OPPORTUNITIES AND STRATEGIES FOR INDIAN PHARMACEUTICAL INDUSTRY IN NEED OF DIGITAL TOOLS FOR SUCCESS

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ABSTRACT

The Indian pharmaceutical industry is a rapidly growing sector with significant potential for further expansion. This review article critically examines the current status of the industry and explores the manifold opportunities that digitalization presents for enhanced success. As global demands for pharmaceutical products continue to evolve, the need for agile and data-driven approaches becomes paramount. The article delves into the potential of digital technologies, such as data analytics, artificial intelligence, and blockchain, to optimize various facets of the pharmaceutical value chain, from research and development to manufacturing, distribution, and beyond. Additionally, the review discusses strategic frameworks that pharmaceutical enterprises can adopt to seamlessly incorporate digital tools, ensuring not only compliance with evolving regulatory landscapes but also fostering innovation and competitiveness in a rapidly changing market. This paper explores the opportunities and strategies for Indian pharmaceutical companies in need of digital tools for success. The paper highlights the key trends shaping the global pharmaceutical industry and discusses how Indian pharma companies can leverage digital technologies to improve their efficiency, productivity, and competitiveness.

Keywords: Digital tools, Indian pharmaceutical industry, AI and Machine Learning, digital marketing, supply chain management

INTRODUCTION:

The pharmaceutical sector in India is positioned for revolutionary expansion at a time characterised by technological breakthroughs, but it also faces previously unheard-of opportunities and difficulties**(Glenn Hole, et al.)**. This review article examines how digital tools have shaped this dynamic sector's success trajectory. **(Jayapala Reddy & Madhusdhan Rao, 2017a)**In an ever-changing digital landscape, the paper explores critical tactics that Indian pharmaceutical companies can use to their advantage. A thorough grasp of the crucial intersections between technology adoption and industry success emerges as we examine the

options available and the necessity of digital integration**(Popelo OV & Tulchynskyi RV, n.d.).**. This analysis provides an overview of the Indian pharmaceutical industry's current situation and lays forth a plan for utilising digital tools to spur innovation, improve operational effectiveness, and guarantee sustainable growth in an increasingly**. (Nandy Scholar & Pal, 2015)**Recognized for its strong manufacturing capabilities, affordability, and significant contributions to the worldwide supply of generic medications, the Indian pharmaceutical industry is a global powerhouse **(Ma et al., 2023)**. However, the healthcare sector must embrace digital transformation and harness the power of technology to improve its operations, R&D, and consumer interaction if it hopes to keep its competitive edge and navigate the changing healthcare landscape **(Aghaei & Alarsali, 2023)** . This review article explores the tactics and opportunities available to Indian pharmaceutical companies to capitalise on the transformative power of digital tools and establish long-term success in the international market.**(Girdharwal, 2018a)**

The pharmaceutical sector in India operates in a dynamic and fiercely competitive market that is marked by stricter regulations, growing healthcare expenses, and changing patient demands**(Pradhan, 2006)**. Indian pharmaceutical businesses need to adopt digitization as a means of survival in this market **(Arji et al., 2023)**. With a rich legacy of innovation and a strong manufacturing base, India has established itself as the world's largest producer of generic drugs, accounting for over 20% of global generic drug exports **(Blanco-González et al., 2023).**.Despite its remarkable achievements, the Indian pharmaceutical industry faces increasing challenges, including rising healthcare costs, stringent regulatory requirements, and intensifying competition from multinational corporations. **(Kulkov, 2021)**To overcome these hurdles and maintain its global position, the industry must embrace digital transformation and integrate advanced technologies into its operations. The adoption of digital tools presents a plethora of opportunities for Indian pharmaceutical companies. These tools can streamline operations, enhance supply chain management, optimize clinical trials, and facilitate personalized medicine **(Sonawane & Vidyapeeth', n.d.)**. Moreover, digital technologies can empower Indian pharmaceutical companies to engage effectively with healthcare providers, patients, and regulatory bodies, fostering stronger relationships and gaining valuable insights.**(Sanjay Kumar, 2019)**

