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Report on

A STUDY ON THE ADOPTION, UTILIZATION, AND FUTURE PERCEPTION OF AI-DRIVEN HEALTHCARE TOOLS

Submitted By :

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2K23/UMBA/19

Under the Guidance of :

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& ENTREPRENEURSHIP

Delhi Technological University

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I also acknowledge the contributions of all those who assisted me directly or indirectly, through technical, academic, or logistical support, in completing this research project.

ABSTRACT

Artificial intelligence has been growing ever since its conception. It has revolutionized many significant fields, from finance to healthcare, from human resources to building software. It is bound to grow in the future with new advancements coming in every now and then. But when it comes to sensitive fields like health care and medicine, its adoption and utilization are not as easy to understand as it is in other fields like finance. The majority of the time, when artificial intelligence is correlated with the healthcare field, medical professionals are kept Add the core of the study, and rarely is the user's perspective understood. This project will keep keeping general public in focus of the study and understand their utilization, trust, and adoption of artificial intelligence tools, in addition to how they perceive the future of these tools.

There are multiple drivers and multiple barriers the widespread adoption of these tools in current times as well as in future as well. This study focused on what factors are more significant to the general user and what matters to them the most. In addition to this the most commonly used tools Were identified using the responses obtained from the general public.

Using multiple tools like SPSS, Excel, etc., significant quantitative analysis was done in addition to the qualitative analysis of the respondents in order to analyze and observe the attributes. The respondents were provided with multiple closed and open-ended questions to gain opinions.

Both quantitative and qualitative analyses were conducted to solidify the results, and conclusions were made strictly on the basis of the results of different analyses.

The primary objective of the research was to understand different characteristics of the general public.

As secondary objectives of the research, results were expected to show what the most widely used tools, the most influential driver, and the most influential barrier. These insights are crucial to understanding what users want and what matters most to them. This helps in building strategies according to what is needed and not what might be needed.

The study concludes that the successful integration of AI in personal healthcare will need tools with user-centered design, better trust mechanisms, and policies that balance innovation with ethical responsibility. These insights offer practical implications for developers, healthcare managers, and policymakers working towards AI for improved healthcare delivery.

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CHAPTER 1: INTRODUCTION

1.1) Background

Artificial intelligence, popularly called as AI, which is a computer science area, is a strong and disruptive force with powerful potential to "disrupt" or being able to transform the ways and processes by which the healthcare industry practices and how healthcare services are delivered to the consumer. (B). Artificial intelligence in the public-facing healthcare tools is a growing area; it has significant impacts on the operations and data-based decision-making. These AI tools promise to be able to revolutionize the use and the access to Healthcare by reducing cost and putting pressure on the overburdened healthcare systems, but their adoption by the general public is still uneven. The adoption by the general public is influenced by multiple factors, Like trust, accuracy, Quality of advice by the AI system, etc. Generally, whenever AI is mentioned or studied in this domain, existing literature focuses on the way it impacts healthcare professionals, the adoption of AI in hospitals, and doctors, etc., but its general public adoption and the way they perceive and use these tools are more or less neglected. Hence, this study on artificial intelligence and the general public takes a different turn in examining the tools that are available by keeping the focus on the general public rather than the medical professionals. The study explores how various factors influence the utilization and adoption of artificial intelligence tools.

1.1.1) What is AI?

Before getting into any further depths, it is essential to understand what AI is. In most simple terms, it is the field of technology and science that focuses on the creation and development of machines that are "intelligent", meaning that these machines should be able to perform tasks that typically require human intelligence for task completion. Artificial intelligence uses predefined rules or algorithms to enable such machines to be able to learn and to make decisions to solve problems the way humans do.

1.1.2) The Changing Industry

Artificial intelligence, with the combination of other technologies, has the ability and strong potential to transform the way industry works. Not only in medical settings, but artificial intelligence is also being used outside of clinical settings by the general public. This includes fitness wearables, symptom checkers, online self-diagnostic tools, Mental health chatbots, etc. At a more strategic level, this space shows the changing dynamics of the industry in which the traditional healthcare professionals are collaborating with artificial intelligence and other technologies in order to create hybrid solutions. This transformation and integration need re-engineering of the operational processes and models, innovations, leadership partnerships, processes, etc. In order to understand and work on these changing ways of the industry in a possible customer-centric manner, it is essential to understand the adoption and utilization of these tools by the general public. It is crucial to reflect on what the consumer feels about these changes, i.e., are these changes good or bad, essential or not, are these changes even required or not, etc.

AI Healthcare tools show a significant trend in service innovation. AI symptom checkers can prove to be significantly helpful in healthcare operations management by reducing the load on the system by streamlining preliminary assessments, thereby reducing unnecessary clinical visits. Fitness wearables can be used to track biometric data continuously, which can be used and analysed as early signs for any critical problems. Even though Artificial Intelligence can be used to make operations more efficient, and by the general public to have convenient options, what makes it problematic is the trust the general public has in Artificial Intelligence to make their health decisions. It is very important to understand what the consumer prefers, is ready to adopt, is not ready to adopt, what their concerns are, and what advancements they expect. In order to develop consumer-oriented tools, it is important to understand the perspective of the consumer and what they are ready to adopt. It is important for the consumer to have trust before any widespread utilization.

This new frontier has divided consumers into groups; many strongly support it, while many don’t, and then others are somewhat neutral about it. It is crucial to

take insights from all points of view to develop this relatively newer technology in a more consumer-friendly and oriented way. This study investigates the user adoption, perception, and utilization of AI tools by the general public, hence offering meaningful managerial insights.

1.1.3) Artificial intelligence tools available to the public

In the healthcare domain, artificial intelligence is not only confined to the limitations of hospitals or research laboratories, but there are several artificial intelligence-based healthcare tools and platforms that are designed for public use, thereby enabling individuals to independently and proactively manage their health in real-time. These include tools ranging from symptom checkers to mental health chatbots, and from wearables to fitness and nutrition tools.

- Symptom Checkers: Symptom checkers are a type of AI tool that is available in the healthcare domain. These checkers take use of machine learning AI algorithms in order to analyse the symptoms reported by the user and present potential causes, Treatment pieces of advice, and other recommendations. There are multiple such symptom checker applications that make use of natural language processing and machine learning algorithms. Their work is that the user inputs the symptoms in simple and plain language, and the system then matches these symptoms with the knowledge that it possesses about the medical conditions using models like probabilistic models. It uses its fed and learned knowledge to suggest possible issues, concerns, how severe the problems are, what could be the potential recommendations, and whether or not emergency or any professional care is required..
- Fitness/ Nutrition Tools and Applications: Applications like Noom, HealthifyMe, etc, provide individuals with tailored fitness plans, meal recommendations, calorie and health tracking, nutritional pieces of advice, and wellness coaching. Platforms like these are the most popular form of Artificial Intelligence tool, which is especially popular among users trying to manage lifestyle-related conditions like body weight, diabetes, blood pressure, etc. These applications or tools provide user with options using which they can manage their health without clinical visits for every minor issue. It brings ease in health

management. Such tools use reinforcement learning to provide personalised recommendations based on user data that the system collects about the goals, intakes, and activities of the user.

