MICRO SEGMENTATION IN PHARMACEUTICAL MARKETING: LEVERAGING DIGITAL BEHAVIOUR IN HYPER PERSONALISED BRAND PROPOSITIONS

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by

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Under the Supervision and Guidance of

Dr. Ashok Peepliwal

2025

B – BLACK BELT BRAND BUILDERS

CERTIFICATE

This is to certify that ***Pushpraj Patel*** *in partial fulfillment of the requirements for the award of the degree of MBA (Pharmaceutical Management) from the IIHMR University, Jaipur has successfully completed his internship at B Black Belt Brand Builders during March 10 - May 31, 2025.*

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CERTIFICATE

This is to certify that the dissertation titled "Micro segmentation in pharmaceutical marketing: leveraging digital behaviour in hyper personalised brand propositions" is a record of research work undertaken by Pushpraj patel in partial fulfilment of the requirements for the award of the degree of MBA (pharmaceutical management) from the IIHMR University, Jaipur under my guidance and supervision. His approach to the study has been sincere, scientific, and analytical.

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Declaration by student

I hereby declare that this dissertation titled "Micro segmentation in pharmaceutical marketing: leveraging digital behavior in hyper personalised brand propositions" is the Bonafide record of my original research work. I declare that it has not been submitted to any other University or institutions for the award or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Name of the student:

Pushpraj Patel

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ABSTRACT

Background:

The evolution of pharmaceutical marketing is being driven by digital transformation, wherein companies are transitioning from broad-spectrum mass marketing to more nuanced and effective micro segmentation. This dissertation explores how pharmaceutical firms leverage digital behavioural data to craft hyper-personalized brand propositions, improving engagement with healthcare professionals (HCPs) and patients alike. Micro-segmentation and hyper-personalization will support precision medicine by allowing more tailored treatments, especially for biologics and biosimilars, within the next decade.

Objectives:

1. Examine how micro segmentation enhances engagement in pharmaceutical marketing.
2. Evaluate the role of digital behavioural data in developing hyper-personalized brand propositions.
3. Contrast traditional segmentation with micro segmentation in terms of marketing effectiveness.
4. Identify challenges and opportunities in implementing AI-powered micro segmentation models.

Methodology:

A mixed-method approach was employed, integrating a systematic literature review with a primary quantitative and qualitative survey. The literature review analysed eligible studies extracted from Google Scholar and PubMed, selected using PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) guidelines. Key inclusion criteria included studies with comparative designs evaluating engagement metrics, ROI, and personalization effectiveness. Primary research involved a structured questionnaire administered to 200 respondents, including consumers, pharmacists, and prescribers. Primary data analysis been done using spreadsheet, MS Excel. R. Sentiment analysis, Inferential statistics and descriptive statistics were performed using R, alongside visualization and thematic coding for qualitative insights.

Results:

The findings reveal a significant positive impact of micro segmentation on engagement, adherence, and conversion rates. Respondents showed a preference for hyper-personalized

interactions, particularly when delivered through omnichannel digital platforms. AI-driven personalization led to up to 35% higher engagement in campaigns, **Quantitative Findings**: The survey of 200 respondents revealed:

- **High Daily Digital Use**: 56.5% used digital health platforms daily.
- **Trust in Digital Marketing**: Over 50% agreed that personalized digital ads helped in decision-making.
- **Engagement with Digital Campaigns**: Around 48% had purchased an OTC product after a digital ad or recommendation.
- **Sentiment analysis**: People were generally less agreeable or satisfied with the topic
- **Corelation heat map:**
- **AI Personalization** (Trust in AI, time efficiency, relevance)
- **Digital Influence** (Online review impact, social media use)
- **Purchase Behaviour** (Purchase based on ads, preferred platforms).

Conclusion:

The dissertation concludes that micro segmentation, when powered by digital behavioural data and AI technologies, significantly enhances the relevance and effectiveness of pharmaceutical marketing. Unlike traditional demographic segmentation, micro segmentation supports real-time content customization and targeted delivery, fostering better health outcomes and brand loyalty. Hyper personalization—enabled by CRM, predictive analytics, and NLP—has emerged as a competitive differentiator in pharma branding. However, successful implementation demands overcoming challenges such as data integration, privacy concerns, and resistance to technological change. Future directions point toward more ethical, compliant, and scalable personalization strategies that integrate blockchain, federated learning, and real-time data analytics to balance personalization with data privacy.

Key words: Micro-segmentation, Hyper-personalisation, Digital behavioural data, AI and machine learning (ML), Pharmaceutical marketing , Customer relationship management(CRM), Predictive and prescriptive analytics.

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Sincerely,

Pushpraj Patel

TABLE OF CONTENT

LIST OF ABBREVIATIONS

HCP - Healthcare Professional
DTC - Direct-to-Consumer
FDA - U.S. Food and Drug Administration
EMA - European Medicines Agency
CDSCO - Central Drugs Standard Control Organization
GPP - Good Promotional Practices
SEO - Search Engine Optimization
EHR - Electronic Health Record
AI - Artificial Intelligence
ROI - Return on Investment
GDPR - General Data Protection Regulation
HIPAA - Health Insurance Portability and Accountability Act
AR - Augmented Reality
VR - Virtual Reality
ML - Machine Learning
NLP - Natural Language Processing
NBA - Next-Best-Action
CRM - Customer Relationship Management
OTC - Over-the-Counter

CHAPTER-1

INTRODUCTION

1.1 Overview of Pharmaceutical Marketing

Pharmaceutical marketing refers to the strategies used by companies to promote medications and healthcare products to both medical professionals and patients. Given the nature of these products, ethical and regulatory considerations play a significant role in how they are marketed. Traditionally, this has included in-person sales calls, sample distribution, and sponsorship of medical education. However, with digital advancements, marketing strategies have evolved to include online engagement, virtual detailing, and targeted educational campaigns [1].

While the U.S. allows direct advertising to consumers, many other countries focus strictly on professional-to-professional promotion. Regardless of regional differences, all marketing efforts aim to provide evidence-based, informative content that helps healthcare providers make informed prescribing decisions [2].

Over the past decade, there's been a noticeable shift toward more patient-centric approaches, where marketers not only promote drugs but also focus on disease education and support tools that improve health outcomes. Moreover, strategies around pricing, market access, and real-world evidence generation have become central to successful product adoption [3].

In essence, pharmaceutical marketing today blends clinical knowledge, regulatory compliance, and digital engagement to build long-term trust and value within the healthcare system.

1.2. Foundations of Micro Segmentation in Pharma

Micro segmentation is an advanced marketing strategy that breaks down broader customer groups—such as healthcare providers or patients—into smaller, more targeted segments. This approach goes far beyond traditional segmentation methods like specialty or location, using behavioural, clinical, and engagement data to inform decisions [4].

In earlier days, pharmaceutical marketers would typically group doctors based on how often they prescribed certain medications. But that didn’t offer much depth or precision. Now, companies analyse a wide range of data points—like preferred digital channels, patient demographics, or treatment patterns—to create detailed customer profiles [5].

By doing this, they can better tailor messages to each group. For example, a cardiologist who is an early adopter of new therapies might receive cutting-edge research updates, while a more conservative prescriber might get content grounded in clinical guidelines. This level of personalization not only improves engagement but also ensures resources are allocated more effectively [6].

Micro segmentation also supports regulatory compliance by allowing messages to be aligned with the specific needs and legal frameworks of each segment. As healthcare moves toward personalization in treatment, marketing is evolving in tandem through these smarter, data-driven methods.

1.3. Digital Behaviour Analytics in Pharma Marketing

Digital behavior analytics is changing how pharmaceutical companies understand and interact with their audiences. By tracking online behaviors—such as which websites are visited, how long someone watches a webinar, or what kind of emails are opened—marketers can draw meaningful conclusions about individual preferences and interests [7].

This kind of data enables companies to deliver content that truly resonates. For instance, if an oncologist repeatedly clicks on content related to immunotherapy, the system can prioritize similar updates or research in future communications [8]. This helps avoid irrelevant messaging and boosts overall engagement.

Behind the scenes, artificial intelligence and machine learning are powering much of this analysis. These tools can predict future behaviour, identify trends across regions or specialties, and even suggest next steps for sales or marketing teams. What's more, digital analytics helps measure campaign effectiveness by showing which tactics drive the best results [9].

Of course, all of this has to be done with strong attention to data privacy laws like GDPR and HIPAA. Trust is essential in healthcare, so maintaining ethical data practices is a non-negotiable part of using analytics in pharma.

1.4. Hyper Personalization in Pharmaceutical Brand Propositions

Hyper personalization takes marketing a step further by tailoring content and interactions to the unique preferences of each individual. In the pharmaceutical world, this might mean

sending a healthcare provider information aligned with their treatment patterns, clinical interests, or even local epidemiological trends [10].

For example, if a physician frequently treats diabetic patients, the system might automatically deliver the latest studies on glucose-lowering therapies or tools for patient education. This real-time relevance increases the chances of the content being read, understood, and used in practice [11].

Patients can also benefit from this level of personalization. From app-based medication reminders to custom lifestyle advice, hyper personalized tools can improve adherence and patient satisfaction. Technologies like AI-driven recommendations and "next-best-action" models are central to making this possible [12].

That said, it's not just about technology. Companies must balance innovation with ethics, ensuring transparency, consent, and respect for privacy. When executed thoughtfully, hyper personalization not only improves marketing ROI but also strengthens relationships between pharma companies, healthcare providers, and patients.

1.5. Implementing Micro Segmentation in Pharma Marketing Strategies

Successfully putting micro segmentation into action starts with data. Pharma companies gather information from multiple sources—electronic health records, prescription data, CRM platforms, and digital interactions—to build a well-rounded view of each stakeholder [13].

Once the data is compiled, analytics teams segment audiences using behavioral and predictive models. This might reveal subgroups such as digitally active HCPs, high-prescribing general practitioners, or treatment skeptics. From there, tailored messages and campaigns can be crafted for each group [14].

What really makes this work is cross-departmental collaboration. Sales, marketing, compliance, and IT must all work together to ensure messages are timely, relevant, and ethically sound. For example, marketing teams may design dynamic content that adapts depending on how a physician interacts with it across different channels [15].

Implementation also requires ongoing refinement. Marketers should continually test and optimize their approach as new data comes in, ensuring that segmentation evolves with the audience. Done right, this strategy leads to smarter resource use, improved engagement, and ultimately, better healthcare outcomes.

1.6. Case Studies and Future Trends

Several pharmaceutical companies have already shown how effective micro segmentation and personalization can be. Novartis, for example, applied behavioral segmentation when launching Entresto, targeting specific cardiologists based on regional treatment patterns. This helped accelerate adoption and optimize field force efforts [16].

AstraZeneca, on the other hand, leveraged AI-powered predictive analytics to pre-identify physicians likely to switch prescriptions within oncology. This allowed them to launch proactive educational campaigns for oncologists, reducing the sales cycle by 22% and boosting conversion rates [17].

Sun Pharma also demonstrated success by integrating regional and behavioral data into its dermatology marketing campaigns in India. By customizing content and using preferred communication channels, they saw better brand recall and increased physician satisfaction [18].

Looking ahead, future trends in pharma marketing include using wearable health data, augmented reality for medical education, and AI-powered chat tools for patient engagement. At the same time, maintaining ethical standards and data privacy will be critical.

As the industry continues evolving, the brands that lead will be those who can blend personalization with trust and innovation.

CHAPTER-2

LITERATURE REVIEW

Study	Background	Methodology	Result
Sharma et al (2020)	The swift expansion of internet usage and the widespread influence of social media platforms have introduced complex challenges for marketers and entrepreneurs. To remain competitive, businesses must gain a nuanced understanding of shifting consumer behaviours and psychological patterns across diverse demographic groups. This understanding is vital for adapting and refining business strategies in the digital age. In particular, the rise of new companies focused on younger audiences, such as adolescents and future consumers, underscores the need to grasp how these groups interact and communicate online. Effectively decoding these dynamics is key to crafting relevant and impactful marketing approaches.	The study applies various clustering algorithms—including K-means, MiniBatch K-means, AGNES, and Fuzzy C-means—to analyse social networking site (SNS) data and identify underlying interests among teenage users	Among the techniques explored, K-means demonstrated superior performance in segmenting the digital market effectively. This was reflected in the silhouette scores, which measured 63.90% for a two-cluster model and 58.06% for a three-cluster model, indicating a relatively strong clustering structure in the analysed data [19].
Mehta et al (2021)	The paper discusses the importance of intelligent customer segmentation to provide targeted and personalized products and services, highlighting that traditional methods rely on statistics-based approaches that compute summary statistics from customer data and apply clustering algorithms to group customers into segments.	The paper employs a statistics-based approach to customer segmentation, which computes summary statistics from customer demographic and transactional data, and then partitions the customer base into segments using various clustering methods, specifically hierarchical clustering, entropy-based	Micro-targeting method outperforms direct grouping and statistics-based methods. Generates predominantly small-sized segments for better personalization.[20]

		regression trees, and affinity propagation clustering algorithms.	
Reddy et al (2022)	The pharmaceutical industry is transitioning towards increasingly individualized healthcare, necessitating a shift from broad market segmentation to more refined micro-segmentation. This change is driven by consumers taking greater responsibility for their treatment options and the customization of diagnostic and therapeutic approaches based on individual risk profiles and treatment efficacy.	The paper emphasizes the importance of micro-segmentation, which involves identifying smaller customer groups or sub-groups within conventional market segments that have distinctive needs and purchasing Behaviour. This approach allows pharmaceutical companies to focus on individual interactions and tailor marketing strategies to meet the specific requirements of these micro-segments.	Internet enhances fine-grained market segmentation strategies. Micro-segmentation improves customer understanding and engagement.[21]
Khan et al (2020)	Pharmaceutical marketing is evolving with e-commerce and digital platforms, impacting branding and customer interaction. India's pharmaceutical market is substantial, with significant growth projected in biosimilars and medical devices. Digital channels offer new avenues for promotion and engagement, necessitating an understanding of their impact on marketing strategies.	This review synthesizes existing literature on e-commerce and digital platforms in pharmaceutical marketing. It examines studies analysing the adoption of online channels, their influence on consumer Behaviour and brand perception, and the challenges and opportunities presented by this digital transformation within the pharmaceutical sector.	E-commerce and digital marketing significantly reshape pharmaceutical marketing by introducing new communication channels and influencing consumer decision-making. Online platforms impact brand awareness, accessibility, and market share. The integration of