In recent years, the pharmaceutical landscape has witnessed a paradigm shift, driven by the convergence of traditional pharmaceutical practices with cutting-edge digital solutions **(Aghaei & Alarsali, 2023)** . This article will explore key opportunities that arise from the integration of digital technologies, including but not limited to data analytics, artificial intelligence, blockchain, and Internet of Things (IoT), in the pharmaceutical value chain. Furthermore, we will elucidate on the strategic frameworks that industry players can employ to navigate the digital landscape successfully.**(Alagarsamy et al., n.d.)** The adoption of these digital tools not only enhances operational efficiency but also opens up avenues for accelerated drug discovery, improved manufacturing processes, enhanced supply chain management, and personalized patient care**(Glenn Hole, et al.)**. As the Indian pharmaceutical sector stands on the brink of a new era, the insights provided in this review aim to serve as a guide for industry stakeholders, policymakers, and innovators **(Padariya et al., 2023).**. By embracing digital frontiers and strategically integrating these tools into their operations, Indian pharmaceutical companies can not only overcome existing challenges but also position themselves as global

leaders in the race for innovation, efficiency, and ultimately, improved healthcare outcomes.**(Mustapää et al., 2022)**

LITERATURE REVIEW:

Overview Of Indian Pharmaceutical Industry

One of the biggest and fastest-growing pharmaceutical industries in the world is found in India. In terms of volume, it is the third-largest pharmaceutical producer in the world, while in terms of value, it is ranked fourteenth **(Nandy Scholar & Pal, 2015)**. Numerous factors, such as a sizable and expanding domestic market, a robust manufacturing base, and a highly skilled labour pool, propel the industry. The history of the Indian pharmaceutical business dates back to the early 1900s **(Pawar et al., 2021)**. India's pharmaceutical sector started to expand quickly after the country gained independence in 1947, with the first company being established in 1907. The Indian government, which supported the sector with subsidies and other incentives, was crucial to its growth. The Indian economy now receives a significant boost from the pharmaceutical sector **(Liu & Racherla Editors, n.d.)**. It brings in over $50 billion in income annually and employs over 2.5 million people. Pharmaceuticals are another important export for the sector; exports make up more than 20% of overall income **(Petrova & Andonova, n.d.).**

The pharmaceutical sector in India is quite diverse and produces a broad range of goods, such as biosimilars, bulk medications, generics, and vaccines. **(Arden et al., 2021)**. More than 20 percent of the world's generic drug market is accounted for by India, a major producer of generic medications **(Mustapää et al., 2022).** The pharmaceutical business in India is among the world's biggest producers of vaccines and a significant player in the global vaccination market **(Girdharwal, 2018b)**. The pharmaceutical sector in India is confronted with several obstacles, such as growing rivalry from international firms, escalating regulatory expenses, and the requirement to allocate resources towards research and development. In spite of this, the sector is well-positioned to overcome these obstacles and expand in the years to come **(Jha Assistant Professor et al., n.d.).**

Factors driving the growth of the Indian pharmaceutical industry

The Indian pharmaceutical sector is expanding due to several factors, such as:

Large and expanding home market: India's middle class is expanding quickly, with a population of over 1.3 billion people. As a result, there is a significant and rising need for medications **(Sonawane & Vidyapeeth', n.d.)**.

robust manufacturing base: India boasts a sizable labour pool and a robust manufacturing base. This makes it possible for Indian pharmaceutical firms to manufacture premium goods at prices that are competitive **(Kumar Mukherjee et al., 2021).**

Highly skilled labour force: With a sizable population of scientists and engineers, India has a highly trained labour force. This makes it possible for Indian pharmaceutical firms to fund R&D and the creation of new goods **(Aghaei & Alarsali, 2023)** .

Government support: The Indian government offers a variety of incentives, including tax exemptions and subsidies, to encourage the pharmaceutical sector **(BHARSKAR & SIDDHESHWAR, 2020).**

Challenges facing the Indian pharmaceutical industry

There are several obstacles that the Indian pharmaceutical business must overcome, such as: Global players are becoming more competitive: International pharmaceutical companies are growing their operations in India. For Indian pharmaceutical companies, this means more competition **(Nataliia et al., 2021).**

Regulatory costs are on the rise: It is becoming more expensive to comply with regulations. The profitability of Indian pharmaceutical companies is being adversely affected by this.