- Health Chatbots: Health chatbots, especially mental health chatbots, have seen growing usage in recent times. These chatbots simulate conversations with users to provide medical and emotional support. These chatbots take use of natural language processing, algorithms, and sentiment analysis to analyse, interpret, and understand the input by the user and then use pre-fed, trained, and relevant responses to the user query.
    - Mental Health Chatbots: There are many chatbots that work towards providing mental health care to the user. They detect emotional cues using AI and use it to provide the required emotional support and feedback to the users. Mental health is a stigmatizing topic, and such tools provide patients who are not comfortable sharing their issues a platform where they can engage in empathetic and stigma-free dialogues that they can take advantage of 24/7. Although these tools can prove to be useful, their long-term effectiveness has not something that has been proven or widely adopted by users.
- Wearable Devices: Wearable devices like Apple Watches, Fitbit, etc., use artificial intelligence in order to track health in real time. These devices collect data like heart rate, sleep cycle, heart rate, etc. and use machine learning algorithms to observe and point out any kind of anomalies or issues. This data can be used to detect problems, assess potential issues like sleep apnea or cardiovascular problems, by incorporating ML algorithms.
- Other Tools: -
    - Medication management apps
    - Wellness apps
    - Telehealth Assistants, etc.

These tools, generally, are not replacements for traditional professionals' advice and recommendations, but can be extremely helpful as complementary tools. These tools can also improve patient management, flow efficiency, etc, in clinical settings and thereby improve healthcare operations (C).

There is an abundance of studies that are based on the technology of AI algorithms, It is important to look at it from an interdisciplinary point of view that investigates how these AI tools are being adopted, used, and perceived across various stakeholders. Hence, this study examines artificial intelligence not only from a technological point of view but also from the user's perspective. The future of our deficient intelligence in health care depends on and will be shaped by the future perception of Users and their narratives. It will shape how technologies evolve in the future and how their policies and strategies will be crafted.

The background of this study is based on the understanding that even though artificial intelligence has a strong potential to be able to transform the healthcare domain, the way users engage with it will be one of the most significant factors in its success. It's not just about what technology can do; the perception and utilization of the technology by the general public is also significant and an important success factor. Understanding user engagement, right from adoption to its long-term use and perception, is important to design user-friendly tools and technologies, making and structuring policies, ensuring proper outcomes, etc. This study does not focus on how AI works or how it is developed, but rather focuses on how crucial user perception is

1.2) Problem Statement

In today's world, AI tools are widely available in several domains. Despite the availability and newer and innovative technologies coming up every now and then, its user adoption and user viewpoints remain inconsistent, mixed, and poorly understood. The major research in this domain is more focused towards AI in hospitals and the professionals' side of the coin, clinical diagnostics, hospital operations, etc. This creates a gap in understanding how everyday individuals use, interact with, and adopt these tools. Their trust, fears, concerns, drivers, etc., i.e., the consumer side of the coin, is less looked into. What factors act as barriers in widespread AI adoption and utilization, and what drives individuals to use these tools in addition to which tools the majority uses, etc., are all overlooked areas generally, but will be the focus of study in this research.

Reliability and privacy concerns, ease of use of the tools, trust, and some other factors influence how users perceive the tools and how efficiently they adopt and utilize them. These variables are generally overlooked in operational planning and other management-related strategies and decision-making.

This overlooking creates a gap between innovation management and real-world usage since this lack of insights hinders the development of user-friendly and solution-based tools.

1.3) Objectives

The objectives of the study include:

- To evaluate the level of public awareness, the basic understanding, and the point of view that is possessed by the general public or consumers.
- To assess the current usage trends, patterns, level, and extent of adoption of various available AI tools among the general public.
- To perform sentiment analysis of the public perception via the received responses.
- To explore if the emerging AI trends improve operational efficiency and healthcare management operations
- To explore what improvements new-age entrepreneurs can bring through their AI-based startups in order to improve trust and adoption levels among the general public.
- To understand whether or not the Indian public is ready to be onboarded onto the transformations AI is bringing and will be bringing in the near future. This will help understand and predict what the future of AI and its related consumer behavior and adoption might look like.
- To generate data-driven analysis and recommendations to improve strategy making in the field of operations management in the healthcare domain. The outcomes of this research will be structured to contribute towards aligning the pathways of technology and management using actual user data, making it convenient to develop strategies.

- To understand if trust impacts future adoption and what factors influence the trust levels among the respondents of the study. This is an important objective because in order to understand whether or not something will grow in the future in terms of usage, it is important to observe if users trust it or not. No technology or invention will be useful or successful until the general audience trusts and accepts it.
- Understand the barriers and facilitators to AI incorporation in daily usage.

1.4) Scope of The Study

It does not cover technical evaluations of specific AI tools or clinical efficacy but rather focuses on public perception and adoption trends.

- Target audience and data collection boundaries
  - Target Audience: The target audience of the study consists of the general public and consumers. This audience was chosen because the objective of the study is to evaluate Artificial Intelligence tools from the user's point of view.
  - Data Collection: The study involves survey-based data collection. It involved both qualitative and quantitative (e.g., trust, frequency of usage, etc.) metrics. The questionnaire included both multiple-choice questions and open-ended questions, which were then used for analysis (includes: regression, measure of dispersion, sentiment analysis, etc)
  - Findings: The findings or the recommendations and suggestions of this study will primarily be relevant to businesses and new-age entrepreneurs, as the study shows consumer recommendations and needs.

- Tools Considered:

  The tools considered include:

  - Symptom checkers (e.g., WebMD)

- Mental health chatbots (e.g., Woebot)
- Wearables (e.g., Fitbit, Apple Watch)
- Medication management apps (e.g., Medisafe)
- Wellness & fitness AI apps (e.g., Noom)

- Geographical And Demographic Scope:
  - This research focused on obtaining data primarily from urban and secondly from semi-urban areas. This was chosen to ensure the data is gained from the actual user population since these tools are mainly popular in urban areas and, if used, are generally used in urban areas. The participants were the general public, and the data was collected in an online form to diversify the input and not to get confined to the boundaries and limitations of reach. The mode of data collection excluded the public who do not possess smartphones or use AI.
  - Demographic parameters like age, gender, etc, are taken into consideration while observing the results.

