliers to evaluate patients' lives and work on the course of therapy in view of their singular restorative necessities. As indicated by the CDC, in 2020, almost 34.2% individuals were experiencing diabetes and 10.5% of this populace was in the U.S. The obesity application section held the second-biggest offer in 2021 attributable to the developing obese populace around the world. Digital therapeutics give cost effective answers for the therapy of numerous chronic illnesses, as most would consider to be normal to fuel the market in not-so-distant future. ^[65]

1.3. Regional Insights

North America outperformed Europe as the world innovator in the Digital therapeutics market in 2021 with an income portion of 41% of the global revenue. The changes designated at diminishing the locales expanding healthcare costs moreover this area is likewise home to an enormous number of Digital therapeutics solution suppliers that serves to an areas market development.

The Asia Pacific area is supposed to extend at the quickest development rate during the projected period. This high development can be credited to the expansion sought after for compelling healthcare, ascend in mobile phone entrance, and further developed admittance to the internet. Developing interest for personal care gadgets and related administrations, because of expanded government spending on medical services, is likewise expected to speed up market development. ^[66]

2. Market size, Market share and insights of EHR

The market for digital health records was projected at US\$28.76 billion in 2020, and it is anticipated to expand at a CAGR of 5.1% over the next years. ^[67]

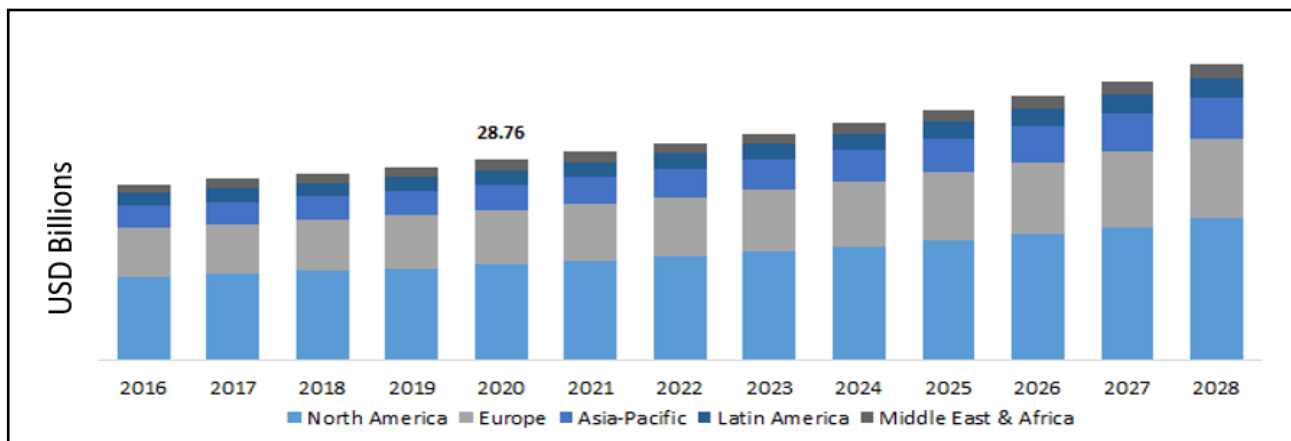


Fig 10: Market Size of EHR (2016-2028) US\$ billion

Source: <https://www.polarismarketresearch.com/industry-analysis/electronic-health-records-ehr-market>

2.1. Electronic Health Records Market Segmentation

By Product	By Type	By End Use	By Region
✓ Client based Server ✓ Web-Based HER	✓ Acute EHR ✓ Ambulatory EHR ✓ Post-Acute EHR	✓ Hospital ✓ Ambulatory ✓ Physician's Clinics ✓ Laboratories ✓ Pharmacy	✓ North America (U.S., Canada) ✓ Europe (France, Germany, UK, Italy, Spain, Netherlands, Austria) ✓ Asia Pacific (Japan, China, India, Malaysia, Indonesia, South Korea) ✓ Latin America (Brazil, Mexico, Argentina) ✓ MEA (Saudi Arabia, UAE, Israel, South Africa)

Table 4: Electronic Health Records Market Segmentation

Source: <https://www.polarismarketresearch.com/industry-analysis/electronic-health-records-ehr-market>

2.2. Growth Drivers

It is anticipated that growing support for medical activity centralization and easing will aid in the acceptance of electronic health records. The worth-based strategy, which primarily focuses on optimising the procedures used by emergency clinic executives, re-appropriating auxiliary administrations, and improving quality consideration with better quiet results, is what typically determines the centralization of the medical administration. Additionally, increasing consolidation and acquisition activities are anticipated to drive market movement. ^[67]

2.3. Application Insights:

In view of the item, The customer server-based and online health record systems are the two segments of the global market for digital medical records. In the global electronic health records market in 2020, the online component had the largest offer of all. Such market development is attributed to a number of factors, including the growing importance of online electronic health records. framework among clinical suppliers and its simple establishment, with practically no requirement for in-house servers with modified arrangements, guaranteeing versatility. ^[68]

2.4. Regional Insights

North America held a major market share starting at 2021, because of the presence of deeply grounded

healthcare foundation as well as good government drives with respect to populace wellbeing the executives.^[69]

Starting at 2017, a bigger number of than 80% of the doctor workplaces and around 96% of the intense consideration emergency clinics are utilizing Patients and the public are trading data, according to ONC-certified medical IT. wellness, research associations, and clinical suppliers is quickly expanding.