Need to invest in R&D: To create new drugs and maintain their competitiveness, Indian pharmaceutical businesses must make R&D investments. However, it costs money to invest in research and development **(Kumar & Londhe, 2019).**

Outlook for the Indian pharmaceutical industry

The Indian pharmaceutical sector has a bright future. The industry is anticipated to keep expanding in the upcoming years because to the robust manufacturing base, the highly skilled labour force, and the sizable and expanding domestic market **(Andreani ESCP Europe & Joonas Rokka, n.d.).** The government's backing of the pharmaceutical business in India is also anticipated to be advantageous to the sector. The National Pharmaceutical Policy and the Pharmaceutical Vision 2025 are just two of the steps the government has made to support the pharmaceutical industry, which it is committed to growing **(Popelo OV & Tulchynskyi RV, n.d.).**

Journey of the Indian Pharmaceutical Industry in Adopting Digital Tools for their Success over the Past 50 Years

The Indian pharmaceutical sector has a bright future. The industry is anticipated to keep expanding in the upcoming years because to the robust manufacturing base, the highly skilled labour force, and the sizable and expanding domestic market **(Scientific & Posilkina, n.d.).** The government's backing of the pharmaceutical business in India is also anticipated to be advantageous to the sector**(Pradhan, 2006).**. The National Pharmaceutical Policy and the Pharmaceutical Vision 2025 are just two of the steps the government has made to support the pharmaceutical industry, which it is committed to growing **(Kulkov, 2021).**

Enterprise resource planning (ERP) software was among the first digital tools that the Indian pharmaceutical sector used. ERP software offers a consolidated platform for managing every facet of a company, including sales, marketing, and production **(Shahbaz et al., 2021)**. Businesses were able to increase supply chain visibility and streamline operations as a result **(Jayapala Reddy & Madhusdhan Rao, 2017b).** Customer relationship management (CRM) software is another significant digital tool that the Indian pharmaceutical business has successfully implemented. CRM software aids businesses in monitoring and controlling their consumer relationships. By doing this, they are able to better understand the wants and desiresof their clients and give them better service **(Blanco-González et al., 2023).**

Indian pharmaceutical companies have embraced a variety of other digital tools in addition to ERP and CRM software, including:

Manufacturing execution systems (MES): Real-time manufacturing process management (RPM) software is provided by MES providers. This aids in raising the calibre and effectiveness of their output **(Girdharwal, 2018b)**.

Laboratory information management systems (LIMS): LIMS software facilitates data and process management for businesses using laboratories. This aids in raising the standard and precision of their development and research **(Arji et al., 2023)**.

Supply chain management (SCM) software: SCM software helps companies manage their supply networks more effectively. This lowers expenses and improves the calibre of the products that are delivered to customers.**(*AnalysisIndianPharma.85135952*, n.d.)**.

Analytics software: This type of software aids businesses in the analysis of their data and the acquisition of operational insights. They are able to perform better and make wiser selections as a result **(Jayapala Reddy & Madhusdhan Rao, 2017c)**.

Over the past 50 years, Indian pharmaceutical businesses have had a lot of breakthroughs because to the introduction of digital tools. Among these achievements are:

Enhanced quality and efficiency: Indian pharmaceutical enterprises have been able to increase the quality and efficiency of their operations with the use of digital tools. They are now more competitive in the international market as a result **(Gupta et al., 2021).**

Enhanced innovation: Indian pharmaceutical companies have been able to produce more innovative products thanks to the use of digital tools. This has aided in the creation of new goods and services that cater to the requirements of medical professionals and patients **(Aghaei & Alarsali, 2023) .**Global footprint expansion: Indian pharmaceutical enterprises have been able to increase their global presence with the use of digital tools. Currently, they export their goods to more than 200 nations worldwide **(Liu & Racherla Editors, n.d.).**

Here are some particular instances of how Indian pharmaceutical businesses are succeeding by utilising digital tools:

One of the biggest pharmaceutical firms in India is Sun Pharma. It optimises its supply chain and manufacturing processes with digital tools. In order to interact with both its clients and medical professionals, it also uses digital tools **(Aghaei & Alarsali, 2023)** .