CHAPTER 2: LITERATURE REVIEW

Artificial Intelligence has been emerging as a revolution in multiple domains. It is making multiple sectors and domains go under revolutionary transformation, making their operations and processes smoother and more efficient at different levels. In the context of the healthcare industry, it has revolutionised the way the healthcare system works. Not only from the medical perspective, but it has brought changes in the operational and management side of the system, which is as crucial as the core medical part of the healthcare domain. It has led to enhanced diagnostic accuracy, planning personalised treatment plans, efficient operational management (patient planning, scheduling, etc.), streamlining administrative tasks, etc.

Artificial intelligence in the healthcare industry is not an independent field that only belongs to STEM and is confined to related research only but it is crucial to look at it from the management point of view as well. A report from Deloitte (2022) mentions that integrating AI with EHR (Electronic Health Records), healthcare, and pharmacy databases can enable and improve personalised and preventive care pathways. These AI integrations streamline and make operations efficient by reducing redundancies and operational bottlenecks. In the context of strategic business operations, AI integration and technological shifts can prove to be a significant process reengineering opportunity for existing organisations and a platform for new startups to come up with ideas that fill the existing gaps.

Even though Artificial intelligence is emerging as a strong force, its adoption and utilization are influenced by multiple factors. These factors dictate how ready and comfortable the consumer side is while using and adopting AI while making their healthcare decisions. AI adoption has its impactful drivers and barriers, which are listed below:

2.1) About The Industry

The healthcare industry is a field that is dedicated to providing medical care to individuals to treat or prevent health issues. It is a group of organisations that

provide support and care by providing systems for delivering healthcare, support functions, medical support, technologies, clinical studies, health insurance, pharmaceutical care, etc.

Hospital-centric AI tools have been researched for a long period of time. Recently, trends have focused on consumers and how they use Artificial intelligence. According to the World Health Organization (2021), the non-clinical use of digital health tools has expanded since COVID-19. With this expansion, it is important to understand and analyse the adoption of AI from the point of view of product innovation, operational scalability, and user-based Analytics.

2.2) Evolution Of Ai In The Healthcare Industry

Artificial intelligence has traditionally revolved around clinical practices, which include diagnostics, treatments, clinical decision making, imaging analysis, etc. Lesser advancements were seen in the context of public-facing AI. But over the decade, advancements and innovations have been observed, reflecting a visible shift towards public-facing AI tools. Initial AI tools included basic symptom checkers and health information bots (e.g., WebMD, early versions of Ada, etc.). With the advancement of AI and ML, the tools and applications have evolved and become more adaptive, working on real-time input and user behaviour to provide more personalised recommendations and guidance to the user.

In the late 20th century, public-facing AI tools emerged as rule-based systems like basic chatbots, etc. (Example: ELIZA in 1966 by Weizenbaum was one of the first chatbots). These systems were based on predefined rules and hence offered very limited flexibility, but were a great foundation. These applications focus more on being cost-efficient, but their rigidity and limited flexibility were a drawback for many users.

The sector saw a breakthrough in the 2010s, with the rise of Natural Language Processing. This led to the development of voice-based assistance like Siri and Alexa Which were able to interpret and respond to natural human language. These models initially struggled with the complexity of human language, like different accents, etc and used machine learning to improve their understanding

of the context of human Language. This technology developed exponentially, and by the end of the decade, many households used the Voice Assistant. The next set of advancements was related to personalisation and predictive analytics scope in public-facing AI.

These advancements were followed by the introduction of generative AI (Example: ChatGPT) in the 2020s. These tools were able to generate outputs according to the wants, rules. and the input provided by the user. However, there were significant challenges like inadequate accuracy of responses, Misleading information, Biased Data, etc. All of this led to ethical and related responses from the audience.

19 Another major step towards advanced AI is the wearable devices, like Apple Watch and Fitbit, which make use of AI in order to provide users with real-time health monitoring, sleep pattern analysis, heart health-related warning signs, etc. These devices can be used as preventive health devices, reducing the burden on the system and allowing users to engage and monitor their health in real time and take necessary actions. In the context of mental health tools, advancements in NLP have powered chatbots that could simulate cognitive therapy.

The evolution of public-facing AI reflects significant opportunities for business transformation and reengineering. The transformation values scale, user-centric design, and monetisation of data. The shift in perception of users provides new opportunities to develop innovative tools upon understanding how to progress and evaluate strategic opportunities in digital health. Public-facing AI has developed and evolved from rigid rules-based systems to user-centric and flexible tools that have the capacity to learn and grow. However, there is still a great scope of advancements, for example, UNESCO (2023) reported that 80% of AI research focuses on America and Europe, thereby increasing the global inequalities.

2.3) What Drives This Adoption?

Two of the most crucial drivers are Operational Efficiency and Cost Reduction. AI algorithms can analyse complex medical data rapidly, helping in disease detection and diagnosis at an early stage. It fills the gaps and inefficiencies in the workflows

and administration by automating several processes that would otherwise be very time and labour-intensive. For example, applications in the radiology area of medicine have shown promise in reducing diagnostic reporting times by up to 30%.

AI tools are also being adopted to address inefficiencies in clinical workflows and administrative tasks. By automating time-consuming processes such as patient management, appointment scheduling, billing, and documentation, AI reduces the burden on healthcare staff and allows them to focus more on direct patient care. In hospitals, AI-based systems can predict patient deterioration, optimize bed allocation, and manage surgical schedules—all contributing to more streamlined operations. These efficiencies often translate to significant cost savings, which is a major incentive for healthcare providers operating under tight budgets.

Concerning users, what drives adoption becomes crucial to be understood because it is a field bound to have extreme and diverse opinions. By understanding what factors can act as drivers for user adoption it can make product development decisions more informed for entrepreneurs. Important factors that are crucial for making important managerial and operational decisions for public-facing AI are listed below:

- Trust: Many fear AI, but many other individuals trust AI in making healthcare decisions, even if it's just for getting dietary recommendations. This trust is facilitated by the opinions that AI works on academically backed clinical data. Being able to engage with the development of AI tools can further improve trust levels because it will reduce uncertainty. Trust is very significant because then it will have perceived usefulness. With the trust and confidence improved, the general public tends to use the product or service irrespective of its usefulness or not.
- Convenience and 24/7 Accessibility: One of the reasons that makes users use this tool is the ease of picking up a smart device and getting immediate support without any long waiting times. This convenience aligns with what the new age users demand and according to consumer behaviour, i.e. need for instant services. The 24/7 accessibility of tools drives the adoption, motivating users who seek quick solutions and are tech-savvy. This helps in reducing pressure

on healthcare systems, thereby making strategy-making and operations more efficient.