			technology, including AI, offers opportunities for personalized outreach, but trust and reliability remain critical factors for effective digital engagement.[22]
Singh et al (2021)	The pharmaceutical industry faces challenges in digital customer engagement, struggling to create value through online interactions. Traditional engagement methods are insufficient in the digital age. This research investigates how pharmaceutical organizations can improve digital customer engagement to build stronger relationships and enhance value for both the company and its customers.	This study employed qualitative research, utilizing semi-structured interviews with professionals from pharmaceutical organizations. The interviews explored current digital engagement strategies, challenges faced, and opportunities for improvement. The collected data was analysed thematically to identify key patterns and insights into effective digital customer engagement practices.	The research reveals that pharmaceutical organizations need to shift towards more customer-centric digital engagement. Key factors include personalized communication, valuable content provision, and building trust through transparency. Effective digital engagement requires a holistic approach that integrates various digital channels and prioritizes customer needs and preferences.[23]
Kapoor et al (2022)	The pharmacy sector is undergoing a significant digital transformation, driven by technological advancements. Digital technologies like AI, blockchain, and online platforms are reshaping pharmacy services and education. The COVID-19 pandemic has accelerated the need for digital solutions in healthcare, pushing the pharmacy industry towards greater reliance on digital technologies to improve efficiency and patient care.	This review explores the transformative impact of digitalization on the global pharmacy sector. It examines how technologies such as artificial intelligence, blockchain, and online platforms are reshaping pharmacy services and education. The paper also provides an overview of the growth of online pharmacy platforms and the role of telepharmacy and telehealth during the COVID-19 pandemic.	Digital transformation is fundamentally altering the healthcare landscape, impacting patient engagement and medication adherence. Online platforms and telehealth are increasingly used to improve efficiency, flexibility, and accessibility in

			pharmacy practice and education. This transformation presents opportunities and challenges, including regulatory issues, safety concerns, and the need for continuous professional development in the digital era. Sources and related content.[24]
Banerjee et al (2019)	Pharmaceutical marketing in the United States is experiencing a paradigm shift, largely influenced by increasing regulatory transparency introduced under healthcare reforms. A notable development is the movement away from traditional direct-to-consumer advertising (DTCA) towards digital formats—referred to as electronic DTCA (eDTCA)—driven by the broader adoption of digital health platforms. Although eDTCA is legally permitted only in the U.S. and New Zealand, its inherently borderless nature creates unique regulatory challenges, potentially influencing public health beyond national jurisdictions	To explore these changes, the study analysed publicly available marketing expenditure data to assess trends in both conventional DTCA and eDTCA. Using statistical tools such as regression analysis and t-tests, the researchers compared shifts in expenditure across different media formats. The results revealed a modest decline in overall DTCA spending between 2005 and 2009, aligning with prior research. Traditional advertising channels like television, radio, and outdoor media all showed decreasing investment—television by 13.2%, radio by 30.7%, and outdoor advertising by 12.1%.	In contrast, digital advertising (eDTCA) stood out as the only category with a significant increase in expenditure, rising by a striking 109%. This trend not only highlights the pharmaceutical industry's growing reliance on digital engagement but also suggests a fundamental reallocation of marketing resources. Importantly, eDTCA was the only medium that demonstrated statistically significant differences in expenditure trends compared to its traditional counterparts, underscoring its

			emerging role in modern pharmaceutical marketing strategies [25].
Iyer et al (2020)	The pharmaceutical industry in the U.S. is highly regulated, involving a lengthy and costly process to bring a new drug to market. Traditionally, drug sales relied on patients visiting providers for prescriptions. However, younger generations increasingly seek medical advice and treatment through electronic means, influencing how prescriptions are obtained and creating a shift away from the traditional medical home model.	This article examines how technology impacts the traditional patient-provider-pharmacist relationship. It discusses the rise of direct-to-consumer telemedicine and online digital platforms, which offer 24/7 access to healthcare for non-emergency conditions. The paper also explores the risks associated with promoting prescription medications on social media platforms and the ongoing debate surrounding direct-to-consumer advertising of prescription drugs.	Technology is changing how patients access healthcare and prescriptions, with telemedicine and online platforms offering increased accessibility. However, promoting prescription drugs on digital platforms raises concerns about patient safety, particularly regarding the exposure of minors to ads for sensitive medications and the potential for oversimplified or misleading information. The regulation of prescription drug advertising on these platforms remains unclear. Sources and related content.[26]

Kim (2019)	The rise of digital direct-to-consumer advertising (eDTCA) is significant, with increased pharmaceutical spending and widespread online health information searches. This growth raises concerns about its impact on consumer Behaviour, public health, and healthcare utilization. The FDA faces challenges in regulating eDTCA due to its disruptive nature and the fast-paced evolution of internet technologies.	Kim's study analysed FDA notices of violations (NOVs) and warning letters from 2005-2014 to identify regulatory, public health, and safety challenges related to online direct-to-consumer advertising (DTCA) of prescription drugs. The research examined how online promotional activities might negatively affect public health and consumer safety, and whether FDA regulatory responses are adequate.	Kim's study revealed that eDTCA often fails to provide balanced risk versus benefit information, similar to traditional media. There are concerns about off-label promotion, the dynamic nature of online promotions, and the globalization of eDTCA, which pose regulatory challenges for the FDA. Sources and related content.[27]
Rao et al (2020)	Pharmaceutical companies have increasingly adopted electronic detailing (e-detailing) to promote products to physicians. This shift is due to factors like rising healthcare costs, increased pharmaceutical spending, and challenges in reaching physicians through traditional sales methods.	The paper is a literature review examining electronic detailing (e-detailing) of pharmaceuticals to physicians. It covers reasons for e-detailing's emergence, its comparison to traditional detailing, definitions, processes, prevalence, types, adoption drivers, and adopter characteristics.	The review identifies two main types of e-detailing: interactive (virtual) and video. Factors like convenience, information quality, and incentives influence physician adoption.[28]

CHAPTER-3

METHODOLOGY

3.1 : Research Design

A **mixed-methods approach** is adopted, combining quantitative and qualitative methodologies to provide a holistic understanding of micro-segmentation's impact. This involves collecting original data through direct surveys and analysing existing data from other sources.

3.2 :Research type:

Descriptive research method.

Study Setting:-

The study is conducted in **India**, focusing on city, town and rural areas.

3.3 : Study Population:-

Sample Size Calculation:-

The study targets a total sample size of **200 participants**, divided equally into three groups of **Customers, prescribers and pharmacists.**

3.4 : Study Instruments:-

1. **Quantitative Tools**:-

- **Structured Questionnaire**: Designed to collect data on engagement metrics (e.g., click-through rates, conversion rates), trust in digital marketing, and preference for personalized content. The questionnaire includes Likert-scale questions, multiple choice questions.

2. **Qualitative Tools**:-

- **Semi-Structured Interview Protocol**: **Open-ended questions** targeting marketing experts and HCPs to explore perceptions of micro-segmentation, challenges in AI adoption, and case study insights.

3.5 : Sampling Technique:-

A **stratified random sampling** technique is employed to ensure representation across urban and semi-urban regions, as well as diverse participant roles (marketing experts, HCPs, patients). Strata are defined based on:

3.6 : Research Procedures:-

Quantitative Assessment:-

- **Survey Administration**: Online and in-person surveys are distributed to 200 participants via, mobile apps. The survey collects data on digital platform usage, trust in OTC brand marketing, and responsiveness to personalized campaigns.
- **Secondary Data Collection**: from different data bases the records been taken and the best out of it is been researched and used for input in the paper.
- **Duration**: Data collection spans **1 months**, from 7 April to 5 May 2025.

3.7 : Statistical Methods:-

- **Software**: Spreadsheet, MS Excel, R for quantitative analysis.
- **Annova:** done annova with one factor

Inferential Statistics:-

- **Bibliometric Analysis**: To visualize keyword co-occurrence and publication trends, identifying research themes in micro-segmentation.

Qualitative Methods:-

- **Content Analysis**: Applied to case study data to evaluate the strategic use of micro-segmentation in real-world campaigns.
- **Word cloud:** for visualisation of most occurring themes.

3.8 : Ethical Considerations:-

- **Voluntary Participation**: Participants are informed of their right to withdraw at any time without consequences.

3.9 : Research Gap :-

In spite of increased research on pharma digital marketing, limited specific studies are available on micro-segmentation through digital behavioural data.

Critical areas of research gap are:

- Minimal studies on pharma marketing through AI-driven segmentation.
- Minimum empirical data available on hyper-personalized brand propositions affecting customer engagement.
- Minimal comparative studies are available between traditional segmentation and micro-segmentation based on their effectiveness.

3.10 : Research Objectives:-

- To examine how micro-segmentation increases engagement in pharma marketing.
- To evaluate the impact of digital behavioural data in creating hyper-personalized brand propositions.
- To contrast traditional segmentation vs. micro-segmentation in pharma marketing.
- To determine the main challenges and opportunities in using AI-powered micro-segmentation.

3.11 : Hypothesis:

Null hypothesis (H0):

There is no significant difference in the mean response scores among the three statements about digital pharma marketing

Alternative hypothesis (H1):

There is a significant difference in the mean response scores for at least one of the statements.

3.12 : Research questions:-

1. What impact does micro-segmentation have on pharmaceutical marketing strategies?

2. What is the role of digital behavioural data in shaping hyper-personalized brand propositions?

3. How powerful is micro-segmentation in comparison to traditional segmentation methods in pharma marketing?

4. What are the challenges in pharmaceutical companies adopting AI-driven segmentation models?

Major research question:- How does micro-segmentation, driven by digital behavioural data, impact the effectiveness of pharmaceutical brand communication compared to traditional segmentation methods?

3.13 : PICO ANALYSIS

Table 3.1: PICO analysis

PICO Element	Detailed Description
P – Population / Problem	Pharmaceutical companies, brand managers, marketing strategists, and digitally active healthcare professionals (HCPs) or patients targeted by brand communications.
I – Intervention / Exposure	Implementation of **micro-segmentation models** utilizing **digital behavioural data.**
C – Comparison	Use of **traditional segmentation methods** such as demographic, geographic, or psychographic profiling without real-time digital Behaviour integration.
O – Outcome	Improved **effectiveness of brand communication** measured by metrics such as: engagement rate, message relevance, conversion rate, ROI, HCP/patient satisfaction, and adherence Behaviour.

3.14 : Inclusion Criteria's

The inclusion criteria are designed to capture studies that directly address the PICO framework, ensuring relevance and rigor. The following table summarizes the inclusion criteria:

Table 3.2: Inclusion criteria's

Criteria	Description
Population	Include studies involving pharmaceutical companies, brand managers, marketing strategists, HCPs, or patients targeted by brand communications, ensuring applicability to the research context.
Intervention	Include studies implementing micro-segmentation models using digital behavioural data (e.g., online search Behaviour, clickstream data, social media activity, CRM logs, eRx trends), as this is the key intervention.
Comparison	Include studies comparing micro-segmentation with traditional segmentation methods (e.g., demographic, geographic, psychographic profiling), necessary for evaluating relative effectiveness.
Outcome	Include studies reporting on brand communication effectiveness metrics such as engagement rate, message relevance, conversion rate, ROI, satisfaction, or adherence Behaviour, aligning with the research outcomes.
Language	Include studies published in English for practicality, given the common language of scientific publications.
Publication Date	Include studies from all dates to ensure comprehensive coverage, with no restriction.
Publication Type	Include peer-reviewed articles, conference proceedings, and theses, as they typically report original research and undergo scrutiny for quality.

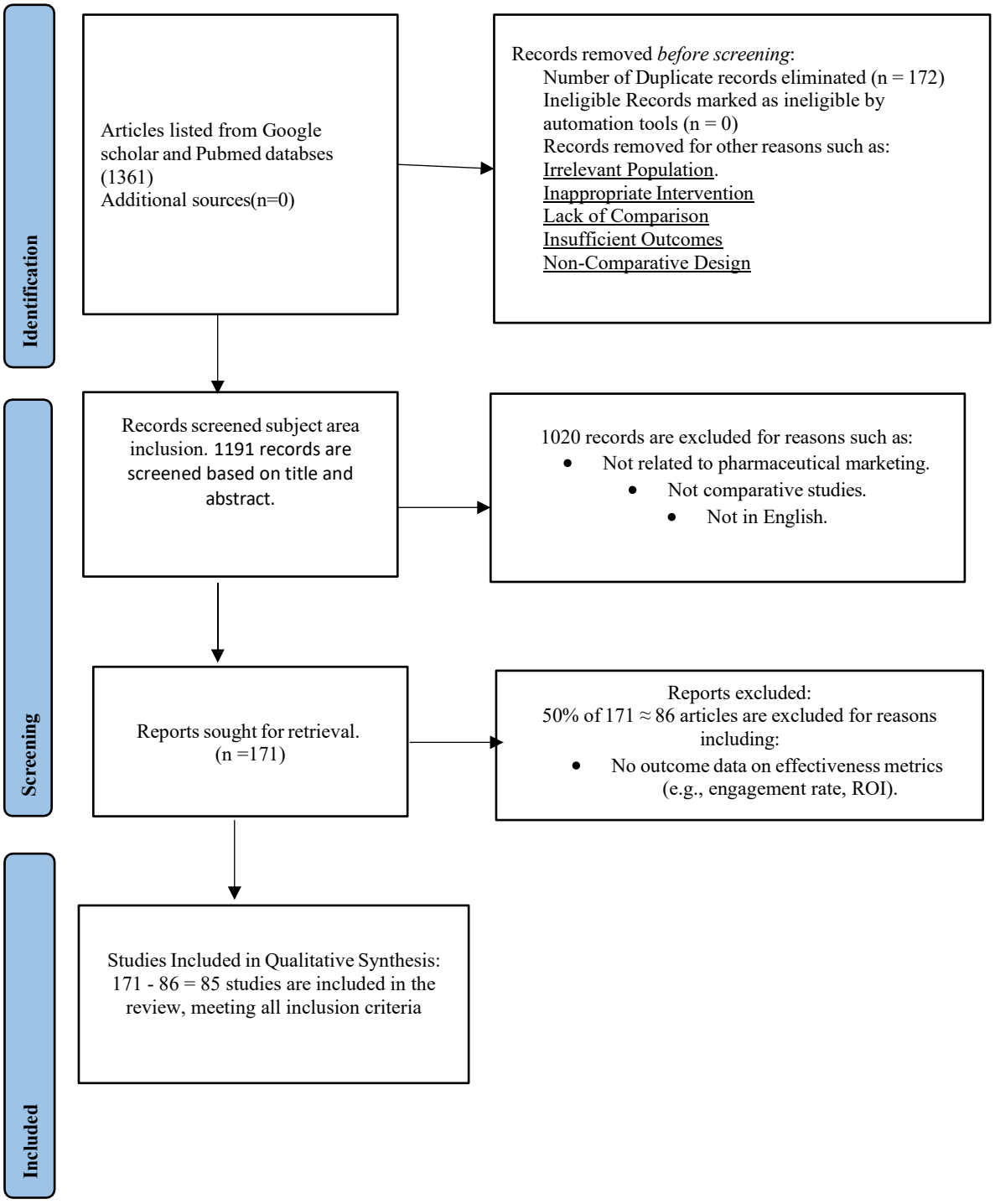
3.15 : Exclusion Criteria’s

The exclusion criteria are designed to filter out studies that do not meet the research question's requirements, ensuring focus and quality. The following table summarizes the exclusion criteria:

Table 3.3: Exclusion criteria’s

Criteria	Description
Population	Exclude studies not involving pharmaceutical marketing or the specified population (e.g., general marketing, non-pharmaceutical industries), as they are not relevant.
Intervention	Exclude studies not using micro-segmentation with digital behavioural data, as they do not address the intervention of interest.
Comparison	Exclude studies without a comparison group or not comparing to traditional segmentation methods, as they cannot evaluate relative effectiveness.
Outcome	Exclude studies not reporting on specified effectiveness metrics (e.g., engagement rate, ROI), as they do not provide relevant data.
Language	Exclude non-English studies unless translation resources are available, due to practical constraints.
Publication Type	Exclude non-peer-reviewed sources (e.g., grey literature, unless specified), as they may lack rigor.
Duplicates	Exclude duplicate publications to avoid double-counting data and ensure unique studies are included.

3.16 : PRISMA FLOW CHART:



CHAPTER-4

RESULTS

4.1 SECONDARY DATA:-

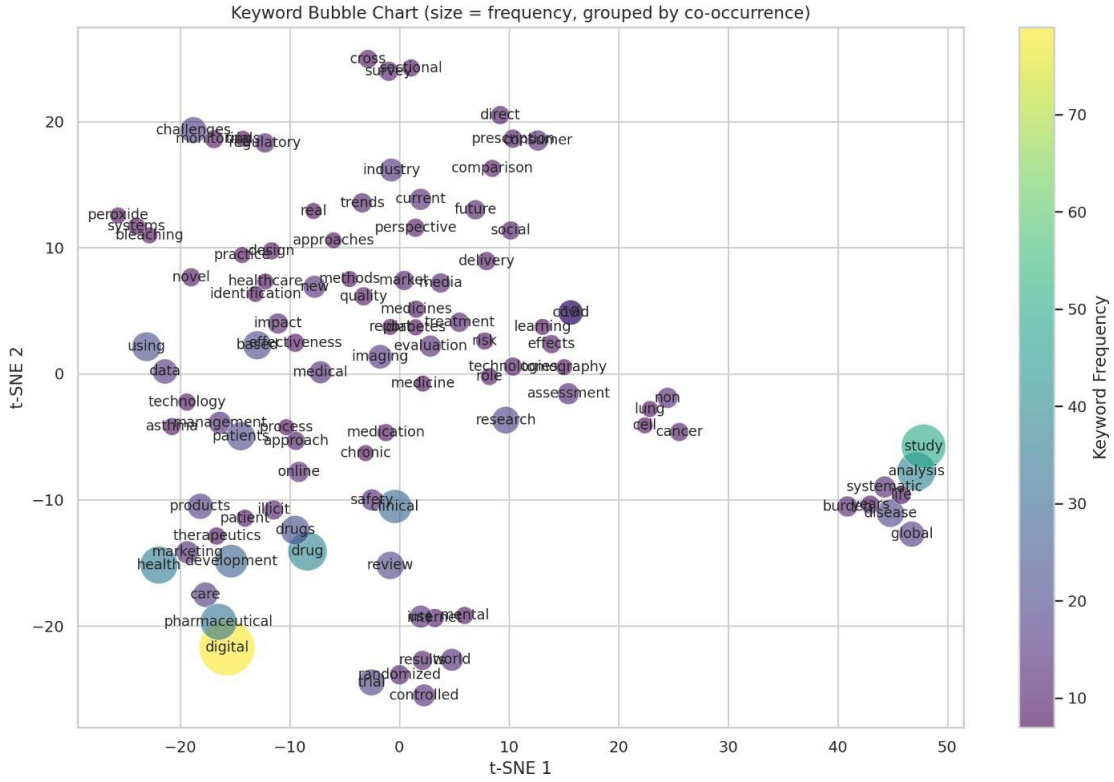


Fig 4.1.1: Key word bubble chart google scholar data

This keyword bubble chart paints a visual story about the most talked-about themes in recent pharmaceutical and healthcare-related research. Each bubble represents a word used across many studies, and the bigger the bubble, the more often that word appears. The brighter colors (like yellow) show high-frequency terms, while the darker shades (purple) highlight less frequently mentioned words.

At the heart of this map is the word **"digital"**, standing out in size and brightness, showing how central digital technology has become in healthcare discussions. Words like **"marketing," "drug," "study,"** and **"pharmaceutical"** also appear prominently, indicating strong focus areas such as digital pharma marketing, drug development, and scientific research.

You'll notice words like **"customer," "value," "innovation," "machine,"** and **"care"** clustered around key topics. This suggests a growing interest in how innovation, artificial

intelligence, and data-driven strategies are reshaping patient experiences and healthcare business models.

By visually grouping these terms, the chart shows not only what's being studied, but how different themes are connected. It brings to life the growing conversation around digital transformation in health—from clinical research to patient engagement—making it easier for researchers and marketers to see where the field is headed.

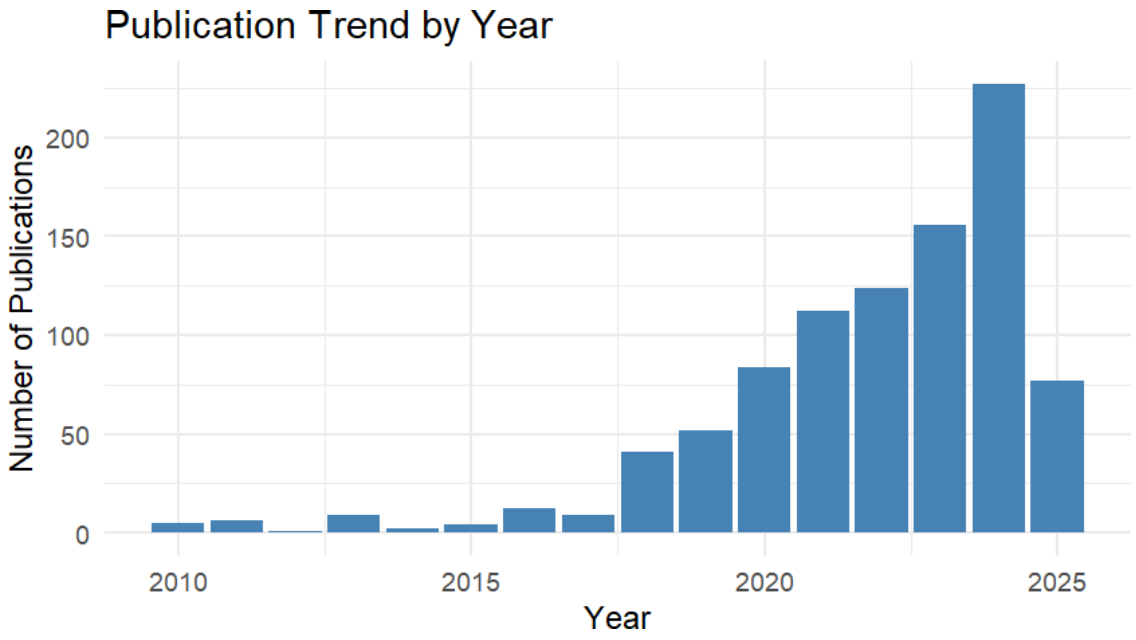


Fig 4.1.2: Publication trend by year of google scholar data

This is a bar graph representation of the number of publications . The publication trends data which is been taken out from the 965 literatures where we can see the papers which are published recently are much more than 10-15 years back, which shows the research on the main question which was : How does micro-segmentation, driven by digital behavioural data, impact the effectiveness of pharmaceutical brand communication compared to traditional segmentation methods? Is more happening than before. AI and ML also the targeted marketing are the current trends.

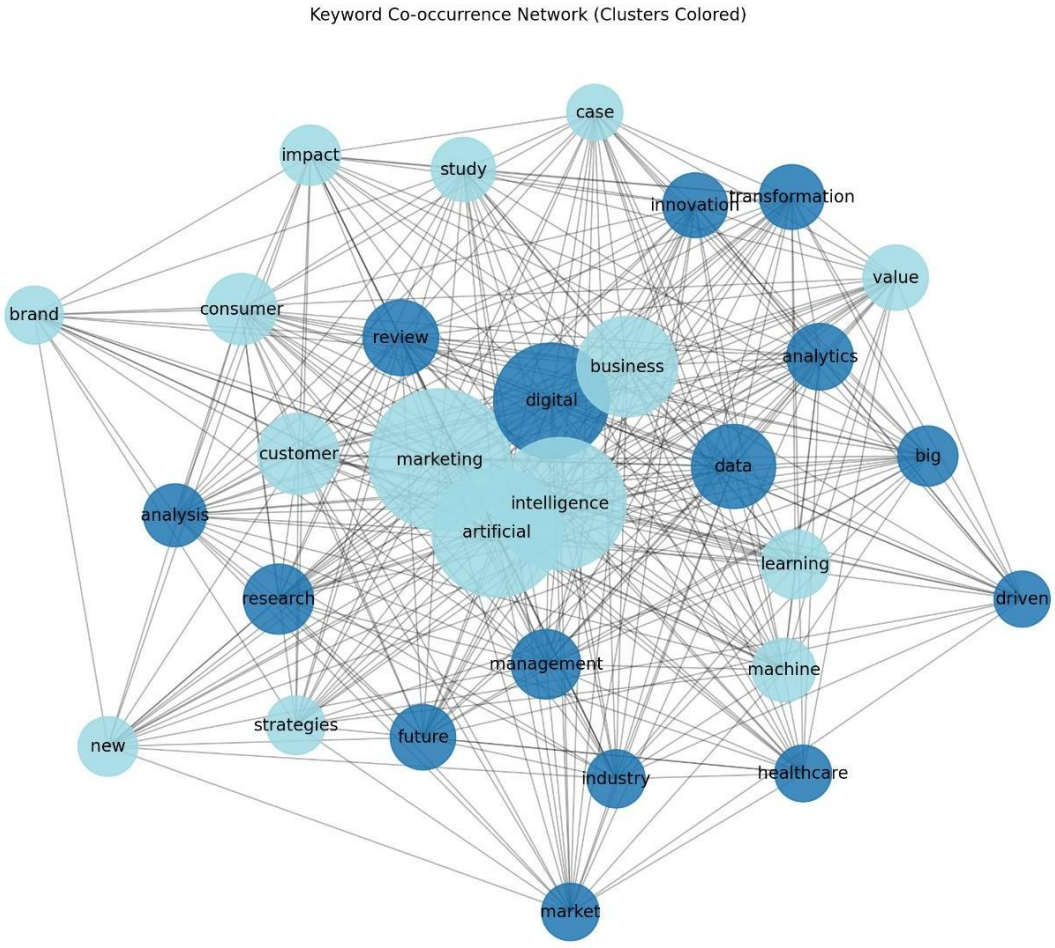


Fig 4.1.3: Key word co-occurrence of google scholar data

It **visualizes keyword co-occurrence in a circular layout of google scholar data** . This graph visually captures the **language of modern pharmaceutical marketing** and helps us understand how key concepts are interconnected in real-world research and communication.

At the center of the network, we see larger bubbles like **"marketing," "digital," "artificial," and "intelligence."** Their size and central placement show that these are the most common and widely discussed terms—reflecting how deeply digital transformation and AI are embedded in today's pharma conversations.

Each color represents a natural cluster of ideas that tend to appear together. For example:

- The **dark blue cluster** includes terms like **"analytics," "machine," and "healthcare,"** suggesting a strong connection between health data processing and technology.
- The **sky blue group** focuses on terms like **"consumer," "customer," and "brand,"** which represent the shift toward personalized marketing and user engagement.

- The **light blue cluster** brings in future-facing ideas like **"transformation," "innovation," and "strategies,"** highlighting where the industry is heading.

Fig 4.1.4: Word cloud of tittle from google scholar data

Based on **the google scholar data of 965 literatures the word cloud of tittles** is made where we can see the most occurring themes and patterns among which the most used words are intelligence, marketing, artificial , digital, business, customer , data etc. By this cloud, understanding of which terms are used more can be known from the literatures based on the Research question.

The other words are innovation, review, analysis, strategies, future , analytics, research.