Cipla: Another well-known pharmaceutical firm in India is Cipla. It boosts the effectiveness of its clinical trials with digital tools. It also makes use of digital tools to give its clients access to details about its goods and services **(Selvaraj et al., 2022).**

One well-known pharmaceutical firm in India with a focus on R&D is called Dr. Reddy's Laboratories. By utilising digital tools, it speeds up the process of discovering novel medications **(Sonawane & Vidyapeeth', n.d.)**. I New digital tools and technologies are constantly emerging, and the pharmaceutical sector in India is still changing. The pharmaceutical industries in India are leading the way in implementing these new instruments and technologies, and they are making even more success out of them **(Girdharwal, 2018b).**

IMPACT OF DIGITAL TOOLS ON INDIAN PHARMACEUTICAL INDUSTRY

With the introduction of new digital tools, the field of Research and Development (R&D) in the Indian pharmaceutical sector has been greatly impacted **(Ma et al., 2023)**. The industry has undergone a revolution thanks to these instruments, which have improved the production, testing, and drug development processes' accuracy, speed, and efficiency **(Shah et al., 2019).** Pharmaceutical R&D is now in a different place thanks to the integration of digital technologies including artificial intelligence (AI), big data analytics, machine learning, and sophisticated simulations **(Mak & Pichika, 2019).**

AI and Machine Learning:

The research and discovery of new drugs has been accelerated in large part by artificial intelligence and machine learning. These methods shorten the time and expense associated with early R&D stages by predicting possible drug candidates by analysing large datasets **(Arji et al., 2023)**. To expedite the research process, businesses such as Strand Life Sciences, based in Bengaluru, are utilising artificial intelligence (AI) to forecast the efficacy of molecules in medication discovery **(Padariya et al., 2023).**

Big Data Analytics:

The pharmaceutical industry is accumulating immense amounts of data from various sources, including clinical trials, genetic information, and patient records **(Padariya et al., 2023).**. Big data analytics tools assist in deciphering patterns within this data, aiding researchers in identifying potential drug targets, understanding disease pathways, and optimizing clinical trial designs. A notable example is Tata Consultancy Services (TCS), which utilizes big data analytics to optimize R&D processes, leading to more effective and targeted drug development**.(Publication & Lobo, 2022).**

Advanced Simulations and Modelling:

The R&D process for pharmaceuticals is now much more predictive because to the use of modelling and simulation technologies. Researchers can forecast drug behaviour, interactions, and possible side effects with computer-based simulations **(Sonawane & Vidyapeeth', n.d.)**. With the use of this technology, possible problems can be found before expensive experimental stages are undertaken. These techniques are being integrated by Indian companies like Biocon to model intricate biological systems and forecast drug activity, which speeds up decision- making in research and development **(S. A. Kumar et al., 2022)**.

Virtual Clinical Trials:

The idea of virtual clinical trials, where data is gathered remotely and site visits are not necessary, is another product of the digital transition**(Glenn Hole, et al.)**. This method shortens trial durations, improves patient recruitment and retention rates, and lowers expenses. Indian pharmaceutical companies are investigating various digital trial approaches to improve the effectiveness and patient experience of clinical trials **(Pradhan, 2006).**

These digital tools have had a wide range of effects on the Indian pharmaceutical sector. First off, it has significantly lowered the duration and expense of the medication development process. Companies can accelerate the time to market by identifying promising medication candidates more quickly and designing clinical trials more effectively **(Zhou et al., 2021).**Furthermore, the incorporation of these digital technologies has established India as a centre for pharmaceutical research and innovation**(Glenn Hole, et al.)**. These developments have been largely fueled by the nation's supply of highly qualified professionals in the biological sciences and technology, which has led to partnerships between tech companies andpharmaceutical corporations to develop creative solutions **(Joseph, 2021).**But issues with data protection, legal frameworks, and the requirement for specific skill sets to use these tools still exist. It will be essential for continued growth and innovation in the sector to embrace and

adjust to these issues as it continues to change **(Ma et al., 2023)**. The Indian pharmaceutical industry is now at the forefront of global pharmaceutical breakthroughs thanks to the integration of cutting-edge digital tools into its R&D processes. This has sped innovation, improved cost-effectiveness, and increased medication development **(Padariya et al., 2023).**

Manufacturing:

The healthcare industry is one of the most important sectors that has made substantial progressover the past few decades and is continuing to evolve in many different areas **(Ma et al., 2023)**. The applications of digital manufacturing technologies such as three-dimensional (3D) printingare rapidly increasing and likely Among the most significant industries, the healthcare sector has advanced significantly over the last several decades and is still changing in a variety of ways**.(Roy et al., 2022)** Digital manufacturing technologies, including 3D printing, are findingexpanding uses and have the potential to revolutionize the healthcare sector. Furthermore, 3Dprinting skills are a good fit for medical applications and can be used for regenerative medicine, prosthetic applications, tissue engineering, and organ manufacturing, among other things**. (M. Kumar & Londhe, 2019)**Thus, it is anticipated that 3D printing will revolutionize the healthcare sector in the coming years. to transform the healthcare industry. Moreover, 3D printing capabilities align well with the needs of medical applications and are feasible for specialized pre-surgical planning. **(Arden et al., 2021)**, prosthetic applications, tissue engineering and organ printing, regenerative medicine, etc. Therefore, in the next few years 3D printing is expected to transform the healthcare industry **(Song et al., n.d.)**

Pharma and biopharma companies are embracing modern production methods due to the benefits they offer in terms of increased profitability, quality, efficiency, and flexibility**(Blanco-González et al., 2023).**. Automated systems can eliminate mistakes and improve productivity by taking the place of manual processes **(Arji et al., 2023)**. These technologies include automated data collection and electronic batch records, which can enhance data integrity, and the use of robots, which eliminates the possibility of human error and lessens the risk of ergonomic or safety concerns for operators **(Markarian, J.et.al 2021).**

Connectivity, robotics, and artificial intelligence (AI) together to create systems that function with little to no human intervention to maximize manufacturing and enterprise-wide management, integrated autonomous and robotic systems combine industrial production processes, artificial intelligence, and real-time and online data**. (Roy et al., 2022)**When it comes to pharmaceutical production, internal data like energy and resource management, modelling and simulation results, and laboratory data may combine with external data like patient experience, market demand, supplier stocks, and public health issues **(Shahbaz et al., 2021)**. The COVID-19 pandemic has brought attention to the need for manufacturing technology that can adapt quickly to changing market conditions and lessen the need for humanintervention.**(Arden et al., 2021)**

The pharmaceutical industry has however been resistant to digitalization, mainly due to fair experience and the complexity of the entailed development and manufacturing processes. Nevertheless, there is a clear need to digitalize the Pharmaceutical Industry as the demand for both traditional and new drugs is constantly growing**.(Ma et al., 2023)** Contract Development Manufacture Organizations (CDMOs) have a special digitalizing challenge. Digitalization of the pharmaceutical industry, and CDMO precisely, should be tightly related to the main aspects

of Good Manufacture Practice (GMP), and, to succeed in the pharmaceutical Industry digitalizing requires a constant focus on GMP **(Glenn Hole, et al.)**

Supply chain management:

The industry of pharmaceutical supply chains must speed up digital building. It has been discovered that

research being done right now in the area of pharmaceutical supply chain management tends to use digital technologies to innovate the supply chain **(Padariya et al., 2023).**. Since COVID-19 had an impact on the supply chain, pharmaceutical companies are putting more of an emphasis on risk management to prevent disruptions and guarantee continuous supply. By implementing digital technologies like blockchain, pharmaceutical companies can enhance supply chain traceability and information sharing, hence improving supply continuity.**(Bader et al., 2023)**

The pharmaceutical industry has seen digital revolutions that have changed the way businesses handle supply chain management and customer service. **(Arden et al., 2021)**. It is not a novelidea to trace pharmaceuticals in order to increase visibility across the pharmaceutical supply chain. Many nations around the world have begun to highlight and even legislate the need for drug traceability **(Ma et al., 2023)**. Regulatory agencies are integrating digital drug verification into the supply chain to verify the authenticity of drugs and reduce the possibility of counterfeitgoods. The pharmaceutical industry has seen digital revolutions that have changed the way businesses handle supply chain management and customer service. **(Song et al., n.d.)** It is nota novel idea to trace pharmaceuticals in order to increase visibility across the pharmaceutical supply chain**(Pradhan, 2006).**. Many nations around the world have begun to highlight and even legislate the need for drug traceability. Regulatory agencies are integrating digital drug verification into the supply chain to verify the authenticity of drugs and reduce the possibility of counterfeit goods**.(Sarkar, 2022)**