- Cost Saving: AI tools are often either free to use or less expensive than other modes, making them accessible, affordable, etc.
- Other drivers include:
  - Technological comfort
  - Early and preventive diagnostics
  - Personal health empowerment
  - Previous results of the followed recommendation

2.4) Barriers Of Adoption:

While there are multiple significant drivers in the adoption of AI-based tools by the general public, despite AI being there in the industry for a significant period of time, the adoption and widespread utilization of artificial intelligence for the purpose of making healthcare decisions has been slower than expected and more inconsistent than anticipated.

- Trust: One of the most important barriers and A driver is trust. Trust as a barrier can significantly reduce adoption. Trust can be reduced due to lack of accuracy, privacy concerns and breaches, results that can be unsafe or not useful, doubts, perception, acceptance, being uncertain about who is behind the tool and how it's developed, usability, less reliability, less accountability, etc. another factor that acts as barrier is the opinion that AI is a replacement and not a facilitator, this in addition to low accountability further reduces the trust levels.
- Limited Understanding and Awareness: The Awareness of the presence of artificial intelligence in the healthcare domain is limited among the general public. Another important barrier is the misconception that artificial intelligence will replace traditional doctors rather than complement them. Another factor that hinders the widespread adoption of artificial intelligence tools is that the education and awareness about AI's benefits and its limitations are limited, and this makes people sceptical or confused about its role in the healthcare domain. With Limited understanding and Limited awareness about the tools

available, adopting artificial intelligence into regular use becomes a difficult choice for many individuals.

- Data Privacy Concerns: Privacy of the user data remains one of the major concerns and barriers for the widespread adoption of AI. These fears include fear of data leaks, data misuse, opaque nature of AI, etc, and these fears reduce the confidence of the user. Not just in the context of artificial intelligence in the healthcare domain, but user trust in the services of the organization remains extremely crucial for the success of any aspect of any business and its operational management.
- Low Digital Literacy: Among many demographics, especially older, low-income, and rural-based populations, limited digital literacy and technology skills become a barrier to the efficient utilization of AI. This creates a significant gap between innovation and usability. A product or service that is unusable to a significant segment of the general public is difficult to scale. Operationally, it is important for businesses to consider solutions like educational interventions, simple UX design, etc, to improve adoption.
- Absence of Human Touch: Most users who prefer traditional doctors and clinical visits over AI often miss empathetic interactions with real humans when using AI tools. Lack of emotional touch and emotional intelligence in AI bots and tools limits satisfaction among users, especially when it comes to sensitive issues like mental health.
- Use Cases: Another hindering factor towards the widespread adoption and massive utilisation of artificial intelligence tools in healthcare is the different use cases. Many use artificial intelligence only up until it is confined to making fitness and nutritional decisions, and not Diagnostic or treatment plans.
- Other barriers include: Legal accountability of AI-driven recommendations, ethical uncertainty, etc.

2.5) Public Trust And Adoption

One of the most crucial determinants or drivers of AI Adoption in Healthcare decision-making is the trust factor. According to a survey conducted by PWC in 2020 shows that only 30% of users fully trust AI-based help, advice, and

recommendations, even though over 60% have tried these tools. One of the most common barriers to adoption is trust. Longoni et al. (2019) suggested and mentioned that users and the general public are often hesitant to follow an AI-based health recommendation generated advice due to their perceptions of lower empathy and judgment compared to human doctors. However, if AI demonstrates high accuracy and transparency, general users' acceptance and trust can increase significantly (Castelo et al., 2022). This significant gap is because of the lack of transparency in AI decision-making algorithms, and a lack of human trust and touch. Even the trust factor also varies in different use cases, as more users are comfortable and consulting AI for any fitness or activity-based recommendations or medication reminders, more than they can trust AI for any health or mental health-based Diagnostics or treatments. This makes it even crucial to understand the consumer trust levels in order to develop new businesses in a more consumer-centric Way.

Adoption of these AI tools is very inconsistent, which makes decision-making, innovation management, and entrepreneurship complex. Adoption of AI tools varies heavily across demographics.

- Gen Z and millennials are a more tech-savvy group and hence are more willing to adopt and also question AI in public-facing healthcare. They are more familiar with technology and prefer digital convenience. On the other hand elderly population is majorly reluctant to the adoption of AI tools, even though these tools can be very beneficial for them, since they use them for continuous monitoring and evaluation of their health, they face issues with trust and technology usability
- Not just age, but geography also creates differences. Urban populations more readily adopt and also have more access and awareness about such tools and technologies. Low-income and rural populations lack access and also possess less digital knowledge.

2.6) AI Healthcare And Business

The factors like trust, Accuracy, Adoption, Usage, User experience, etc. They are crucial insights for business management strategies. Artificial intelligence as a

field is not just limited to the boundaries of technology and sciences, but Its attributes significantly impact the business management strategies as well.

- Strategy building
  - Building efficient strategies helps with product development and design as well as market segmentation and targeting.
  - Helps focus on building trustworthy features: Integration of transparency in the tools. For example, Babylon Health gives users a reasoning trail in diagnosis, boosting trust levels
  - Helps build accuracy and prioritise validation
  - Demography-based segmentation of users: Young users and older users have different knowledge levels, awareness levels, etc. It helps run campaigns according to the target, for example, social media for younger adults.
- Operational Efficiency
  - Focusing on factors acting as drivers and barriers that can helps make the operation efficient
  - Helping with cost reduction
  - Automation of tasks
  - Resource allocation
  - Training for staff to be able to handle user concerns.
- Risk management
- Decision making
- Entrepreneurial developments according to the expectations and wants of the consumer.
- Efficient customer relationship management due to personalization, feedback loops, continuous improvement, etc.
- Helps build a trust-centric market and brand position
- Gain a competitive advantage by emphasizing the gaps in the market and the gaps that are ignorant towards.
- Building long-term goals and an ecosystem.

2.7) Collaboration between Human and AI : Hybrid path

A significant alternative to the resolution of issues pertaining to different healthcare settings, rather than full automation or fully traditional methods, hybrid models should be promoted as the two can conveniently fill each other's gaps while providing what their strengths are (doctors' empathy and AI's speed). This complementary approach can improve accuracy and satisfaction both.