[70]

3. Market size, Market share and insights of VR and AR for Pharmaceutical

Virtual reality (VR) and Augmented reality (AR) are arising advancements in the medical services industry. AR and VR could be utilized in an assortment of including doctor preparing, patient medicines and hospital management.^[71]

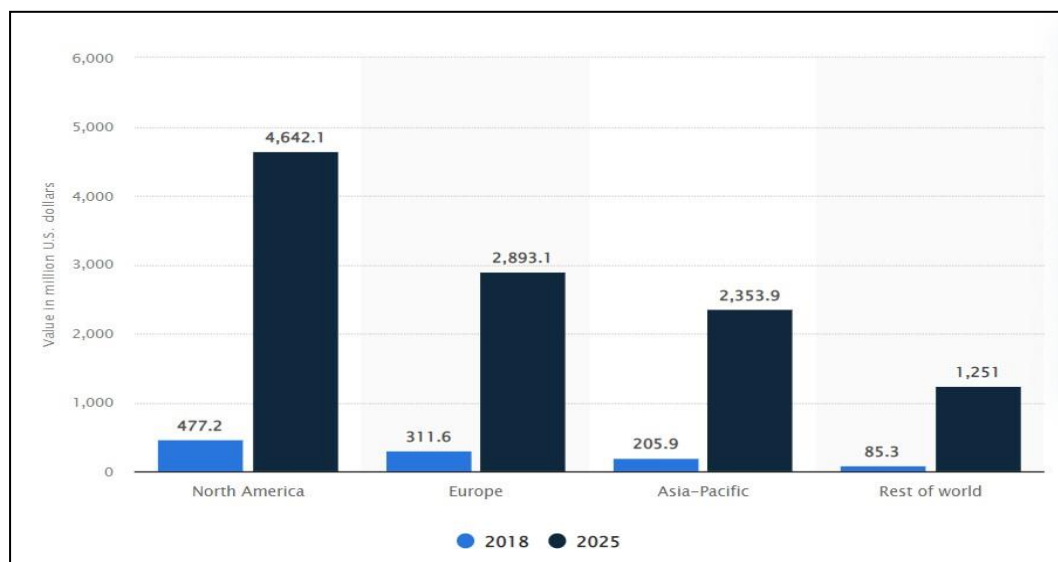


Fig 11: Market Size of VR and AR

Source: <https://www.statista.com/statistics/1033162/healthcare-ar-and-vr-market-forecast-worldwide-by-re-gion/>

3.1. Growth Drivers

The COVID-19 pandemic is likely to boost the market for medical applications using AR and VR, because

Healthcare professionals anticipate using AR and VR HMDs extensively as safety equipment in the near future.

In the healthcare market, augmented reality plays an important role. AR may be used to build a virtual image of a patient that allows a physician to see the condition of the patient's body parts. This can let the physician do operations that are less painful.^[72]

3.2. Application Insights

The VR and AR market in healthcare is expected to develop as many healthcare IT companies engage in this field due to potential growth opportunities. VR may be used for a variety of things, including operation simulation, robotics operation, skill development, and phobia management. The sector is being driven by current developments in healthcare IT. ^[72]

3.3. Regional Insights

The AR and VR healthcare services market in North America was valued at US\$477 million as of 2018. That is anticipated to grow significantly to US\$4.64 billion by 2025.

COVID-19 Pandemic's Impact on Virtual and Augmented Reality Market The use of augmented reality (AR) and virtual reality (VR) advances in head-mounted displays (HMDs) is expected to lead to a large use of these technologies as defensive tools among clinical professionals in the near future. The market for augmented reality and virtual reality has continued to grow despite the negative effects of the COVID-19 pandemic-related lockdowns and low cross-line exchange, thanks to the expanding push towards embracing AR and VR developments and businesses switching to remote working or split-shift working.. ^[72]

4. Comparative analysis of Medical devies companies before and after incorporation of Phygital

*Note: These 5 companies are considered on best case scenario owing to the availability of the secondary information on the public domain.