The COVID-19 pandemic's global expansion has severely damaged healthcare supply systems. The COVID-19 healthcare supply chain**. (Ma et al., 2023)**By using a methodical process, we identified 35 relevant papers. Technologies like blockchain, big data analytics, artificial intelligence (AI), and simulation are crucial in healthcare supply chain management. Due to the worldwide supply chain breakdown that occurred during the pandemic **(Blanco-González et al., 2023).** There is an extreme shortage of essential front-line medical supplies and personal protective equipment, which is upsetting caregivers and raising concerns about the long-term viability of the healthcare sector. Numerous instruments that match the needs of the new production process have been developed and deployed for supply chain management and control during the logistical revolution**.(Arji et al., 2023)**

Cloud computing, middleware, wireless sensor networks, radio frequency identification technology, and IoT applications are the five main IoT technologies that are widely used in supply chain and logistics. IoT data supports automated production and predictive analytics, enables businesses to monitor and react to operational situations in real time **(Padariya et al., 2023).**. Hospitals can share open data in a trustworthy environment thanks to the blockchain, and managing medication inventories and real-time location is made easier by IoT applications. By combining these two technologies, the PSC can create a system for business cooperation and data sharing that is reliable, transparent, and traceable**(Chen et al., 2023)**

Inventory management:

A crucial component of both cost-cutting and customer service is inventory management. The complexity and diversity of client orders are growing, and warehouse operations need to adapt. They also need to change frequently in response to customer needs, and the need for contextualand real-time data is growing. **(Arden et al., 2021)**To ensure that purchases are fulfilled on time, purchase orders and manufacturing must be in sync. You can increase customer satisfaction and save costs with an effective warehouse management system **(Shahbaz et al., 2021)**. Provide a software architecture for the development of a prototype inventory management system intended for use with PCs and other Internet-connected devices. Developa prototype for inventory management that can notify inventory managers via mobile devices and identify products that have been misplaced or have low inventory levels **(Bader et al., 2023)**

Sales and marketing:

There has been a significant rise in the proportion of digital and social media marketing communications across many industries, according to recent data. propelled by technological developments that make it possible for more effective and targeted communications **(Shahbazet al., 2021)**. By using new online media tools, such as e-detailing, pharmaceutical marketing channels, such as sales force (detailing), and traditional marketing media targeted at prescription medicine doctors, can be set off**(Andreani ESCP Europe & Joonas Rokka, n.d.)**

The Indian pharmaceutical business is still in the early stages of digital marketing development. Pharmaceutical businesses are assisting patients in monitoring their health and learning more about their diseases by providing technology-based services **(Padariya et al., 2023).**. Providing the doctors with information about the patient's health and any product's negative effects may also be helpful. **(Paritala et al., 2017)**Companies are now able to target patients, physicians, and caregivers differently thanks to the introduction of digital marketing in this sector in recent years. The Internet, cloud computing, mobile communications, and advanced analytics are some of the technologies that are transforming the healthcare industry. Search engine optimization, pay-per-click

advertisements, email newsletters, social media marketing, e-detailing, and webinars are examples of digital marketing types **(BHARSKAR & SIDDHESHWAR, 2020)**

Research and development data were kept within the walls of the pharma companies, today, technology companies such as Apple, IBM, and Qualcomm Technologies are moving into healthcare. They can engage with patients through apps, health and fitness devices, and online communities. **(Ma et al., 2023)** They can collect petabytes of data from these and other sources,such as electronic medical records and insurance claims, capturing valuable insights**(Glenn Hole, et al.)**. Pharma companies will need to decide soon how to position themselves to compete, collaborate with these new players, or build complementary capabilities. digital success—an ability to deliver more personalized patient care, engage more fully with 2 and 3 physicians and patients, use data to drive superior insight and decision-making, and transform business processes to provide real-time responsiveness**(Champagne et al., n.d.-a)**The way salespeople carry out their daily regular tasks has altered as a result of recent advancements ininformation technology (IT) and the growing popularity of social media. To improve sales effectiveness and customer relationship management (CRM) capabilities, salesforce automation (SFA) systems are typically installed**.(Champagne et al., n.d.-b)** SFA systems fall

short of what salesforces need today. The research reports that the incapacity to interpret the vast amount of data and the disregard for significant data sources are the main reasons why SFA systems fail. The study's conclusions indicate that businesses should provide big data analysis training to their sales staff**.(Shahbaz et al., 2021b)**