CHAPTER 3: RESEARCH METHODOLOGY

3.1) Research Design and Approach

- This research project incorporates both qualitative and quantitative methods.
- This study primarily follows a descriptive research design, with an exploratory component being secondary to it. The descriptive research design is the core of the research, as the main objective is to measure and present the current state of general public perception (adoption, utilisation, etc.) of AI-driven healthcare tools. Through structured multiple-choice Likert-scale, etc, question types, the study captures quantitative data on usage frequency, trust levels, accessibility, and user preferences. This allows for the identification of patterns, demographic trends, etc., aligning with the goals of data-driven decision-making in healthcare.
- However, an exploratory element is also included in the form of open-ended questions, which help look deeper into user perceptions, future expectations, and concerns that may not yet be documented with choice-based questions. This aspect of helps the research by providing context and identifying potential areas for further work. Overall, while the study is based on descriptive analytics, the exploratory part adds valuable depth in order to understand the ever evolving landscape of the AI adoption among the public.
- The exploratory component is also considered as critical due to the relatively newer stage of public-facing AI tools in healthcare and the limited research work focusing on general users.

3.2) Data Collection

- Both primary data and secondary data were collected for this research.
- Primary Data: Primary data was collected using a structured online questionnaire (Annexure A) that was distributed to a diverse population (belonging to different age groups, qualifications, etc). it consisted of both open-ended and closed-ended questions. This data was collected to capture and assess user perception, trust levels, concerns, opinions, motivating factors, future perspectives, etc.

- Structure Of The Questionnaire: The four sections included
  - Demographic details
  - Usage patterns of the tools
  - Trust and satisfaction levels
  - Open-ended questions to understand user opinions on future developments, advancements they are seeking, etc
- Question types: The structure ensured quantitative data for analytics and qualitative data for sentiment analysis.
  - Multiple Choice Questions
  - Likert scale questions
  - Open-ended questions

❖ Secondary Data: Secondary data sources included articles, journals, and survey reports (from firms like Deloitte, McKinsey, and PwC), healthcare technology articles and reports, etc. This secondary data supplemented the primary findings, to support the literature review, support and validate results and recommendations based on observations.

3.3) Sampling

❖ Target Population: The target population consisted of the general public, which included individuals across age groups, educational and occupational backgrounds, etc, having varying degrees of exposure in the context of public-facing AI tools.

❖ Sample Size: A sample size of 125 was taken into consideration. This 125-sample data was taken with the help of a questionnaire which consisted of different question types like Likert scale, multiple choice questions, checkboxes, open-ended questions, etc.

❖ Sampling Technique: The study utilizes non-probability sampling, specifically convenience sampling. Participants are selected based on their availability and willingness because the primary goal of this report was to gather a broad range of insights from the general public.

3.4) Tools and Software Used:

❖ MS Excel

- Python (Google Collab)
- Google Forms
- MS Word and Google Docs
- SPSS
- Tableau

3.5) Data Analysis Techniques:

- Descriptive Statistics: Data such as mean, median, standard deviation, and variance was calculated in order to analyse responses on usage patterns and trust levels of the general public.
- Sentiment Analysis: Open-ended responses underwent sentiment analysis using Python. Sentiments were categorised into positive and negative to evaluate public optimism or scepticism toward AI healthcare.
- Predictive Modelling: Simple linear regression models were developed to forecast the future and frequency of adoption of AI tool usage based on current trust and adoption metrics.
- Chi-square: Chi-square tests were performed to understand different relationships.

3.6) Ethical Considerations:

- Participation was voluntary
- Respondents were well informed about the purpose and usage of data.
- No personal data was collected
- Opinions and responses were kept confidential

CHAPTER 4: CASE STUDIES

- Facebook's AI Suicide Prevention Tool – A Case Of Public Mistrust And Backlash

Facebook introduced a suicide prevention AI-powered tool in 2017. This tool was designed to detect potential suicidal content that users post via their comments and videos. It used machine learning algorithms and artificial intelligence to flag content and alert the user, and provide them with a mental health helpline and support content. This tool, even though it was designed to provide public will being it ultimately suffered significant public backlash and failure to gain acceptance because of its flaws in privacy, consumer engagement, and transparency. This tool operates in a nonconsensual and Opaque manner with consent issues. The content was scanned without the Awareness of user, which raised ethical questions.

Public reaction was sceptical, and many mental health groups criticised the stool for lacking empathy and playing with patient autonomy. These, in addition to multiple other challenges, white spread adoption of the stool and the tool also failed to achieve public support. Even though it is still Active, it is heavily criticised and its Scope is limited. The deployment of these tools varies by region. For example, in the European Union, there are strict data privacy laws and regulations that have limited the implementation of the tool.

This shows that public-facing AI must respect user consent and user autonomy in order to gain trust. It is important for these tools to be transparent, especially when they deal with sensitive topics. It is important to understand what the consumer is ready to adopt and what they are willing to use before designing artificial intelligence public-facing tools.

- Babylon Health - An AI Health App That Lost Public Trust.

Babylon was founded in 2013, aiming to revolutionise the healthcare domain by providing users with AI-driven health consultations via a mobile application.

Through this, the users can input symptoms and receive medical advice. Babylon Health wanted to position itself as an accessible alternative for the users.

Even though initially it gained a lot of attention, it then suffered challenges and public perception issues. The issues included in accurate diagnosis, lack of transparency, overhyped marketing claims, and data privacy concerns.

Babylon Health promised smart AI, but its claims couldn't match its operational performance, hence affecting the brand narrative. This shows that this strategic alignment should match the marketing and the product's abilities. It's inclined to focus on speed, cost saving, etc, and neglecting User experience-driven metrics like trust, accuracy, perception, usability, etc, shows that the product strategies should reflect what the users experience or want and not just what the system can deliver. Its failure to provide transparency and failure to work towards the concerns of the users reduced its utilisation and adoption by the general public.

- Learnings From The Cases:
  - Don't just ask “Can we build this AI tool?”
    Ask: “Will real people want to use this? Trust it? Understand it? Stick with it?”
  - These companies created a tech-first trap, and focused more on building a Technology-first design rather than a user-first design.
  - That shows the gap: Building ‘cool’ technology vs. building useful, usable, and user-trusted solutions.

- <u>Ada Health – Trust Building Through Personalisation And Transparency</u>

Ada Health is a health technology company based in Berlin. It launched an AI symptom checker tool that would help users by providing them with a platform that would assist them in managing and understanding their health concerns. It is a tool that is developed for the general public, and they can take advantage of it by putting their symptoms as input and getting an output that includes possible causes, suggestions, and recommendations, etc.

It gained popularity with over 25 million downloads on the Play Store and millions of users globally.

It did not market itself as a doctor's replacement but as a supportive tool. Its user experience made users feel like they are chatting with a knowledgeable friend, it asks intuitive questions, gives easy-to-understand responses, avoids panic-inducing responses, no jargon, etc., all of which made self-help seeking better. One of the major factors behind its utilization is its transparency. Its operation and ways of processing have been transparent.