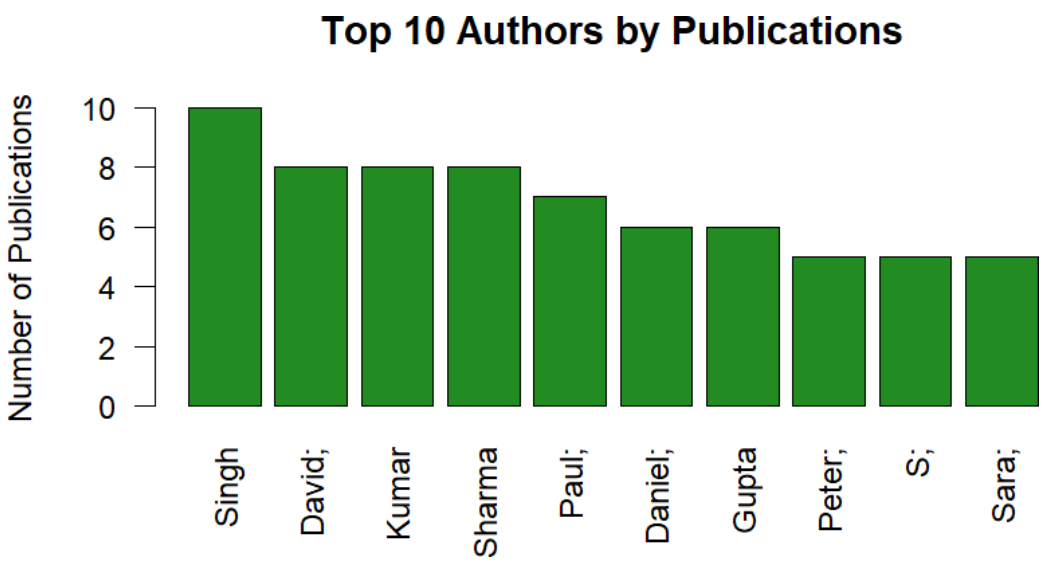


Fig 4.1.5: Top 10 authors by publications of google scholar data

Key Contributors: Researchers like Scar Dovi, Dwivedi, Huang, Rust, and Rosário stand out as some of the most active voices in this dataset, each contributing 3 publications. It's clear they're deeply invested in exploring AI, marketing, and pharmaceuticals, which really reflects the core themes of the dataset.

What They're Studying: The titles of their works, such as *Artificial Intelligence in Service* and *Data-Driven Decision-Making in Marketing*, show they're diving into how AI shapes marketing and business, especially in areas like pharmaceuticals and digital transformation. It's fascinating to see their focus on these cutting-edge topics.

Working Together: Huang and Rust often team up on their papers, which highlights how collaboration plays a big role in their work. It's a reminder of how researchers often join forces to tackle big ideas, something you see a lot in academia.

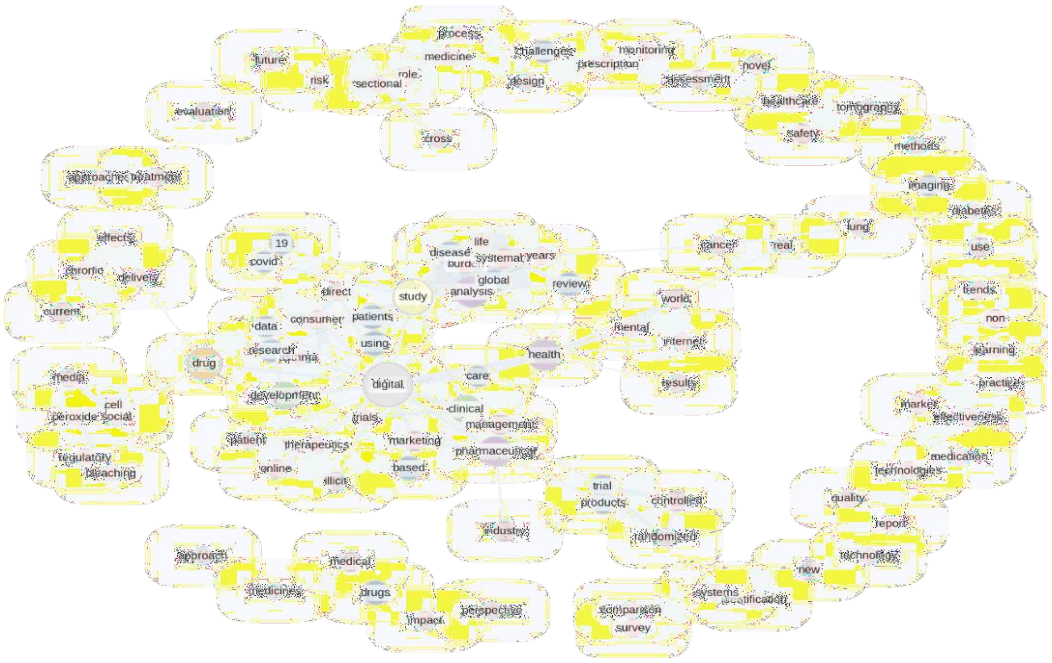


Fig 4.1.6 : Bibliometric Network of PubMed Id data

This graph paints a vivid picture of how the world of healthcare and pharmaceuticals is evolving through digital transformation. At the center, we see the most frequently discussed themes—**"digital," "health," "drug," "study," and "marketing"**—which shows that today's conversations revolve around how digital tools are changing the way medicines are developed, marketed, and accessed by people.

The lines connecting these keywords show how deeply these topics are interlinked. For example, terms like **"clinical," "trials," "patients," and "care"** are closely tied to **"digital"**, highlighting how online platforms and technologies are becoming part of patient care and clinical management. On another side of the graph, we see emerging tech terms like **"AI," "machine learning,"** and **"neural"** clustering together, showing how innovation is driving smarter and more personalized healthcare.

There's also a visible connection to pandemic-related shifts—**"COVID-19," "safety," "internet," and "access"**—pointing to how the industry quickly adapted during times of crisis. This graph reminds us that the future of pharma is not just about medicine—it's about smarter communication, deeper patient understanding, and ethical digital engagement.

Each graph provides a unique perspective on the bibliometric analysis, collectively offering insights into thematic clusters, keyword prominence, temporal trends, and research interconnections.

4.2 PRIMARY DATA: -

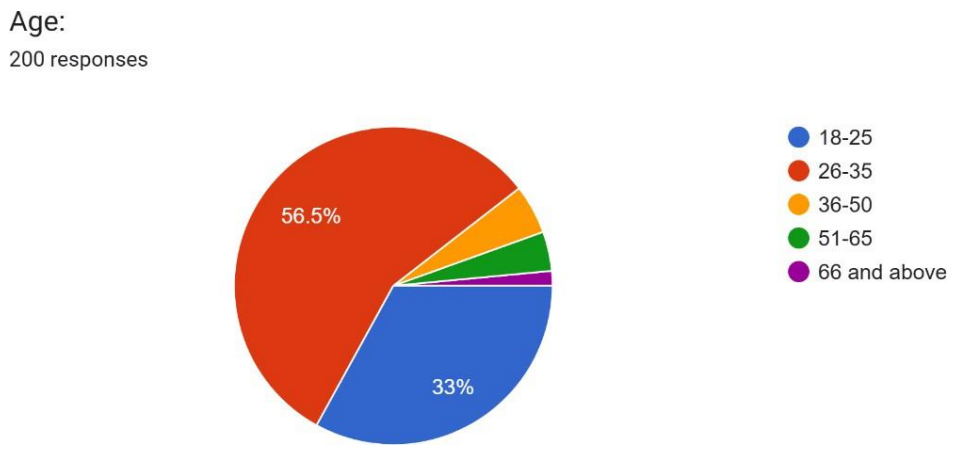


Fig 4.2.1: Age group of respondents

This pie chart illustrates the age distribution of the 200 individuals who participated in the survey. The largest segment, representing 56.5% of the respondents, falls within the 26-35 age group. Following this, 33% are in the 18-25 age bracket. The older age groups are represented by smaller proportions: 36-50 years constitute a smaller segment, followed by 51-65 years, and the smallest group is those aged 66 and above.

This age distribution is crucial for understanding the context of the other survey responses. For instance, when analysing the impact of online reviews (Graphs 1 & 2), it would be insightful to know if the younger, more digitally native age groups are more likely to be influenced by online feedback compared to older demographics. The significant representation of the 26-35 and 18-25 age groups suggests that the survey findings might be particularly reflective of the opinions and behaviours of younger adults.

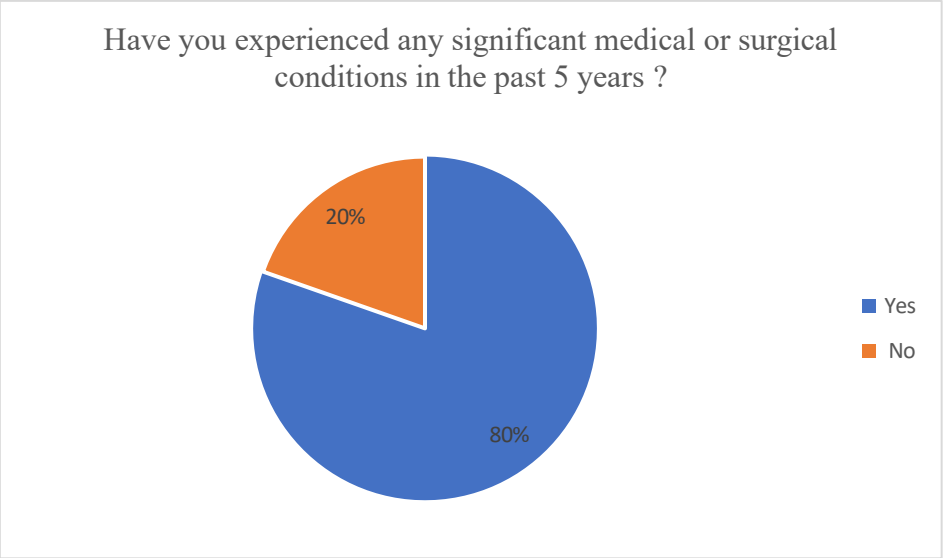


Fig 4.2.2: Significant medical or surgical conditions of the stakeholders in the past 5 years

This pie chart shows that the 80% of the respondents did not experienced any medical or surgical conditions and rest 20% have experienced it.

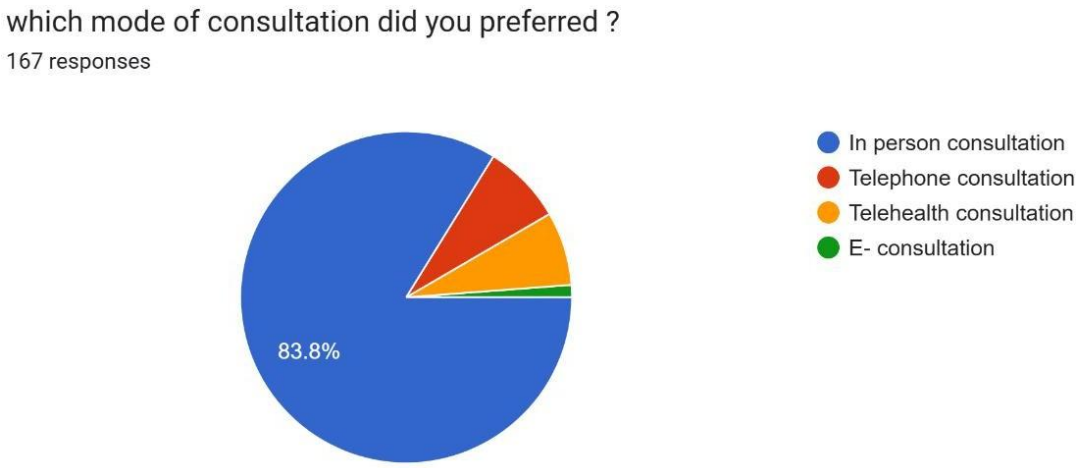


Fig 4.2.3: Mode of consultation preferred

based on 167 responses, The overwhelming preference is for in-person consultation, accounting for a substantial 83.8% of the responses. The other modes of consultation – telephone consultation, telehealth consultation, and e-consultation – represent much smaller proportions of the preferences.

Telephone consultation is the next most preferred option, followed by telehealth consultation, with e-consultation being the least preferred among the given choices. This strong inclination towards in-person consultations suggests that despite the increasing availability and adoption of remote healthcare options, a significant majority of individuals still value and prefer the traditional face-to-face interaction with healthcare providers. This could be due to various factors, including the perceived level of personal attention, the ability for a more thorough physical examination, or simply a matter of established comfort and trust in the traditional setting. The relatively low preference for telehealth and e-consultation might indicate areas for improvement in user experience, accessibility, or awareness to increase their adoption.

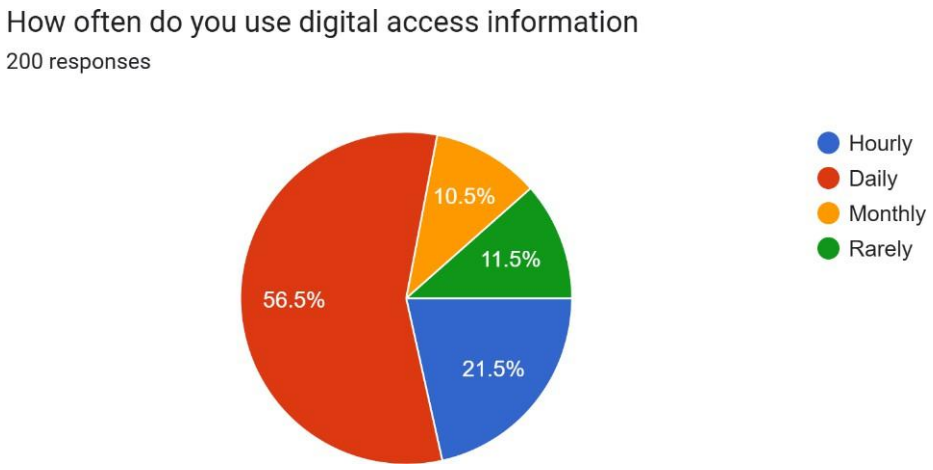


Fig 4.2.4 : Usage of digital access information

based on 200 responses, quantifies the regularity with which individuals engage with digital information. A substantial majority, 56.5%, report using digital information on a daily basis, underscoring the pervasive integration of online resources into daily routines. A further 21.5% access digital information hourly, indicating a segment with near-constant connectivity and reliance on online sources. In contrast, 10.5% access digital information monthly, and 11.5% rarely do so, representing smaller portions of the surveyed population with less frequent engagement with the digital realm. This distribution highlights the increasing importance of digital literacy and access in contemporary society, with a significant proportion of individuals actively and frequently utilizing online resources.