4.1. Boston Scientific

Impact	Before Phygital (2020)	After Phygital (2021)
Revenue (US\$ billion)	9,913	11,888

Table 5: Market revenue of Boston Scientific

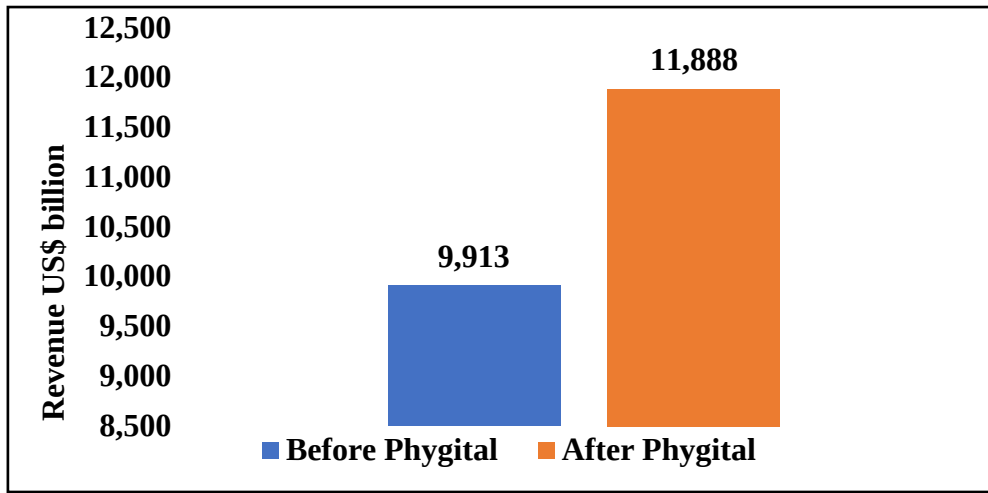


Fig 12: Market revenue of Boston Scientific

Source: <https://www.macro-trends.net/stocks/charts/BSX/boston-scientific/revenue#:~:text=Boston%20Scientific%20annual%20revenue%20for,a%209.28%25%20increase%20from%202018>.

Interpretation:

Boston Scientific collaborated with the VR labs in 2020 for the purpose of physician education to educate physician about surgeries. BS incorporated VR technology with the help of VR labs and one of the reasons for increase in their revenue in 2021 i.e., US\$11,888 billion i.e., 20 % year-over-year growth is because of incorporation of Phygital model.^[73]

4.2. Medtronic

Impact	Before Phygital (2016)	After Phygital (2017)
Revenue (US\$ billion)	28,913	30,117

Table 6: Market revenue of Medtronic

Source: FY 2017 Annual Report Filing SEC Form 10K & Shareholder Letter. [Online]. Available from: https://filecache.investorroom.com/mr5ir_medtronic/189/FY%202017%20Annual%20Report%20Filing%20SEC%20Form%2010K%20%26%20Shareholder%20Letter.pdf.

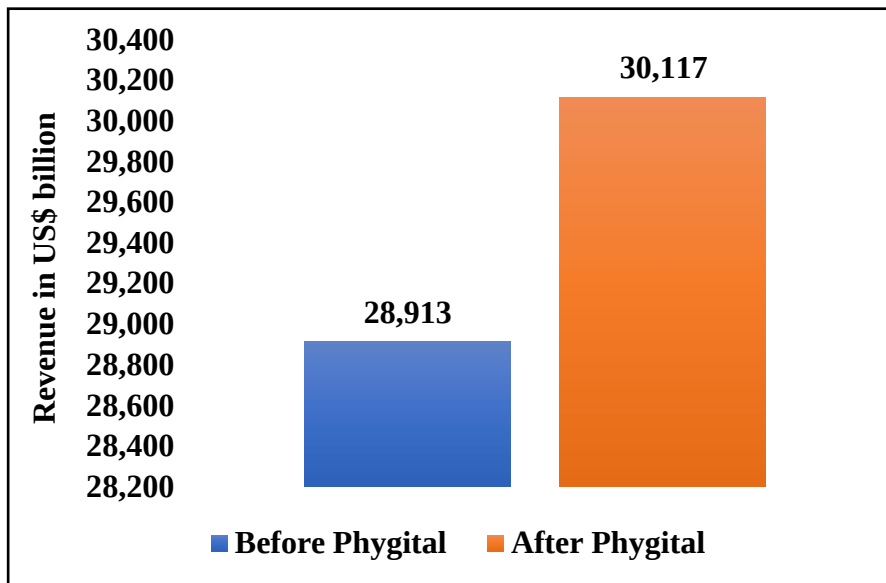


Fig 13: Market revenue of Medtronic

Source: Annual Report SEC 10-K Filing for Fiscal Year 2016. [Online]. Available from: https://file-cache.investorroom.com/mr5ir_medtronic/193/Medtronic%20plc%20FY16%2010-K%20and%20Shareholder%20Letter.pdf .

Source: FY 2017 Annual Report Filing SEC Form 10K & Shareholder Letter. [Online]. Available from: https://filecache.investorroom.com/mr5ir_medtronic/189/FY%202017%20Annual%20Report%20Filing%20SEC%20Form%2010K%20%26%20Shareholder%20Letter.pdf [Accessed 19 March 2022].