CHAPTER 5: FINDINGS AND ANALYSIS

5.1) The Demographics Of The Study:

- AGE

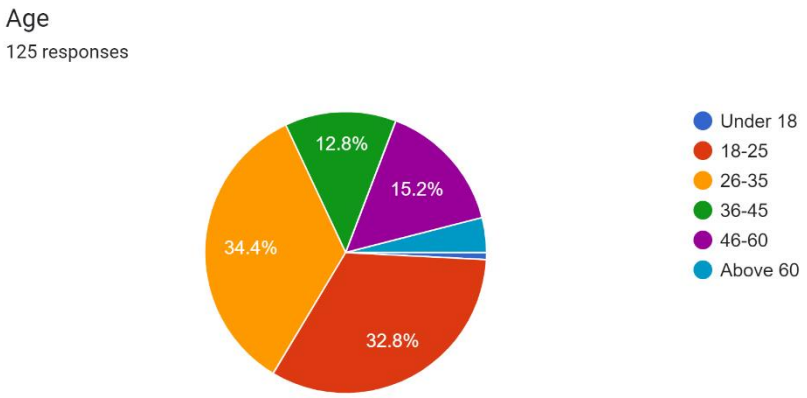

FIG 5.1- Age Distribution (Self Analysis)

INTERPRETATION: The pie chart shows a diverse range of respondents in terms of age group. Almost 67% of the respondents were from 18 to 35 year age group showing the contribution of the young population.

- GENDER

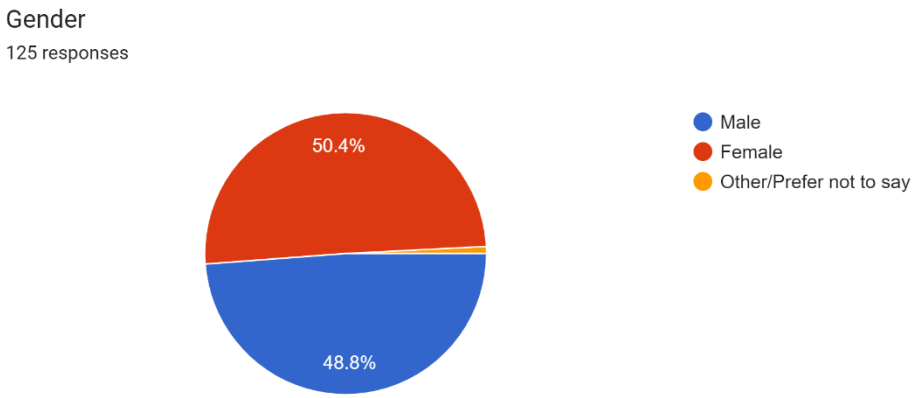

FIG 5.2- Gender Distribution (Self Analysis)

INTERPRETATION: The gender divide was somewhat equal, hence no results are lopsided in terms of age as a factor.

- EDUCATION LEVEL

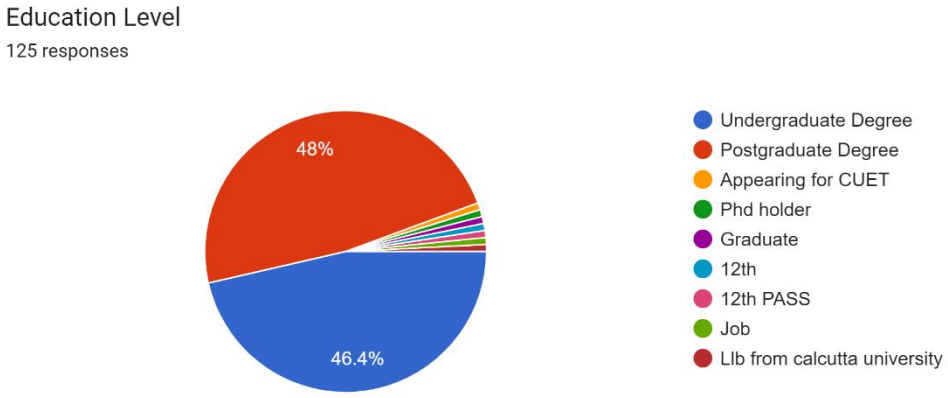

FIG 5.3- Education Level Distribution (Self Analysis)

INTERPRETATION: All of the respondents were educated, a few just passing school, but most of the respondents had higher education. This shows the demographics considered in terms of education level in this studies,i.e., emphasis was to consider higher education.

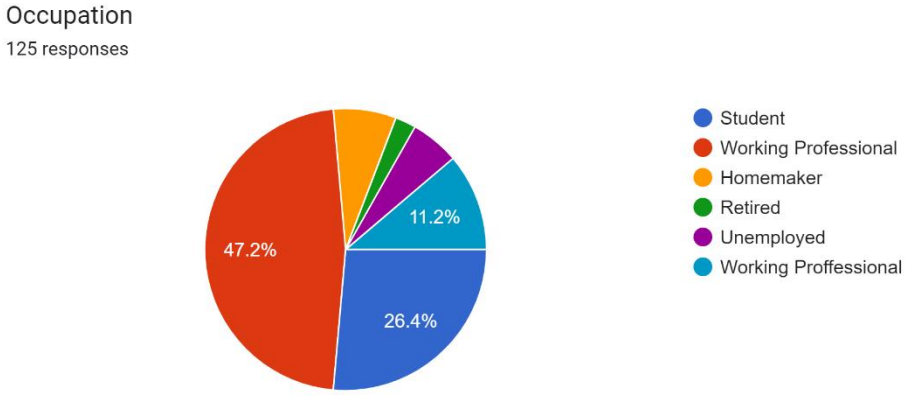

FIG 5.4- Occupation Distribution (Self Analysis)

INTERPRETATION: Almost half of the respondents were working professionals, and the next big cluster was of students. Almost 75% (Exact: 73.6%) of the respondents were either students or working professionals.