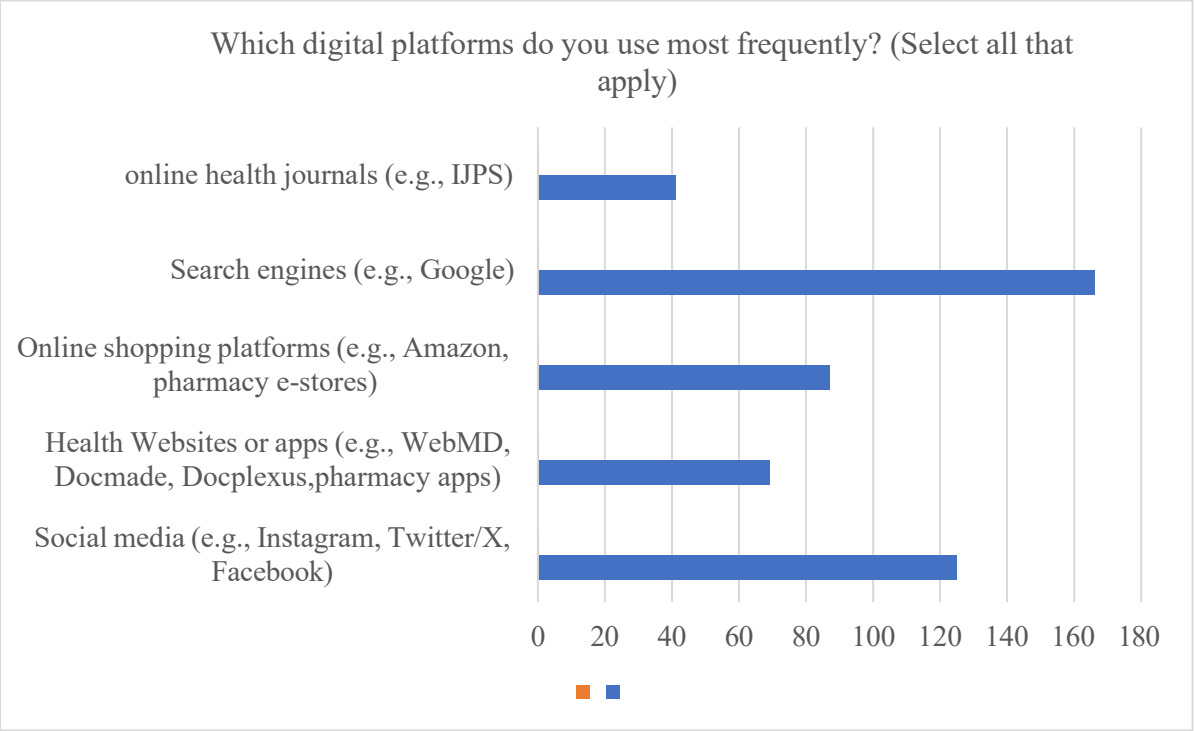


Fig 4.2.5: Digital platforms used most frequently

This horizontal bar chart investigates the frequency of use of various digital platforms for information seeking. The data, although the exact number of responses for this specific question isn't explicitly stated, reveals a clear hierarchy in platform preference. Search engines (e.g., Google) exhibit the highest usage, indicating their pivotal role as the primary gateway for digital information access. [1] Following this, online shopping platforms (e.g., Amazon, pharmacy e-stores) also demonstrate significant usage, suggesting that consumers frequently encounter and potentially seek information within these transactional environments. [2] Health websites or apps (e.g., WebMD, Docmade) show a moderate level of utilization, highlighting a segment of users who actively seek health-specific digital resources. Online health journals (e.g., JIPS) present the lowest usage among the listed options, likely reflecting their more specialized nature and relevance primarily to researchers or healthcare professionals rather than the general public. Social media platforms (e.g., Instagram, Twitter, Facebook) also show a relatively lower usage in this context compared to search engines and online shopping platforms, implying they might not be the primary source for in-depth information but could play a role in broader awareness or discussions.

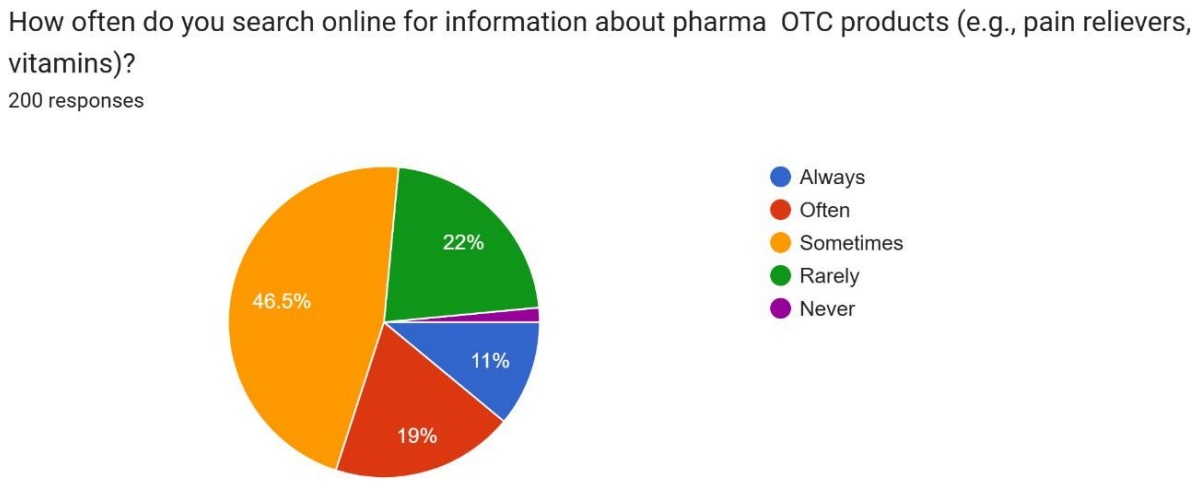


Fig 4.2.6: Duration of search online for information about OTC products

Examining the 200 responses in this pie chart, we observe the frequency with which individuals actively search online for information specifically about over-the-counter (OTC) pharmaceutical products. A notable 46.5% report searching "sometimes," indicating a context-dependent information-seeking Behaviour. Following this, 22% "rarely" engage in such searches, and 19% do so "often," suggesting a segment that proactively seeks online information before considering or purchasing OTC products. A smaller 11% "always" search online for OTC information, highlighting a highly engaged and potentially cautious consumer group. Finally, a very small fraction (indicated by the thin purple slice) report "never" searching online for this type of information. This distribution suggests that while a significant portion of consumers engage in occasional online research for OTC products, it's not a universally

consistent Behaviour.

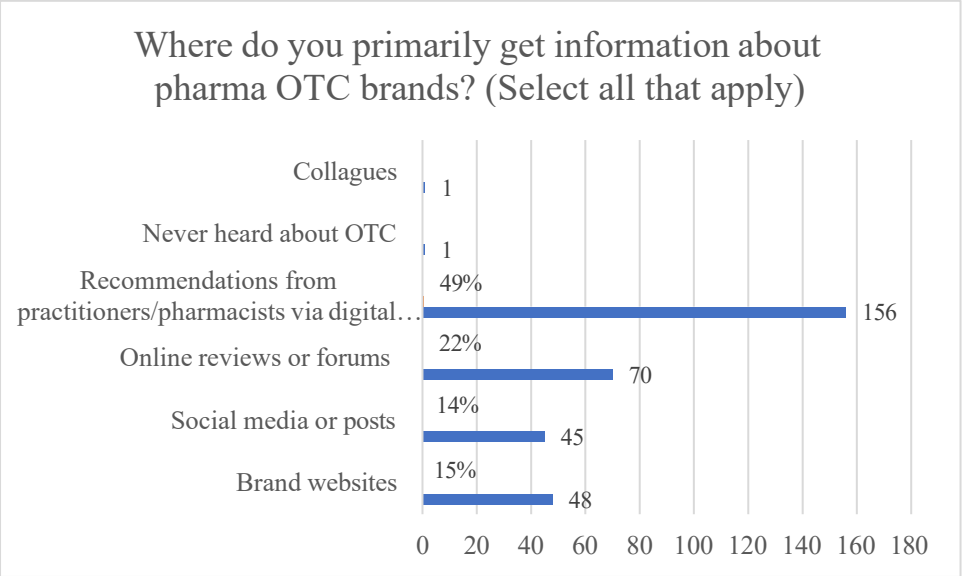


Fig 4.2.7: Information source for pharma OTC brands

This horizontal bar chart explores where individuals primarily obtain information about OTC pharmaceutical brands. Online reviews or forums emerge as the most significant source, indicating the powerful influence of peer opinions and shared experiences in shaping perceptions of OTC brands. Recommendations from practitioners/pharmacists via digital platforms also show a substantial level of influence, highlighting the importance of professional endorsements in the online space. Brand websites are utilized by a considerable number of respondents, underscoring the need for pharmaceutical companies to maintain informative and trustworthy online presences. Social media or vertical (category) specific platforms show a moderate level of information sourcing, suggesting their growing, but not yet dominant, role in OTC brand discovery. Interestingly, "colleagues" and "never heard about OTC" represent the lowest levels, implying that word-of-mouth in a direct professional setting and a complete lack of awareness are less common in the context of information gathering.

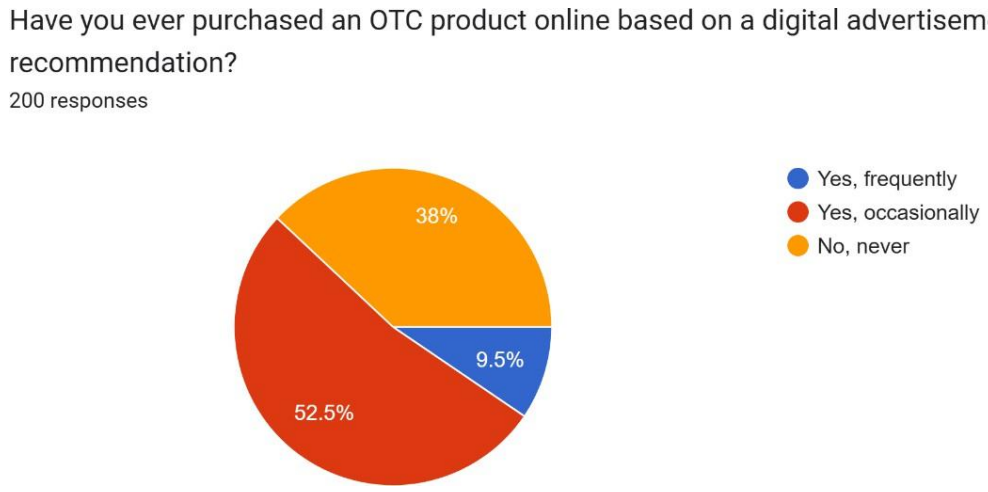


Fig 4.2.8: Frequency of purchasing OTC products based on digital advertisement or recommendation

This pie chart, based on 200 responses, investigates the impact of digital marketing on the actual purchase of OTC products online. A significant 52.5% report having purchased an OTC product online "occasionally" based on a digital advertisement or recommendation, demonstrating the persuasive potential of online marketing efforts. A smaller but still notable 9.5% report doing so "frequently," indicating a segment highly responsive to digital cues in their purchasing decisions. Conversely, 38% state that they have "never" purchased an OTC product online based on a digital advertisement or recommendation, suggesting a degree of scepticism or reliance on other information sources for their online OTC purchases. This data highlights that digital marketing can indeed drive online OTC sales, but its effectiveness varies

Across the consumer base.

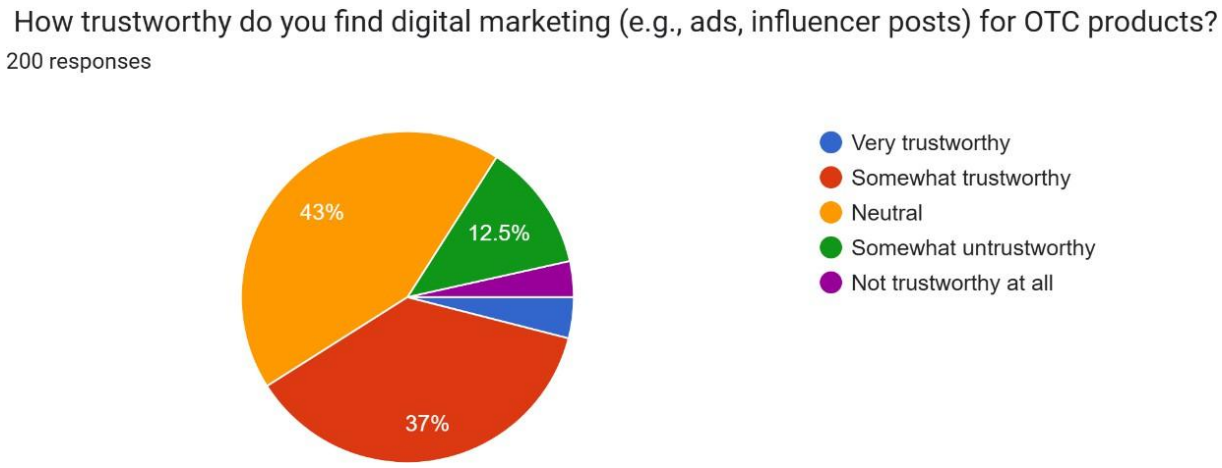


Fig 4.2.9: Trustworthiness of digital marketing for OTC products

This pie chart, with 200 responses, delves into consumer perceptions of the trustworthiness of digital marketing for OTC products. A plurality, 43%, hold a "neutral" stance, suggesting a cautious or undecided perspective towards online promotions. A substantial 37% find digital marketing "somewhat untrustworthy," indicating a prevalent scepticism towards online advertisements and influencer posts in this domain. Only a small fraction, 3.5%, find it "very trustworthy," highlighting a significant challenge for digital marketers in building credibility. Another 12.5% find it "somewhat trustworthy," while 3.5% perceive it as "not trustworthy at all." This distribution underscores the need for transparency and authenticity in digital

Marketing strategies for OTC products to overcome consumer hesitancy and build trust.