Interpretation:

Medtronic's collaborated with the Google Cardboard in 2016 for the purpose of physician education to educate physician about surgeries. Medtronic's incorporated VR technology with the help of Google Cardboard and one of the reasons for increase in their revenue from 2017 i.e., US\$30,117 billion i.e., 2.17 % year-over-year growth is because of incorporation of Phygital model. ^[74,75]

4.3. Fresenius Medical Care

Impact	Before Phygital (2020)	After Phygital (2021)
Revenue (US\$ million)	20,400	20,845

Table 7: Market revenue of Fresenius Medical Care

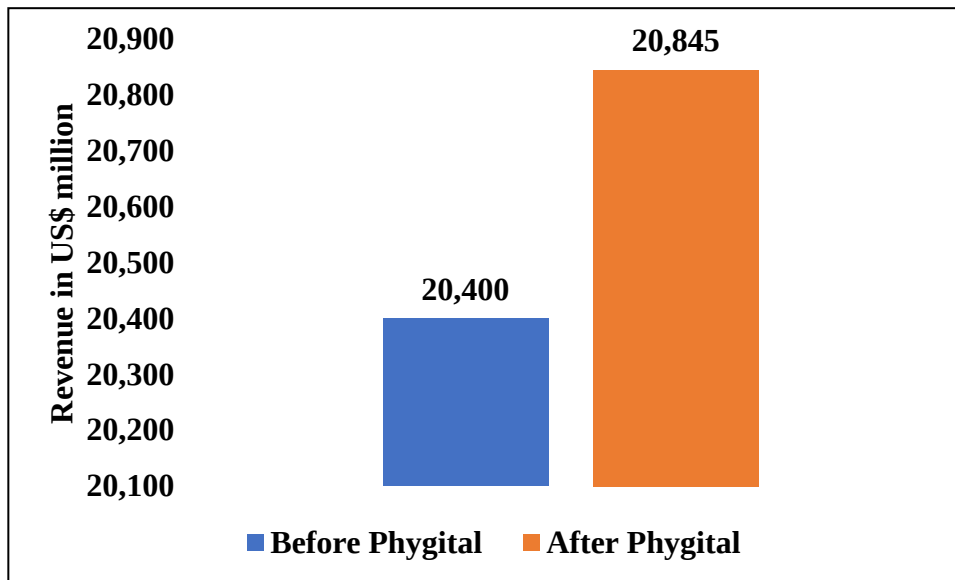


Fig 14: Market revenue of Fresenius Medical Care

Interpretation:

Fresenius Medical Care introduced VR technology in the year 2021 for training purpose of patient for home dialysis and it increase the use of their product and one of the reasons why it showed increase in revenue in 2021 i.e., is US\$ 20845 million i.e., 2.18% year-over-year growth is because of incorporation of VR technology their training model.^[76]

4.4. Johnson & Johnson

Impact	Before Phygital (2016)	After Phygital (2017)
Revenue (US\$ million)	76,450	81,581

Table 8: Market revenue of Johnson and Johnson

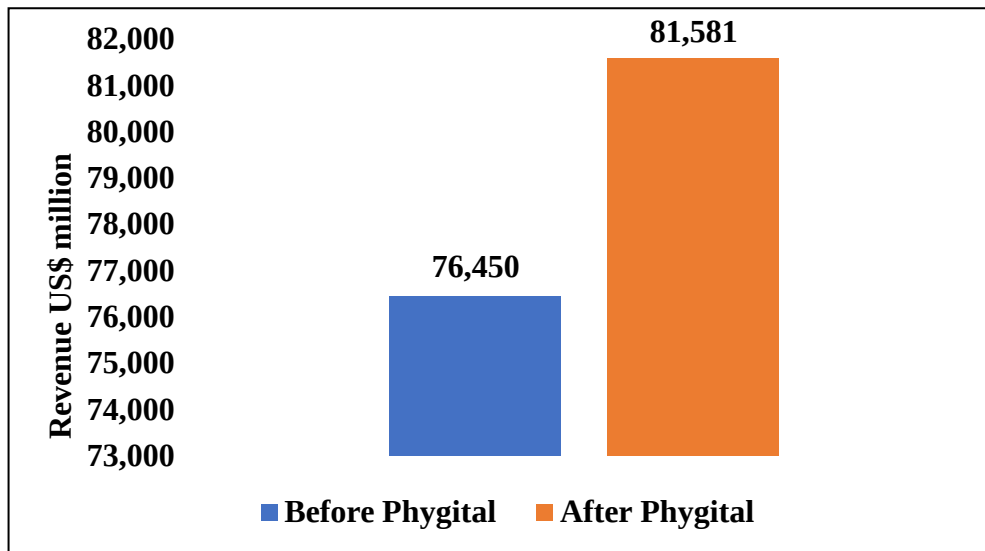


Fig 15: Market revenue of Johnson and Johnson

Interpretation:

Johnson and Johnson introduced VR technology in the year 2017 for training purpose of physician for medical devices and it increase the use of their product and one of the reasons why it showed increase in the revenue in 2018 i.e., is US\$ 81581 million i.e., 6.71% year-over-year growth is because of incorporation of VR technology their training model.^[77]

4.5. Philips

Impact	Before Phygital (2019)	After Phygital (2020)
Revenue (US\$ million)	21,820	22,315

Table 9: Market revenue of Philips

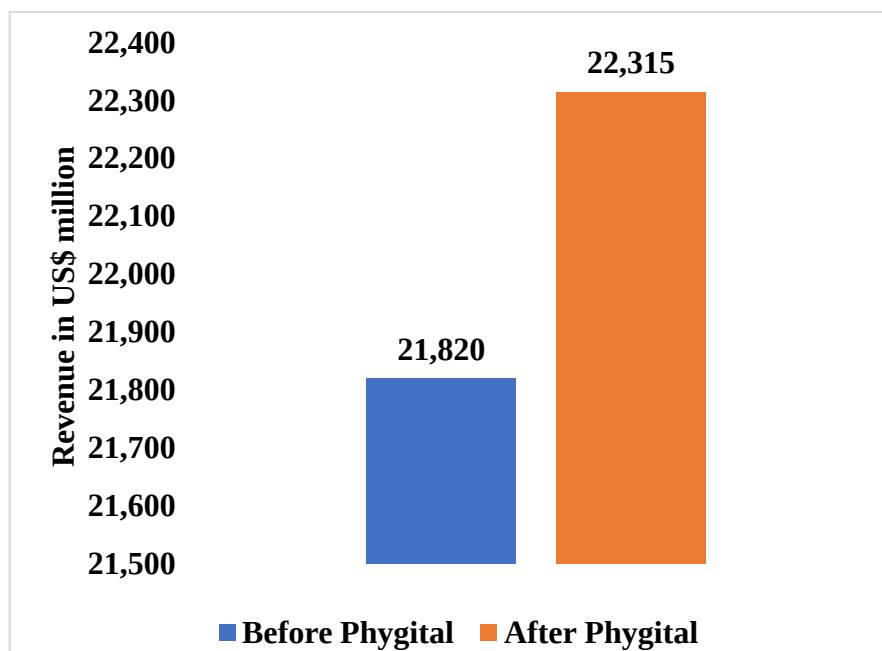


Fig 16: Market revenue of Philips

Interpretation:

In 2019 Philips collaborated with Microsoft for HoloLens for AR technology and one of the reasons why it showed increase in the revenue in 2020 i.e., is US\$22,315 million i.e., 2.27% year-over-year growth is because of incorporation of AR technology.^[78]

5. Comparative analysis of Pharma companies before and after incorporation of Phygital

*Note: These 5 companies are considered on best case scenario owing to the availability of the secondary information on the public domain

5.1. Novo Nordisk

Impact	Before Phygital (2018)	After Phygital (2019)
Revenue (US\$ million)	17,099	18,291

Table 10: Market revenue of Novo Nordisk

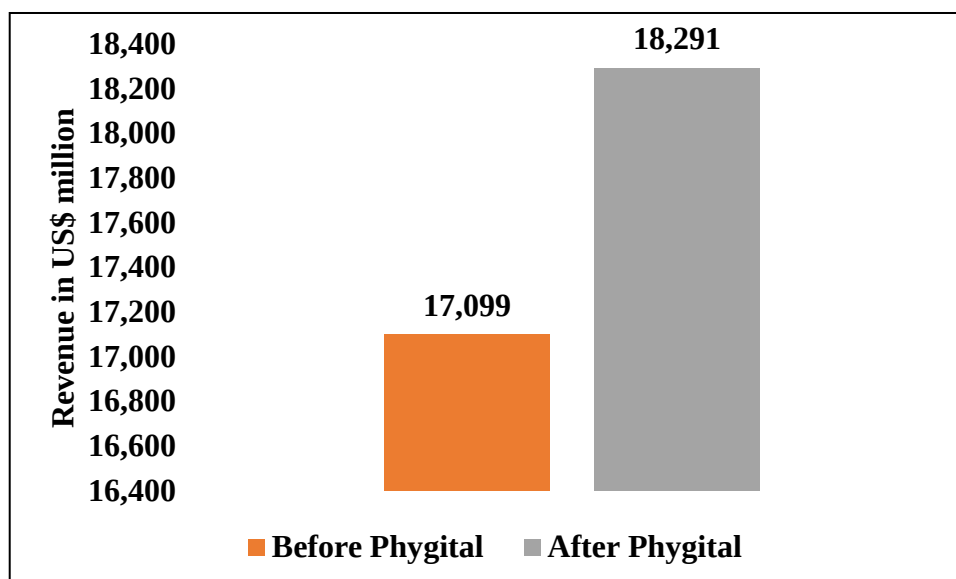


Fig 17: Market revenue of Novo Nordisk

Interpretation:

Novo Nordisk and Noom teamed on eHealth services in 2019 to enable individuals with overweight and promote weight loss and one of the reasons for increase in their obesity. Revenue from 2018 to 2019 i.e., 6 % year-over-year growth is because of incorporation of Digital Therapeutics Model. ^[79]

5.2. Astellas Pharma Inc.

Impact	Before Phygital (2018)	After Phygital (2019)
Revenue (US\$ billion)	11,769	11,934

Table 11: Market revenue of Astellas Pharma Inc

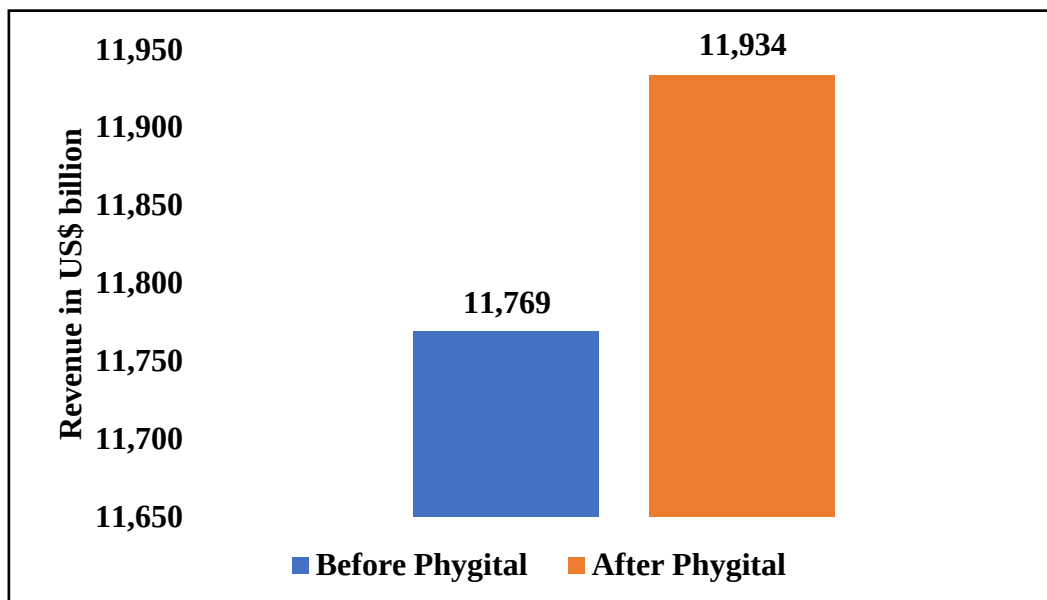


Fig 18: Market revenue of Astellas Pharma Inc.

Interpretation:

Astellas Pharma Inc. And Welldoc Software Pvt Ltd partnered around management of type 1 or type 2 diabetes in Nov. 2019 to assist persons with Diabetes and one of the justifications for increase in their revenue in 2019 i.e., US\$11,934 billion i.e., 1.04 % year-over-year growth from 2018 to 2019 is because of incorporation of Digital Therapeutics Model. ^[80]

5.3. Abbott

Impact	Before Phygital (2020)	After Phygital (2021)
Revenue (US\$ billion)	34,608	43,075

Table 12: Market revenue of Abbott

*Revenue in

Source: Abbott Laboratories Revenue 2010-2022 | ABT. [Online]. Available from: <https://www.macro-trends.net/stocks/charts/ABT/abbott-laboratories/revenue> [Accessed 19 March 2022].