Digital technology has revolutionized working practices and becomes an affordable means withremarkable global reach. However, because of the working staff's inadequate training, lack of awareness, and acceptability, this platform is not being used to its full potential **(Padariya et al., 2023).**. The digitalization of their working practices had a significant impact on marketingand sales professionals. Pharmaceutical industries have changed their marketing methods drastically to survive in this digitalized world. Many tools are being used widely to increase reach to the target population**(M. Kumar & Londhe, 2019)**

AI is already being used by a large number of sales and marketing teams in the healthcare sector to improve their data-driven insights into their experience-based decisions, which is changing the way these teams approach their go-to-market strategies. The pharmaceutical sector is currently transitioning from a fascination with AI to its application. **(Arden et al., 2021)**. By developing a thorough grasp of HCP characteristics, behaviours, and attitudes, AI can assist marketers in segmenting, targeting, and delivering precise and customized marketing**(Pradhan, 2006).**. The shift from personalization to hyper-personalization and hyper-customization may be facilitated by marketers with the aid of AI. With AI, marketers will also be able to more precisely target certain doctors based on their geography, patients, prescribing patterns, and individual behaviors, interests, and attitudes**(Roy et al., 2022)**

The pharmaceutical sector has suffered from social solicitousness, but it is preparing for increased use of digital platforms to become more aware of the power of communication. Pharmacists can utilise prescription data with digital marketing to make more smart investments **(Bader et al., 2023)**. Social media is a tool used by the pharmaceutical sector to interact with customers. But not every pharmaceutical company has a YouTube channel, a Twitter account, or a Facebook profile. Because of the strict regulations, the pharmaceutical industry was unable to leave its footprints; but, thanks to digital marketing, it has now expanded **(Sonawane & Vidyapeeth', n.d.)**

Through digital communication, people are looking for and using health information to help them make decisions about their health. Pharmaceutical companies are under pressure to prioritise their online presence due to the increasing demand for health information among digital consumers and professionals, even if there is currently no definitive rule for their digitalactivities.**(Royal et al., 2022)**

METHODOLOGY

The literature search was limited to articles published from 2005 - 2023. The search for articleswas done online by using the search words 'Digital tools, Indian pharmaceutical industry, AI and Machine Learning, digital marketing, supply chain management '' in the title and keywordsin research databases at Wiley, Elsevier, Taylor & Francis, ERIC, Springer, SAGE, Frontiers.

Analysis

The method used is the Preferred Reporting Item for Systemic Reviews and Meta analytic (PRISMA) method. All articles that have passed the selection process were then reviewed and