5.2) AGE vs AWARENESS

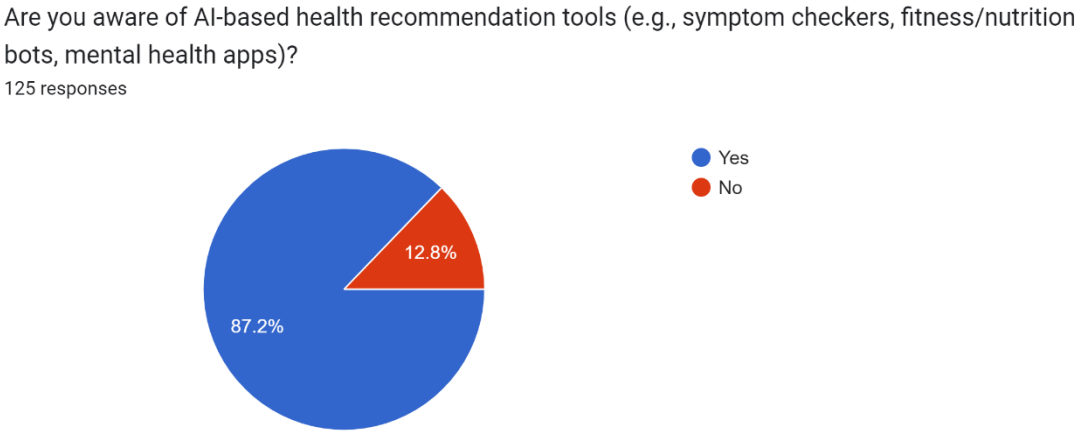

FIG 5.5- Demonstration of awareness differences (Self Analysis)

INTERPRETATION:

- A total of 125 responses were taken. Out of the 125 responses, 109 respondents mentioned being aware of the tools, whereas a total of 16 respondents mentioned being unaware of the tools that exist (the "NO" does not mean the respondents were unaware of AI in healthcare as a concept; the awareness was about being familiar with what all tools exist.

AGE GROUP	TOTAL	AWARE OR NOT	%
UNDER 18	1	1	100
18-25	42	40	95.2381
26-35	42	38	90.47619
36-45	15	13	86.66667
46-60	20	15	75
ABOVE 60	5	2	40

FIG 5.6- Age vs Awareness Distribution (Self Analysis)

- The above table was made using Excel, and it showed a clear decline in awareness as the ages increased. The results of those under 18 and above 60 were not generalized and conceded in further analysis due to the small sample size of both.

- The table used formulas of CountIf and Percentage. An example is mentioned below:

18-25	=COUNTIF(B2:B126,"18-25")	=COUNTIFS(B2:B126, "18-25", F2:F126, "Yes")	=G133/F133*100

INTERPRETATION:

- There is a gradual drop in awareness levels
- The “young” ages (18-25 and 26-35) showed high awareness. This can be due to high exposure and digital literacy. This insight can be useful in targeting different demographics for promoting tools.
- The ages 36-60 show a decrease, but it's gradual, hence it can be said that substantial awareness exists.
- So, the results showed: Clear differences in technical literacy and distrust, and discomfort with Artificial Intelligence.

5.3) Following The Recommendations And Did They Help:

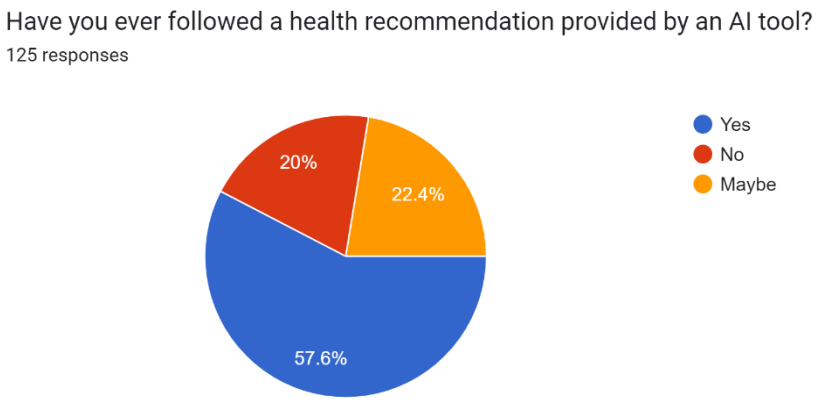

FIG 5.7- Responses chart (Self Analysis)

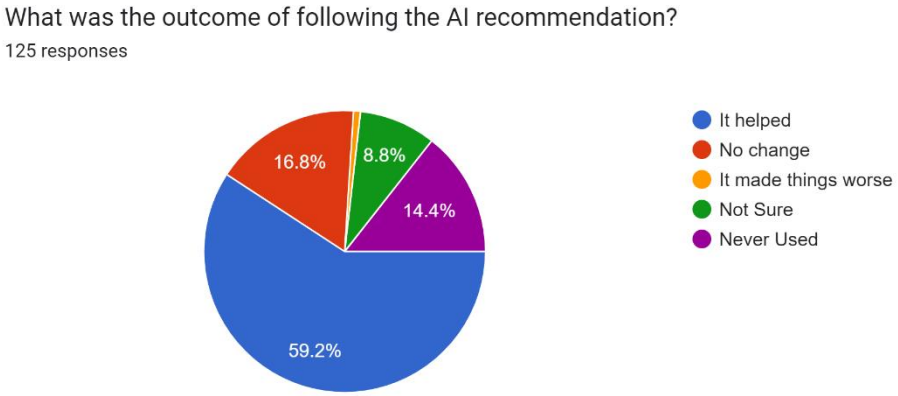

FIG 5.8- Response Distribution (Self Analysis)

INTERPRETATION:

A majority of respondents have followed an AI-based recommendation (57.6%) and the recommendations have helped (59%). These results, when combined with the most used AI tools, can be interpreted that majority used it to track their fitness and health and got benefited by the convenience of AI tools in recommending exercise plans, diet recommendations, etc.

5.4) Trust

TRUST	
AVERAGE	3.248
KURTOSIS	-0.89317
SKEWNESS	-0.2622

Table 5.1- Different measures of trust levels (Self-Analysis)

INTERPRETATION:

- Average = 3.248
  - The average indicates a slightly positive level of trust in AI. (moderate to positive)
  - Respondents are generally moderate, and slightly more toward trusting AI, though not strongly.
- Kurtosis = -0.89

- The data distribution is flat (platykurtic),i.e., fewer extreme opinions.
- Most of the responses are clustered around the middle of the distribution, which shows balance.

❖ Skewness = -0.26

- The data is slightly negatively skewed, with more responses on the positive side.
- Some of the respondents showed low trust, but the majority showed positive trust.