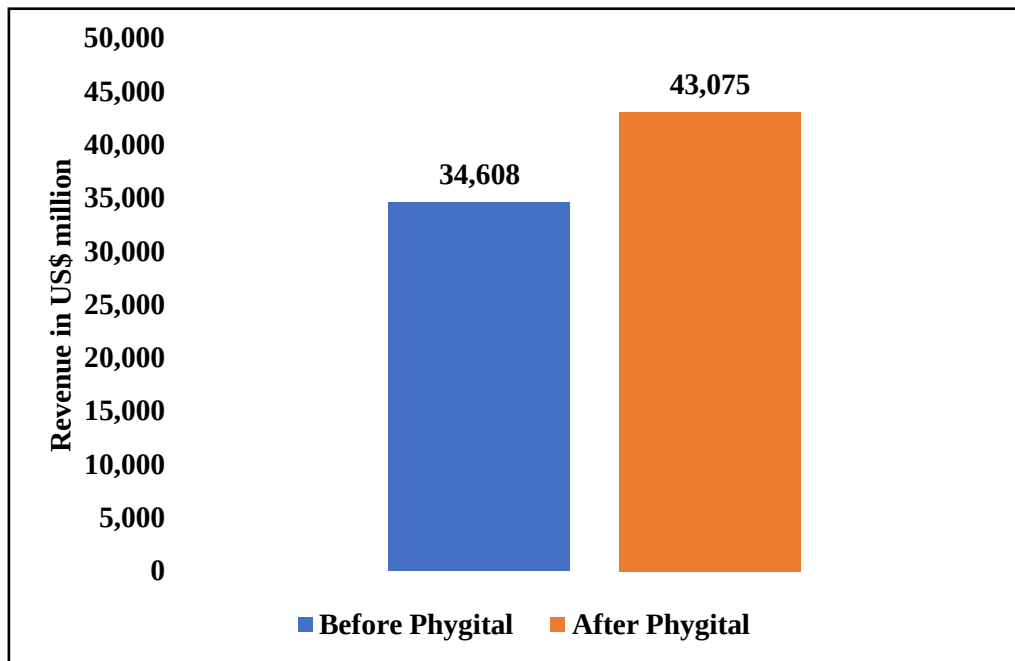


Fig 19: Market revenue of Abbott

Source: Abbott Laboratories Revenue 2010-2022 | ABT. [Online]. Available from: <https://www.macrotrends.net/stocks/charts/ABT/abbott-laboratories/revenue> .

Interpretation:

Abbott and Omada Health joined in 2020 to deliver comprehensive digital health and training expertise for persons with Type 2 Diabetes and one of the reasons why it showed increase in their revenue in 2021 i.e., US\$43,075 billion i.e., 24 % year-over-year growth is because of incorporation of Digital Therapeutics Model. ^[81]

5.4. Eli Lilly

Impact	Before Phygital (2020)	After Phygital (2021)
Revenue (US\$ million)	24,540	28,318

Table 13: Market revenue of Eli Lilly

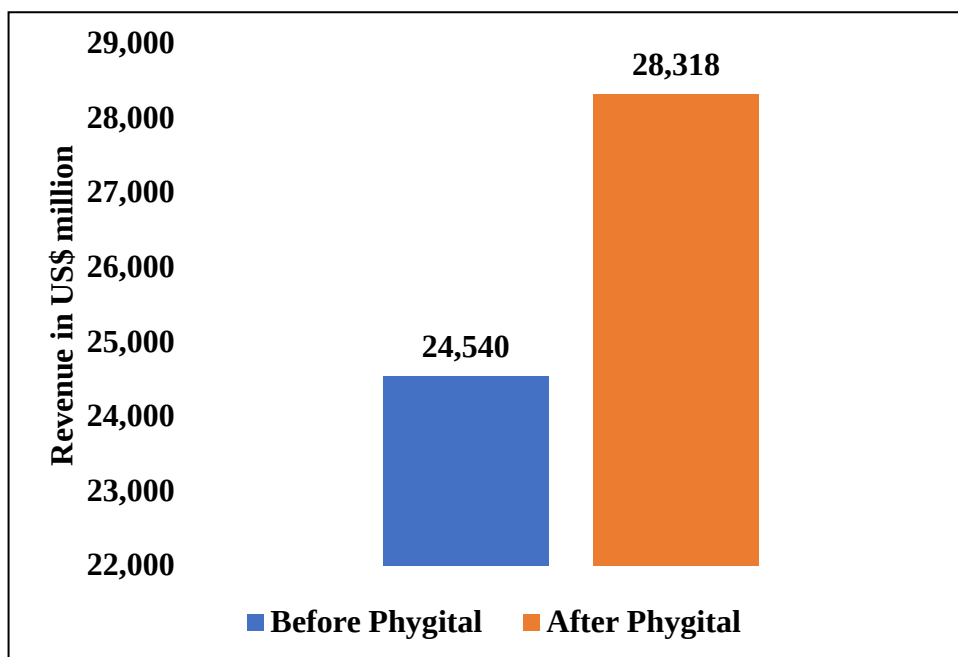


Fig 20: Market revenue of Eli Lilly

Interpretation:

Eli Lilly and Well Software Pvt Ltd. partnered in 2021 to deliver easy diabetes management solution for persons with Type 2 Diabetes and one of the reasons why it showed increase in their revenue in 2021 i.e., US\$28,318 million i.e., 15 % year-over-year growth is because of incorporation of Digital Therapeutics Model.^[82]

5.5. Sanofi

Impact	Before Phygital (2018)	After Phygital (2019)
Revenue (US\$ million)	42,135	42,147