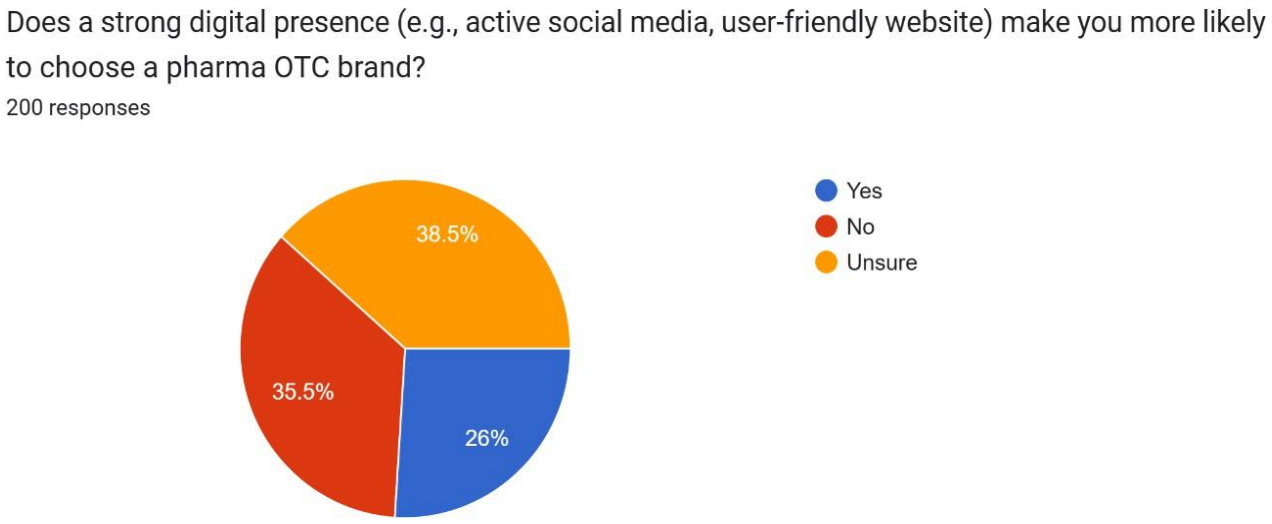


Fig 4.2.10: Factors like strong digital presence make more likely to choose a pharma OTC brand.

With 200 responses, examines whether a strong digital presence influences consumers' likelihood of choosing a pharma OTC brand. A considerable 38.5% are "unsure," indicating that a brand's digital footprint is not a decisive factor for this segment. A further 35.5% state that a strong digital presence does "not" make them more likely to choose a brand, suggesting that other factors like product efficacy or traditional reputation might hold greater sway. However, 26% report that a strong digital presence (e.g., active social media, user-friendly website) does make them more likely to choose a brand. This suggests that while not the dominant factor for all, a robust online presence can positively influence a significant portion of consumers in their OTC brand selection.

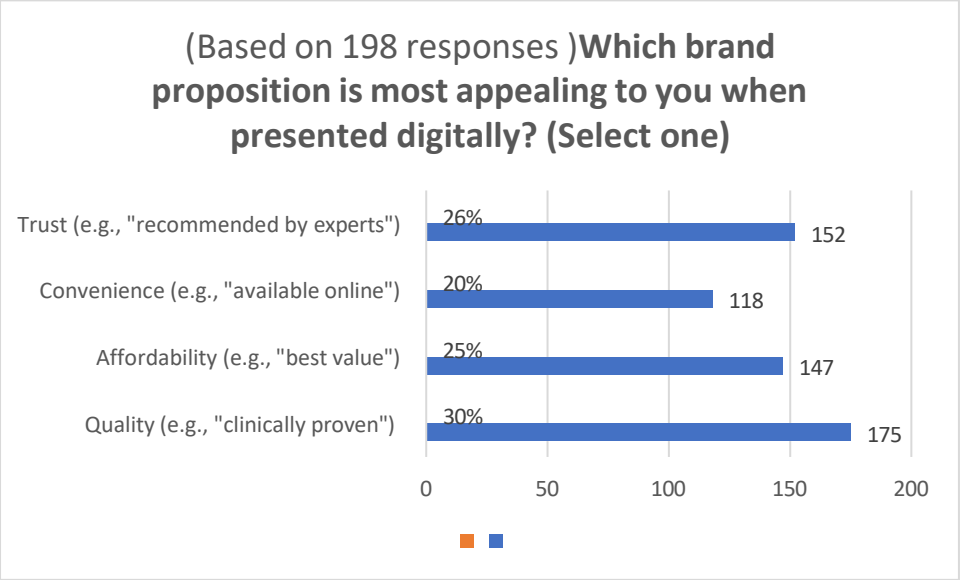


Fig 4.2.11: Brand proposition which is the most appealing

This horizontal bar chart, based on 198 responses, explores which value proposition is most appealing to consumers when presented digitally for over-the-counter (OTC) brands. “Quality(e.g., “clinically proven”) appears to be the most responded brand proposition with 175 responses, following to this "Trust (e.g., 'recommended by experts')" emerges as the most appealing factor by a significant margin. This underscores the critical importance of credibility and authority in the digital space for OTC products. Consumers appear to be heavily influenced by endorsements or recommendations from perceived experts when encountering information online. "Convenience (e.g., 'available online')" also holds considerable appeal, highlighting the value proposition of accessibility and ease of purchase that the digital realm offers for OTC medications. "Affordability (e.g., 'best value')" shows a moderate level of appeal, suggesting that while price is a factor, it might be secondary to trust and convenience in the digital context for health-related products. Lastly, This might indicate that consumers expect a baseline level of quality for health products and are more swayed by trust cues and ease of access in the digital environment.

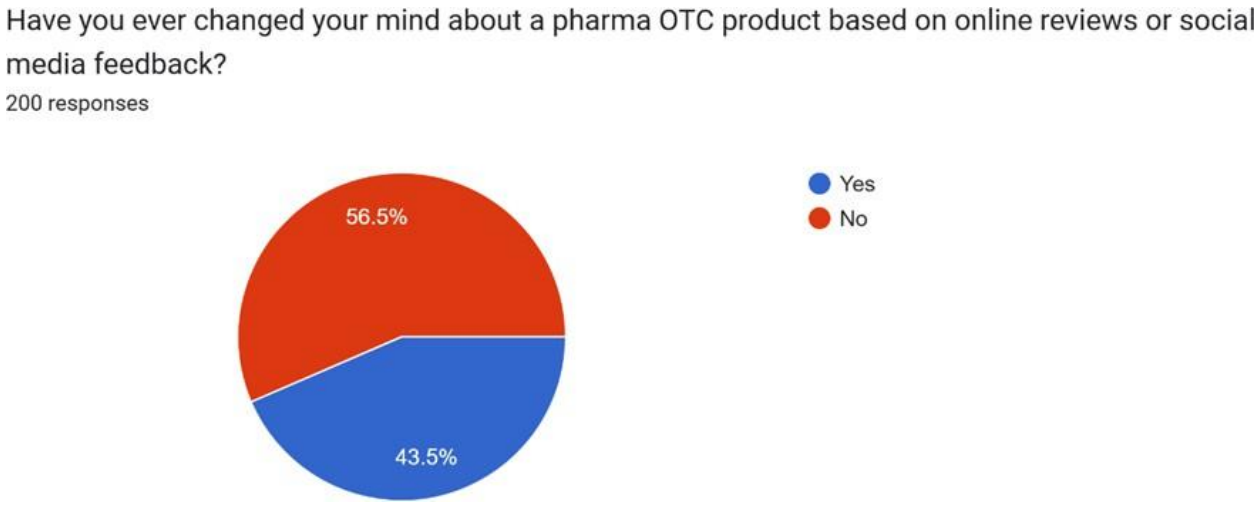


Fig 4.2.12: % of Respondents who have changed there mind about a pharma OTC product based on online reviews or social media feedback

With 200 responses, the data reveals that a significant portion of respondents are influenced by online opinions when it comes to over-the-counter (OTC) medications. Specifically, 43.5% indicated that they have changed their mind based on online reviews or social media feedback, while a larger 56.5% reported that they have not.

This suggests that while a considerable number of individuals are open to being swayed by online sentiment regarding OTC products, a majority still rely on other factors or maintain their initial decisions. The 43.5% figure, however, highlights the growing importance of online reputation and social proof in the healthcare consumer's decision-making process, even for non-prescription medications. This trend underscores the need for pharmaceutical companies to monitor and potentially engage with online conversations surrounding their products to understand and address consumer perceptions.

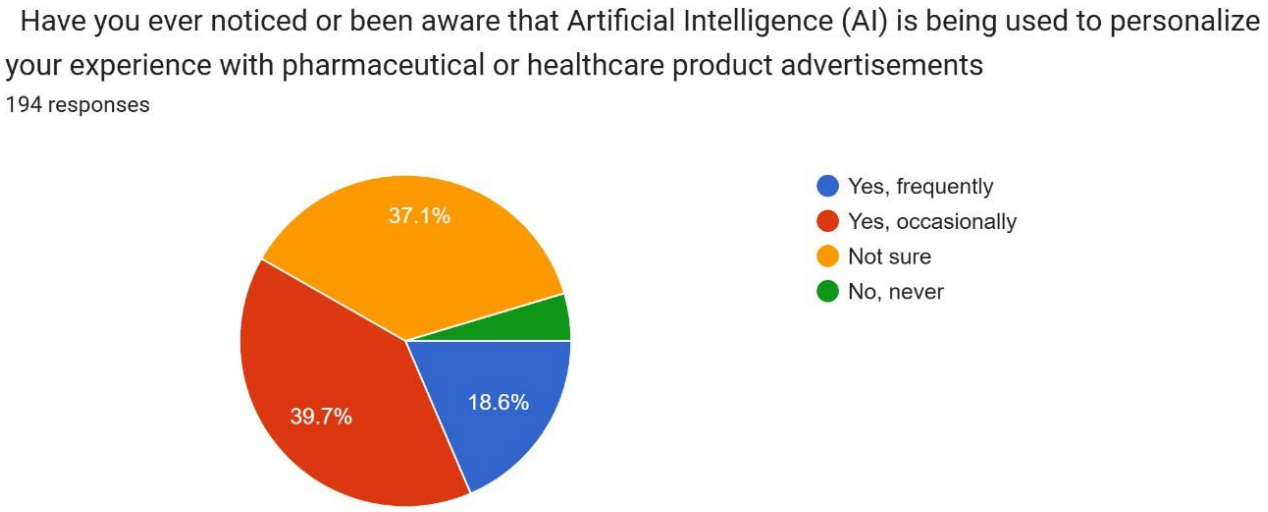


Fig 4.2.13: % of Respondents noticed or been Aware of AI been used to personalize there experience with pharmaceutical or healthcare product advertisements.

derived from 194 responses, investigates consumer awareness regarding the use of Artificial Intelligence (AI) to personalize their experience with pharmaceutical or healthcare product advertisements. A substantial 39.7% report being "not sure" if AI is used for personalization, indicating a lack of clear understanding or awareness of this technology's application in advertising within this sector. Following closely, 37.1% state they have "occasionally" noticed or been aware of AI-driven personalization. A smaller 18.6% report noticing it "frequently", suggesting a segment that is more attuned to or encounters personalized ads more often. Finally, a small fraction, 4.6%, indicate that they have "never" noticed or been aware of AI being used for this purpose. This data highlights a general lack of strong awareness among consumers regarding the use of AI in personalizing pharmaceutical and healthcare advertisements, which could have implications for transparency and consumer understanding of digital marketing practices in this sensitive domain.

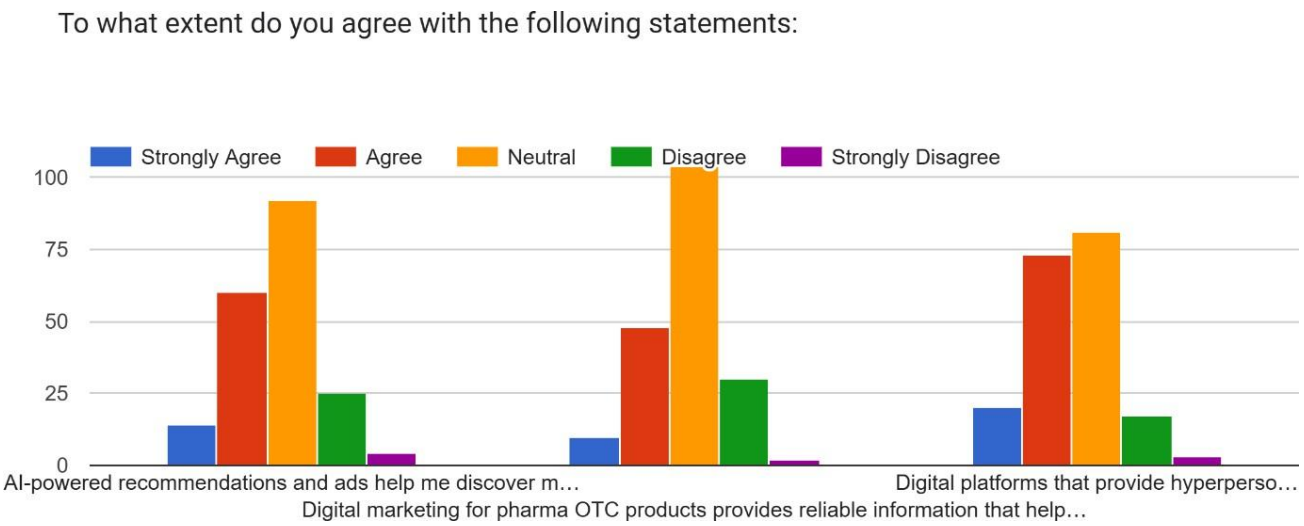


Fig 4.2.14: Extent of agreement with the statements

This bar chart presents the extent of agreement across 200 responses for three distinct statements related to AI and digital marketing for OTC products.