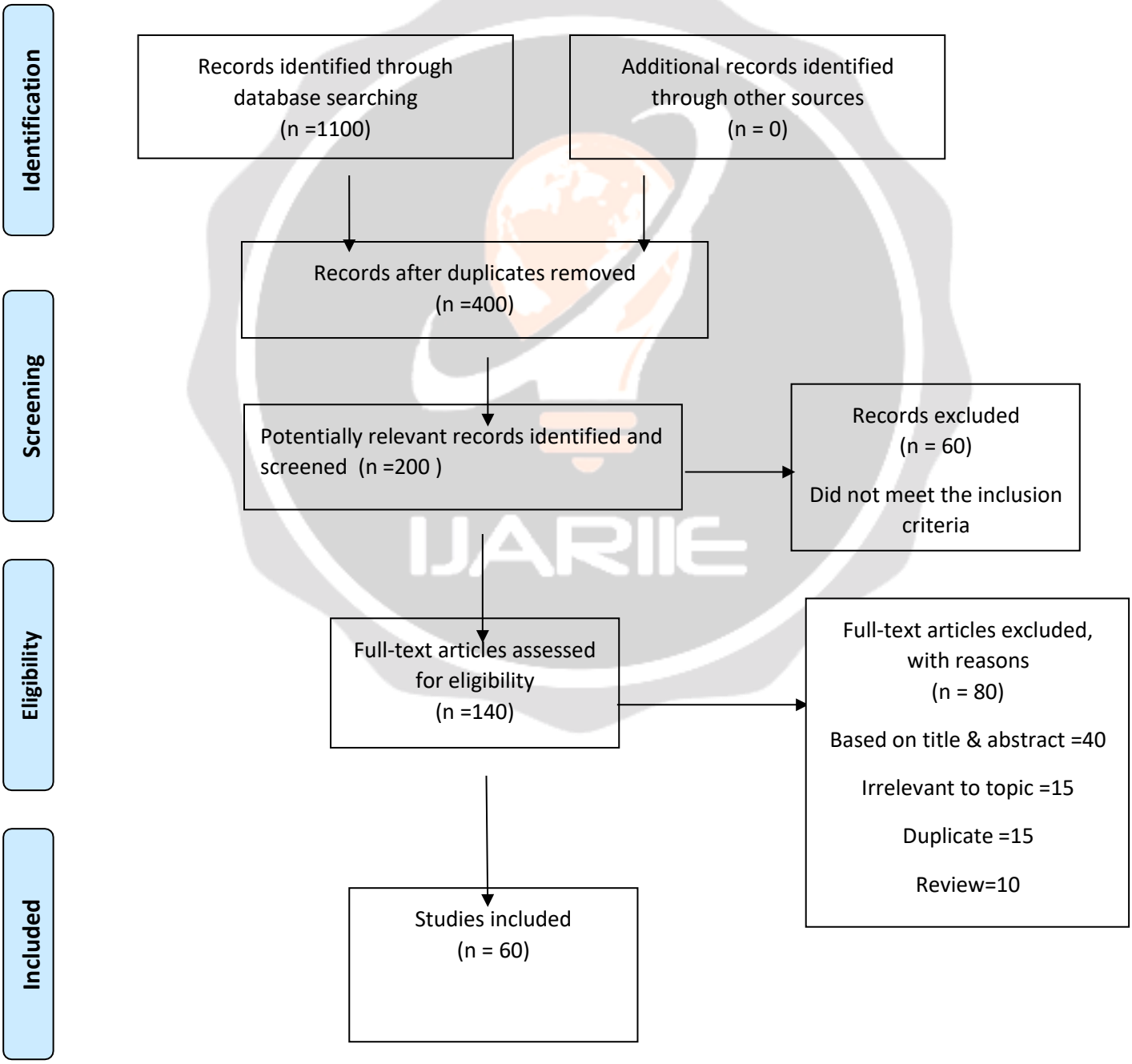
summarised based on the objectives, year of publication, number of citations and suggestionsfor further research.

Inclusion & Exclusion criteria

The be included in current study, studies have to meet some criteria

(a) Studies have included some kind of selection criteria (Digital tools, Indian pharmaceutical industry). These criteria limited the number of studies (b) Accordingly excluded the studies in which it based on irrelevant information there is no proper Title, Abstract & Review.

PRISMA Flow Diagram



Final data set

The research database search resulted in all keywords search results obtained 1100 research articles. After scanning the title, there was the same article in two different databases. The results after deducting the duplicates are 400 articles. A total of 200 articles were screened. 60 Articles excluded that they not meet the inclusion criteria.

Articles accessed for eligibility are 140 articles. A Total number of 80 articles excluded based on title and abstract (40) Irrelevant to topic (15) Duplicate (15).

The final data set consists of 60 articles.

The oldest included study was published in the year 2005 and the most recent study wasconducted on 2023. The Entire process is shown in figure

DISCUSSION:

Being well-established in both local and global markets, the Indian pharmaceutical business isone of the most dynamic and quickly expanding industries globally. Indian pharmaceutical firms have several options for effectively integrating digital technologies. Companies must first create a distinct digital strategy that supports their overarching corporate objectives. Second, in order to facilitate the use of digital technology, businesses must make the required infrastructure and training investments. Third, businesses should cultivate an innovative culture that motivates staff members to try out new digital tools and technology. By providing pharmaceutical items with real-time tracking and guaranteeing efficient distribution, theincorporation of digital solutions helps improve supply chain management.

CONCLUSION:

In conclusion, with digital technologies driving this transformative journey, the Indian pharmaceutical business has unquestionably bright future ahead of it. An entirely new paradigm in research and development has been achieved by combining data analytics and artificial intelligence to optimise clinical trials and speed up the drug discovery process. Innovation and adaptability are two things that the Indian pharmaceutical business is quite good at. These obstacles may be overcome and the sector can continue to grow in the years to come with the appropriate plans in place. Utilizing digital marketing to its full potential for targeted engagements with patients and healthcare professionals further fortifies the industry's communication channels.

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