Table 14: Market revenue of Sanofi

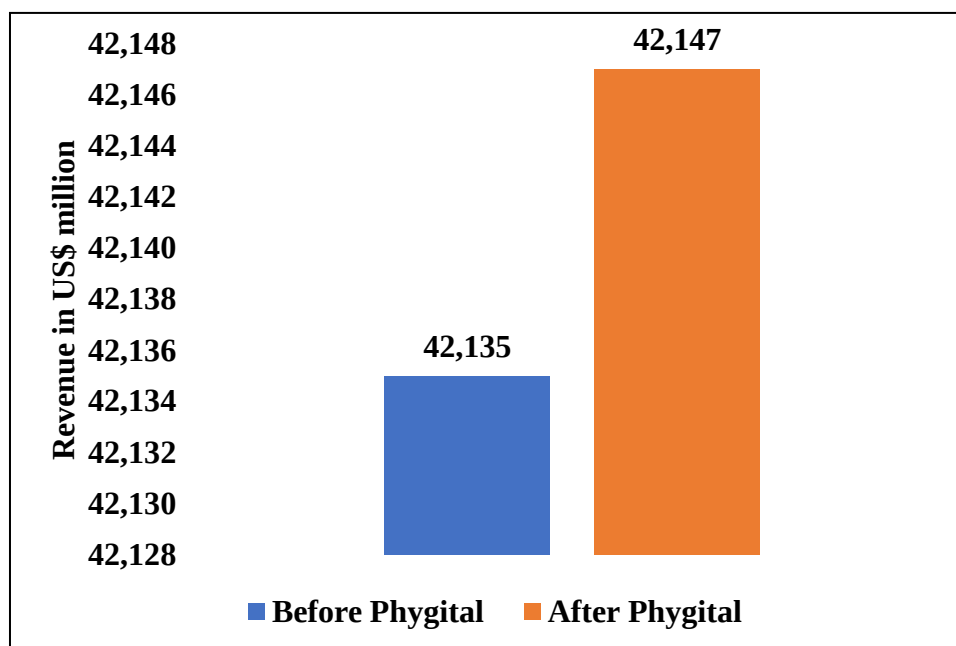


Fig 21: Market revenue of Sanofi

Interpretation:

In 2019 Sanofi partnered with Happify health to treat mental health with prescription DTx and one of the reasons why it showed increase in their revenue in 2019 i.e., US\$ 42,147 million i.e., 0.03 % year-over-year growth is because of incorporation of Digital Therapeutics Model.^[83]

6. Interpretation about impact of Phygital in pharma industry

Presenting Phygital in pharma will bring about new and numerous productivity and perceptions. Phygital is to find success when executed deliberately through the entire organization. Pharma organizations will be more ready to get more prominent benefits from their Phygital speculations assuming they work together between jobs, have a managerial framework that methodize market requests, and an organized instrument to determine automated and administrative worries, instead of adopting a strategy.

6.1. Digital therapeutics offer better medical services

Digital therapeutics may be able to meet unmet patient requirements that pharmaceutical products and treatments have failed to fulfil. Companies that can use life sciences innovation to address the shortage, combined with rapid product development timelines, could achieve a valuable advantage over traditional life sciences firms.

Digital therapeutics provide a method for pharmaceutical and MedTech companies to segregate products with a relatively modest capital investment, especially in comparison to the R&D costs typically associated with a medicine or clinical devices. Digital therapeutics also provide the chance to broaden prod-

uct life cycles, segregate products in development, and fill in any gaps in the search for traditional medicine.

6.2. EHR offer better quality care

EHR aid in considering their customers via enabling swift admission to patient data, bringing about more beneficial examination. They likewise help in treating reasonability with expanding the preparation's practical efficiency.

Upon that consideration supplier's side, several EHR provide physicians with wellness assessment that help with recognizing designs, forecast analysis, and advise viable treatment alternatives.

6.3. AR to reduce cost of Research and Development

Pharmaceutical AR utilized to diminish costs in R & D. That is on the grounds that the innovation can mimic the response of parts in bioreactors without running genuine methods and utilizing assets on tests that could wind up in defective forms of the eventual outcome. Set forth plainly, it lessens likely defects by reproducing visual tests considering past information.

6.4. Commercial Marketing

Present pharma client correspondence campaigns across stages mean to address enormous crowds instead of purchasers with specific interests and wants. This occasionally prompts inadequate and superfluous inclusion, bringing about low showcasing return of speculation. Thus, implementing Phygital omnichannel presence give personalized feeling and high return.

CONCLUSION

CONCLUSION

Phygital is a crucial step for the pharmaceutical company's expansion. It is commonly used in therapeutic research, pharmaceutical promotion, and pharmaceutical synthesis, considering the familiarity of more up to date atoms with the market. Phygital reduces time while giving the required information for investigation and quality administration. AR, EHR, Digital Therapeutics, Virtual reality, and other Phygital components are being used to gain remarkable outcomes.

Phygital is the next popular trend in pharma, and companies who are more adaptive and faster to embrace Phygital will obtain a competitive advantage. Introducing Phygital would be essential to thrive in the sector shortly. The change, on the other hand, would not occur overnight. Rather, it will happen slowly over the next 5 to 10 years.

Phygital will address most of the difficulties and will also perform things which individuals can't complete. The expansion of Phygital in pharma business would transform the full situation of the industry.

To conclude, Phygital is the emerging science and future. It will continue to play a significant role in everyday life from customized experience to impact on brand value. As a result, it will evolve with time.

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