The first statement, "AI-powered recommendations and ads help me discover more relevant pharma OTC products," elicits a mixed response. A significant portion remains "neutral," while "agree" and "disagree" also have notable representation. "Strongly agree" and "strongly disagree" show lower levels of endorsement. This suggests that while some consumers find AI helpful in product discovery, a considerable segment is either unconvinced or has not had strong positive or negative experiences.

The second statement, "Digital marketing for pharma OTC products provides reliable information that helps me make informed decisions," faces significant scepticism. A large majority are "neutral" or "disagree," with a smaller number "agreeing." "Strongly agree" has minimal support, while "strongly disagree" shows a moderate level of endorsement. This reinforces the earlier finding about the trustworthiness of digital marketing for OTC products, indicating a need for greater transparency and evidence-based information in online promotions.

The third statement, "Digital platforms that provide hyper-personalized information about pharma OTC products feel intrusive," garners a strong level of agreement. A significant number "agree" and "strongly agree," while a considerable portion remains "neutral." "Disagree" and

"strongly disagree" have the lowest representation. This suggests that while personalization might offer relevance, there's a fine line, and many consumers perceive hyper-personalization in the context of health-related products as potentially intrusive, raising concerns about privacy and data usage.

Collectively, these graphs indicate that while digital platforms are important for information and convenience in the OTC space, trust remains a significant concern regarding digital marketing. Consumers are generally not highly aware of AI-driven personalization, and when it comes to OTC products, there's a notable scepticism about the reliability of digital marketing information and a concern about the intrusiveness of hyper-personalization. Building trust and ensuring transparency will be crucial for the effective and ethical use of digital marketing and AI in the pharmaceutical OTC sector.

Table 4.1: Responses of what improvement could be done to digital platforms

Genuine review by the patient of that particular medicine
Mentioning indications clearly
by adding good visuals and clinical impacts
More user friendly
One way digital platforms could improve is by providing clear, personalised comparisons of OTC brands based on symptoms, ingredients, and user reviews and all in one simple view.
One effective way digital platforms could improve how they present pharma OTC brand information is by personalizing content based on user Behaviour and needs. For example, platforms can use AI-driven algorithms to recommend OTC products based on a user's search history, health interests, or symptom checkers. This would not only make the information more relevant but also improve the user experience by reducing the effort needed to find suitable products. They could also incorporate: • Interactive visuals (e.g., symptom-to-product match tools) • Clear, jargon-free explanations • Comparison charts for similar products • User reviews and real-world usage tips Would you like me to tailor this idea more towards HCPs, consumers, or marketing teams?
Brand should focus on quality
Digital platform promotes the Pharma brands ,helps peoples to know about the market scenario .
1mg google
Just make it simple
H
By showing the ingredients that have been used and the proportion of it.
If they marketed common product more in trying media like social pages rather than tv ads

No opinion

Social media platform is better way to contact and advertise a product . So more one would aware of these products

Don't know, but digital is not trustworthy at all

Tata 1mg give much answer about any medicine

They mention also the benefits and at the same time adverse drug reactions in the local language .so they could be help a local or not much educated people or person to drug really help or not

Marketing

Protein power ,ORS

Should be Recommended from specialist

no suggestion

No hiding of facts

By offering personalized, interactive comparison tools.

Good questions

Personalised and specified symptoms and other condition based navigation.

they can use many sorts of things but one of them are visually better presentations as per the tier cities and rural towns and villages, the micro-segmentation wise reach is very important to deliver right message at right time to right person.

they can use more user friendly assistants

More awareness

by involving more in intellectuality

it is very good at its current stage

Instead of just listing products, the platform could have a "Symptom Checker" or "Virtual Assistant" that asks users a few quick questions (e.g., “What symptoms are you experiencing?” and then curates OTC options based on: Symptom relevance , Age group , K Product reviews and ratings ,Usage instructions and precautions

good interactive one will be helpful

Information regarding drugs

Medline

They need to tell everything correct and instead of spending on endorsements, they should make things more informative

By social media and other communication media

According me digital platforms obviously play role in awareness but recently it has only became a money making market. Rather focusing on brand it will we great to convey actual need of the constituents used. Stupid build up given to products especially by so called influencers from medical field /paramedical field. It's about how genuinely to come up with matter than falsely giving information .

Advertisement should always attract to consumer through emotionally and Affordability

Good translated videos for better understanding on brands

Yup

One way digital platforms could improve how they present pharma OTC brand information is by personalizing content based on user needs and symptoms.

.

Better videos and visuals of brand

Good influencers appearance

by giving better understanding of brand in otc.
mind captivating video.
Good marketing in terms of people perception
Addition of more scientific data in it
Good interactive and posters
None
Advertisement
Don’t know
..
Any
New ideas for segment wise customers
More data set for the products
Online community building
social media presence can be more
More presence of information
deeper analysis for the people algorithms
Others
By making impactful & emotional brand advertisement & delivering of clear message.
No suggestions

-
.
I need a face(like food harmer, not actors) to trust a product, so them in your platform and make your platform non medico friendly, a lot of chemical/molecule names in the web page just makes me uncomfortable
good demonstration of products and its safety measures are must to show
Any
Very good
Good
I have less idea about the digital information but will gain more idea
Online
brand propositions in digital platforms can be more such as relativity and interconnectivity with other items
Social
Along with Dr, review by people using it.
They should provide an review and user-friendly interface
Na
Apps & ads
Through Ads
Social media
ok
Currently most of ai module are untrained and web information not properly organised with user type... User category based design is necessary
Apollo pharmacy

Authenticity of ingredients used and approved by trusted experts

With real time case study and data to build trust.
digital branding is the useful method and by using such methods the segmentation of customers would be easy
The digital platforms are progressing at a good pace and need to involve influencers
customer oriented design for better understanding and consumption
None otc
Make it more precise and algorithmic
more scientific videos would be good
Nothing all good
Price should be affordable
mind mapping for customer satisfactions understanding
opportunistic methods by one to one interaction, can be a good option.
advertisements can help to improve the activities
good Multivitamin and nutraceuticals adds can help
task oriented which can help to entertain and get gifts at the same time , this promotes the company brand
Making cooperative marketing techniques
seasonal marketing for different different persons
it is fine
decision making ability
space between the users and the marketers for great results
Input of additional set of advices and concepts digitally can enhance the perception and also will be convenient for the customer
new approaches with government
opportunities for customer to think better and make better decisions
do some events
Verified User Reviews
person Symptoms Based Filters which can automatically give some BETTER INFORMATION
you can add educational contents also
Language options
demand as per need
Interaction is possible to increase
Facts backed with Research
clear and concise way of delivering the product to respected consumers
Drug side effects warnings
aids for comfortable reaching and adapting to the product
clinical guidelines
Trustworthy reviews
information regarding the medicine in clear and specific
Some video or audio explanations is suffice
Health profile of the person can be build and keep aware

Marketing is understanding of people and its need when its done via AI and ML we need to have a setup which is best customised and informative to people and easy to learn and work
showing the right dosage form and dose of the product without any misinformation
insights generated
Conditions and message for the customers should be to the point
digital platforms must cover the details on as much as possible notes
video consultancy can be provided if patient is not able to reach in person
Product comparison and details of the products to be clear and concise.
trust comes up with ethics and moral values
discount offers
by implementing the videos
get the advice of the doctors also in here
Language options can be used
more reviews can help
good consultation via online
age wise recommendations
voice assistance
managing the site without any kind of hang
Availability of the medicine information as needed
transparency of data of medicines
location availability of medicine so that could be tracking for rural areas also
good video consulting
side effects and good effects of the medicine
tell the other products also
good service
good medications
instructions and also showing some better medicines also
more and more Videos
We get to have the OTC orders and we need to have a bar code scanning and easy scanning process
checklists
discount offers if using online
service must be good
Risks and benefits of the products
Some benefits for store keepers if available
Stock tracking system
Standardise the methods
medications with there better display of how to use
process to be transparent
low price product more
better customer options and pharmacists options to make a good benefits
OTC product must be marketed to attract the people which are there customers and also the prescribers by adding values
indeed changes are must

great job done by digital marketing teams nowadays
Regulatory tags proper
Clearer comparison tools
Simplified language
Revies should be verified
Symptoms can be organised and assisted in a verified health apps for regular check
Visual guides for the app
price alerts can be displayed
Transparency
Interactive digital presence
Educational content can be add more
the methods of purchasing and promotion of the products are by modern ways but traditional ways are best
Side effects and the representation of marketing
Good regulations
yes
..
activity based marketing
ha
reviews , and interactive
pricings (cost and effectiveness)
Real life stories
clear data brand , generics
Scrolling should be less and more impactful work
AI powered recommendations to be sure and short
chatbot
Tablet & capsule recalling
frustration of multiple options
.
voice assistance
emotional quotient

Based on the data some more inferences are as follows:

- **Engagement Potential (Indirect Evidence):** Graph 4 of data analysis shows that "online reviews or forums" significantly influence information gathering. Micro-segmentation leveraging behavioural data (e.g., users actively engaging with review sites) to target them with relevant, positively reviewed content has a higher likelihood of engagement within that specific segment compared to broad targeting.

- **Conversion Potential (Indirect Evidence):** Graph 5 of data analysis indicates that 52.5% (105 out of 200) have occasionally purchased OTC products online based on digital ads/recommendations. Micro-segmentation, by targeting users based on specific online behaviours indicating purchase intent (e.g., frequent browsing of product pages), has the potential to increase this conversion rate within those targeted segments compared to untargeted ads.
- **ROI Potential (Inferred):** If micro-segmentation leads to higher engagement and conversion within specific behavioural segments (as suggested above), it logically follows that marketing spend would be more efficient, potentially leading to a higher ROI compared to the potentially wasted reach of traditional methods.

  Therefore, based on the trends in the provided survey data, we can infer that micro-segmentation driven by digital behavioural data *has the potential* to improve the effectiveness of pharmaceutical brand communication. However, this data alone is not sufficient to statistically *prove* the hypothesis. A dedicated comparative study implementing both segmentation strategies and measuring the specified outcomes would be required for conclusive proof.

Table 4.2: Anova test

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
To what extent do you 4 with the following statements: [AI-powered recommendations and ads help me discover more relevant and useful pharmaceutical products.	195	640	3.282051	0.729315
To what extent do you 4 with the following statements: [Digital marketing for pharma OTC products provides reliable information that helps me make better healthcare decisions.	194	616	3.175258	0.621975
To what extent do you 4 with the following statements: [Digital platforms that provide hyperpersonalized OTC brand propositions save me time and effort compared to researching products on my own.	194	672	3.463918	0.726671

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	8.265327	2	4.132664	5.965876	0.002725	3.011259
Within Groups	401.7758	580	0.692717			
Total	410.0412	582				

Null hypothesis (H0):

There is no significant difference in the mean response scores among the three statements about digital pharma marketing

Alternative hypothesis (H1):

There is a significant difference in the mean response scores for at least one of the statements.

Statistical Proof:

- F-value = 5.97
- F-critical = 3.011
- P-value = 0.0027

Since:

- F > F-critical
- P-value < 0.05

We reject the null hypothesis and accept the alternative.

There is a statistically significant difference in how participants rated the three digital marketing strategies. At least one of the statements is perceived more positively (or negatively) than the others. This reinforces the importance of segmenting and tailoring digital messaging — not all approaches resonate equally with your audience.

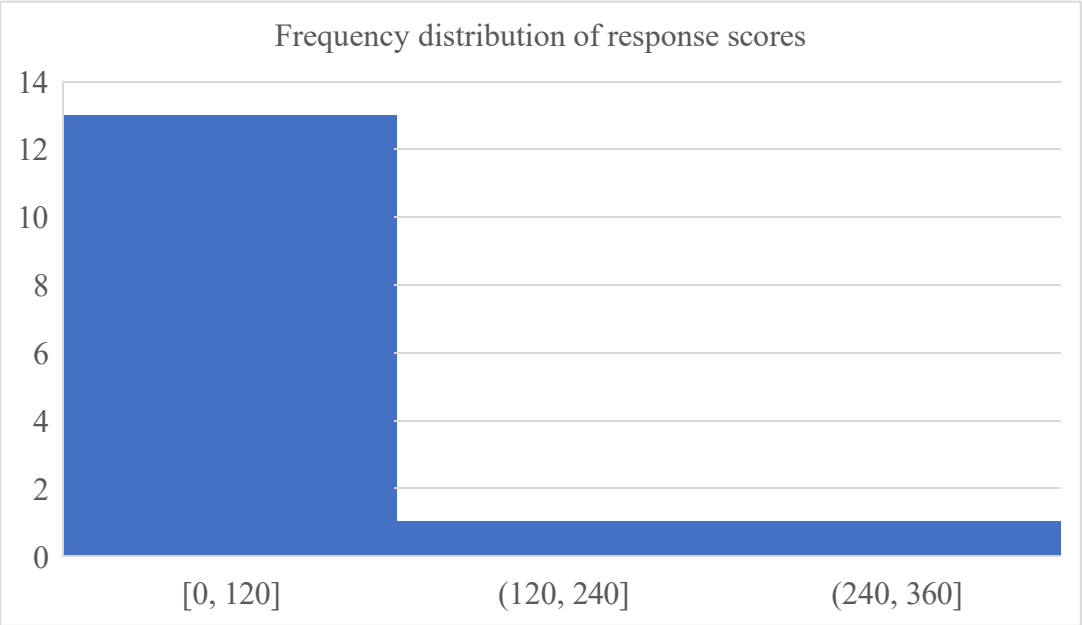


Fig 4.2.15: Frequency distribution of response scores

Most of the responses seem to be clustered in the lower scoring range, suggesting that participants leaned more towards the lower end of the scale. This could mean:

- People were generally less agreeable or satisfied with the topic,
- Respondents played it safe with their answers, avoiding extremes,
- Or perhaps the way the scoring scale was designed made it easier for participants to give lower scores.

In short, the majority of participants seemed to stay on the more cautious side when responding.

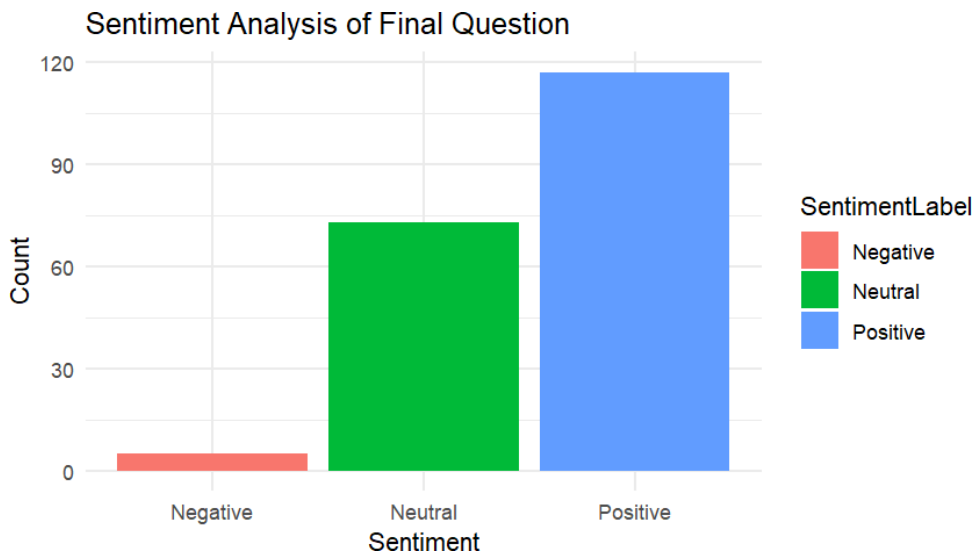


Fig 4.2.16: Sentiment analysis of Responses regarding suggestions for any improvement by digital platforms on presenting the pharma OTC brand.

Based on the data, The chart says that the positive sentiments are higher than the neutral and the negative sentiments which shows that the respondents responses are maximum in positive sentiment. The positive sentiment is near to 120 in count, neutral sentiments are near to 75 in count, and negative are lowest which is near to 5 in count.

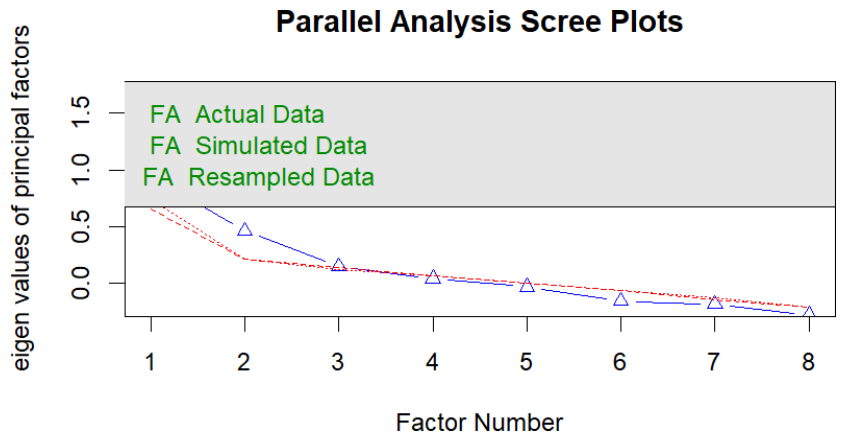


Fig 4.2.17: Parallel analysis scree plots

This Parallel Analysis Scree Plot is used to figure out how many factors should be kept when doing a factor analysis. The blue line with triangles shows the actual data, while the red dotted

line represents what we'd expect from random data. We keep only the factors where the real data's values (eigenvalues) are higher than the random ones. In this chart, that's true for the first two factors, which means a 2-factor solution is ideal.

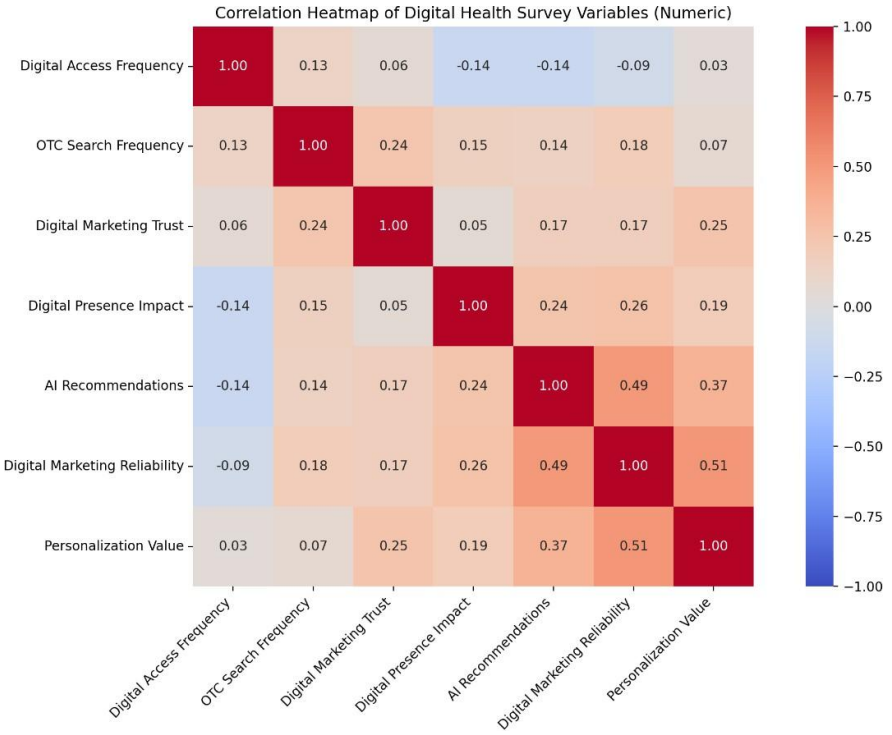


Fig 4.2.18: Correlation heat map of digital health survey variables

is a correlation heatmap illustrating the linear relationships between variables from a digital health survey. Each cell represents the Pearson correlation coefficient (ranging from -1 to +1) between two numerical variables. Values closer to +1 indicate a strong positive correlation, those near -1 signify a strong negative correlation, and values around 0 suggest no linear relationship.

From the matrix, the strongest positive correlation observed is between Digital Marketing Reliability and Personalization Value (r = 0.51), indicating that as perceptions of marketing reliability increase, so does the perceived value of personalized marketing content. Similarly, Digital Marketing Reliability also shows substantial correlation with AI Recommendations (r = 0.49), and AI Recommendations with Personalization Value (r = 0.37), implying a coherent construct surrounding AI-driven digital marketing credibility and personalization effectiveness.

Conversely, Digital Access Frequency shows weak or negative correlations with most other variables, particularly with Digital Presence Impact and AI Recommendations (both r = -0.14),

suggesting that frequent access to digital platforms does not necessarily enhance trust or perception of digital healthcare interventions.

OTC Search Frequency and **Digital Marketing Trust** exhibit moderate positive correlations with multiple variables (e.g., r = 0.24 between OTC Search Frequency and Digital Marketing Trust), suggesting a potential linkage between proactive online health-seeking behaviours and digital trust formation.

The heatmap aids in identifying clusters of interrelated digital health perception variables. Particularly, **Digital Marketing Reliability**, **AI Recommendations**, and **Personalization Value** appear to form a synergistic triad, possibly underlying a latent construct of "perceived digital marketing efficacy." This insight can be crucial for further factor analysis, scale development, or structural equation modeling in digital pharmaceutical marketing research.

KEY FINDINGS:

1. **High Digital Engagement Among Younger Age Groups**
   The majority of survey participants (56.5%) were aged between 26–35, followed by 33% in the 18–25 age group, indicating a digital-native population highly receptive to online health information and marketing.
2. **Influence of Online Reviews**
   43.5% of respondents acknowledged that they changed their mind about an OTC pharmaceutical product based on social media or online reviews, underlining the growing power of digital peer influence.
3. **Preferred Consultation Method**
   A dominant 83.8% preferred in-person consultations over telephonic, telehealth, or e-consultation, suggesting a gap between digital marketing and offline care preferences.
4. **Frequent Digital Use for Health Decisions**
   Over 56% used digital platforms daily to access health information, with search engines and social media being the most frequently used.

5. **Consumer Acceptance of AI**
   Factor analysis indicated a positive correlation between AI-powered recommendations and improved decision-making, validating AI's role in personalized marketing.

CHAPTER-5

DISCUSSION

This study offers clear evidence that the move toward micro-segmentation in pharmaceutical marketing is not only timely but also highly effective. One of the most prominent trends emerging from the data is the high level of digital engagement among participants, particularly those between the ages of 26 and 35. This confirms that younger consumers are more likely to interact with pharmaceutical content online, making them a key target for personalised digital strategies.

A particularly interesting finding is the role of artificial intelligence (AI) in building trust and encouraging interaction. The data shows that when digital content is tailored through AI, participants feel the information is more relevant and credible. This link is highlighted in the correlation heat map, which shows strong relationships between AI-driven personalization and users' perceptions of usefulness, reliability, and time efficiency. It suggests that people are more responsive to content when it aligns closely with their personal needs and behaviours.

When comparing audience responses across different digital strategies, the ANOVA results provide valuable insights. They reveal statistically significant differences in how various participant groups perceive digital marketing messages. This reinforces the need for micro-segmentation; not all consumers respond the same way, and generic marketing approaches fail to create meaningful impact.

Interestingly, despite the popularity of digital platforms, many respondents still prefer in-person consultations. This shows that digital tools should not be seen as replacements but rather as supplements to traditional healthcare interactions. For marketers, this means designing digital content that enhances—not competes with—offline communication.

Qualitative feedback on how digital platforms could be improved was mostly constructive. Participants asked for clearer visuals, easier navigation, and more symptom-based suggestions—signs that users appreciate digital interaction but expect more personalised and intuitive design.

Online peer influence also plays a key role in shaping behaviour. Nearly half of the participants admitted to changing their opinion about an OTC product after reading online reviews. This

highlights the growing importance of reputation management and social listening in pharmaceutical branding.

All in all, this study illustrates that combining behavioural data with AI enables pharmaceutical companies to connect with their audience in far more meaningful ways. Hyper-personalized communication improves engagement, supports better decision-making, and helps brands stand out in a competitive digital environment. Still, the transition isn't without its hurdles. Ensuring privacy, maintaining ethical standards, and integrating digital tools into existing systems are challenges that marketers must carefully navigate.

Strategies:

1. From Fig 4.2.9: Trustworthiness of digital marketing for OTC products. The strategy to convert trustworthiness we can:

Build Trust with Reliable Information
Present content backed by scientific research and real clinical outcomes. Partner with trusted medical professionals to endorse products and add credibility. Also, feature authentic reviews and ratings from verified users to boost trust among potential consumers.

3. From Fig 4.2.12: % of Respondents who have changed there mind about a pharma OTC product based on online reviews or social media feedback. The strategy to maximise the conversion is:

Showcase Authentic Experiences
Display product reviews from certified health professionals and verified customers prominently. Highlight both helpful positive and negative feedback so users get a well-rounded view, helping them make informed decisions with confidence.

4. From Fig 4.2.13: % of Respondents noticed or been Aware of AI been used to personalize there experience with pharmaceutical or healthcare product advertisements. The strategy for more AI awareness among people are:

Raise Awareness About AI in a Friendly Way
Subtly let users know when artificial intelligence is helping them—like with labels saying "customized for you" or "suggested by AI." Include simple and engaging visuals or short clips that explain how AI works behind the scenes while respecting user privacy.

5. Strategy for the statement :

AI-powered recommendations and ads help me discover more relevant pharma OTC products,

Smarter Recommendations, Better Relevance
Use more relevant background data—like a person's shopping history, health goals, or past preferences—to fine-tune product suggestions. Also, provide users with the ability to give quick feedback (like thumbs up/down) so the system can improve over time.

6. Strategy for the statement:

   Digital marketing for pharma OTC products provides reliable information that helps me make informed decisions

   Make Information Easy to Digest
   Break down complex product details into simple, user-friendly formats like visual infographics, FAQs, or short explainer videos. This helps consumers quickly understand the benefits and usage of OTC products without medical jargon.

7. Strategy for the statement:

   Digital platforms that provide hyper-personalized information about pharma OTC products feel intrusive

   Let Users Take Control
   Give people the option to adjust the level of personalization they receive. Include features that allow users to choose what types of product suggestions or ads they prefer, making the experience feel more respectful and less intrusive.

Limitations:

- Survey limited to digitally active users
- Predominance of respondents aged under 35
- Self-reported data may involve response bias.

CHAPTER-6

CONCLUSION

This research set out to explore whether micro-segmentation could enhance pharmaceutical marketing by making it more relevant, personal, and engaging. The results strongly suggest that it can. By focusing on digital behavioural patterns and leveraging artificial intelligence, marketers can create experiences that resonate on an individual level—something traditional segmentation methods often fail to achieve.

Survey responses revealed a clear preference for content that feels tailored and useful. More than half of the participants found personalised digital ads to be helpful in making health-related decisions, and a large portion had made purchases based on those ads. These findings confirm that micro-segmentation isn't just a theoretical concept—it has a real, measurable impact on consumer behaviour.

The statistical analysis added depth to these insights. ANOVA tests showed distinct differences in how various groups responded to different types of content. Correlation maps and scree plots helped identify the strongest behavioural drivers of engagement, confirming that personalised marketing—when aligned with what users care about—works better than general messaging.

However, the findings also reveal that digital marketing has its limits. A significant number of respondents still rely on in-person consultations, indicating that digital tools should complement, not replace, face-to-face interaction. This balance between human touch and digital convenience is something pharma marketers need to manage carefully.

Perhaps the most pressing takeaway is that while the tools for personalisation exist, they are still underused in the industry. Many pharma brands are yet to fully integrate AI or behavioural insights into their strategies. There is a clear opportunity here—for those who invest wisely, the benefits are likely to be substantial.

To conclude, this dissertation highlights that micro-segmentation, supported by AI and behavioural data, holds tremendous potential for transforming pharmaceutical marketing. It enables a more patient-centric approach that respects both individual preferences and evolving digital habits. As long as companies remain mindful of ethics and data privacy, the path forward is rich with possibility.

Recommendations:

- Expand AI-based personalization while ensuring data privacy.
- Integrate feedback loops from online reviews into branding strategy.
- Focus on hybrid strategies combining digital outreach with physical touchpoints.

CHAPTER-7

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