These results are confirmed using the response distribution

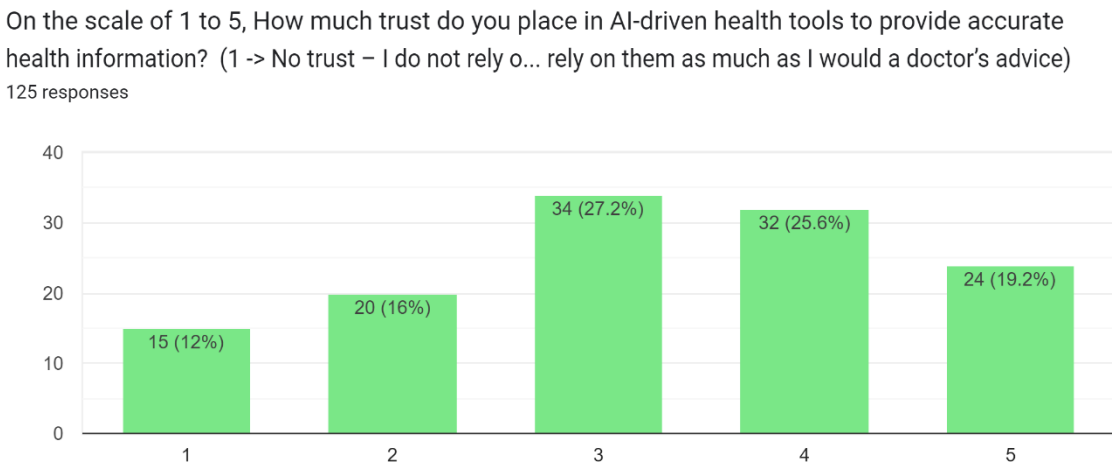

FIG 5.9- Trust Response Distribution (Self Analysis)

5.5) Behavioural Dimensions:

The users were provided with several questions where they could select all of the options that applied to them. Hence, the resulting data had multiple choices under one question, per respondent. Hence, in order to separately understand the most frequently selected options across key behavioral dimensions, Python (using Google Colab) was utilized to tokenize and then do one-hot encoding of the data. The data was divided into binary vectors (0- if not chosen and 1 if chosen).

Results:

The most chosen option count is below; it was obtained using the Max formula of Excel. (Annexure 2)

DIMENSIONS	MOST SELECTED OPTION-COUNT	ATTRIBUTE LINKED TO MOST CHOOSEN
FACTORS IMPACTING USAGE	64	CONVINENCE
MOST USED AI TOOL	84	FITNESS APPS
CONCERNS	69	PRIVACY
MOST FOLLOWED RECOMMENDATION	66	LIFESTYLE CHANGES
MAJOR RESONS OF NON-USAGE	48	PREFERENCE TOWARDS DOCTORS

TABLE 5.2- Most chosen attributes of different behavioural dimensions (Self Analysis)

The above table shows the options chosen by maximum respondents. This data helps understand what matters most to the general user in terms of what their concerns are, what is their main reason of using AI, which tool is the most used tool ,etc.

The table below shows all behavioral aspect options arranged according to their importance to the respondents

RANK	OPTION	TIMES SELECTED
1	FACTORS: Convenience	64
2	FACTORS: Curiosity	63
3	FACTORS: Cost Saving	34
4	FACTORS: To Avoid doctor	28
5	FACTORS: Lack of access to healthcare professionals	23
6	FACTORS: Privacy concerns with doctors	15
1	RECOMMENDATIONS: Lifestyle or diet change	66
2	RECOMMENDATIONS: Take rest / self-care	65
3	RECOMMENDATIONS: Consult a doctor	27
4	RECOMMENDATIONS: Try over-the-counter medication	12
1	REASONS: Preference for traditional doctor visits	48
2	REASONS: Not confident in the effectiveness of AI-based solutions	44
3	REASONS: Concerns about data privacy and security	43
4	REASONS: Lack of awareness about available tools	31
5	REASONS: Lack of trust in the technology	30
1	CONCERNS: Privacy of health data	69
2	CONCERNS: Accuracy of diagnosis	65
3	CONCERNS: Lack of personal touch	54
4	CONCERNS: Misleading advice	48
5	CONCERNS: Over-reliance by users	31
6	CONCERNS: None	6
1	TOOL: Fitness and Health Apps	84
2	TOOL: Symptom Checker	35
3	TOOL: Self Diagnosis tools	26
4	TOOL: Mental Health	22
5	None	21

TABLE 5.3- (Self Analysis)

5.6) Relation Between Misleading Advice And Reducing Trust Levels

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Monte Carlo Sig. (2-sided) Significance	Monte Carlo Sig. (2-sided) 99% Confidence Interval Lower Bound	Monte Carlo Sig. (2-sided) 99% Confidence Interval Upper Bound	Monte Carlo Sig. (1-sided) Significance	Monte Carlo Sig. (1-sided) 99% Confidence Interval Lower Bound	Monte Carlo Sig. (1-sided) 99% Confidence Interval Upper Bound
Pearson Chi-Square	16.822[a]	4	.002	.002[b]	<.001	.003			
Likelihood Ratio	16.908	4	.002	.003[b]	.001	.004			
Fisher-Freeman-Halton Exact Test	16.360			.002[b]	.001	.004			
Linear-by-Linear Association	6.745[c]	1	.009	.010[b]	.008	.013	.005[b]	.003	.007
N of Valid Cases	125								

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.76.

b. Based on 10000 sampled tables with starting seed 1556559737.

c. The standardized statistic is -2.597.

FIG 5.10- Chi Square test between misleading advice and trust (Self Analysis)

INTERPRETATION:

- The chi-square test was done to analyse the relationship between misleading advice and trust in artificial intelligence.
- The test shows that there is a strong and statistically significant relationship between misleading advice and trust because the significance level or p-value is less than 0.05. Hence, there is strong evidence of a statistically significant relationship.
- According to the observations, there is strong evidence that the level of concern regarding the advice that artificial intelligence provides as output significantly impacts and influences general users' trust in AI-based tools.
- The analysis also suggests that there is a directional trend, which means that as the concern increases, the trust levels decrease systematically and not randomly (p value = 0.009 < 0.05)
- Monte Carlo (p value= 0.002), All other tests included in the observations confirm the significance, further strengthening the reliability of the findings that misleading advice is an important factor that influences the trust levels. All tests (p < 0.05, most < 0.01) emphasise rejecting the independence of the variables.
- This data suggests that the accuracy and reliability of the results that artificial intelligence provides are a significant concern that most of the general public has. It is important for the new developers and entrepreneurs to focus on this aspect and work towards building the trust levels of the general public with regard to the misleading advice.

5.7) Relation Between Decreasing Trust And Lack Of Physical Touch

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Monte Carlo Sig. (2-sided) Significance	99% Confidence Interval Lower Bound	99% Confidence Interval Upper Bound	Monte Carlo Sig. (1-sided) Significance	99% Confidence Interval Lower Bound	99% Confidence Interval Upper Bound
Pearson Chi-Square	13.507[a]	4	.009	.008[b]	.006	.010			
Likelihood Ratio	14.956	4	.005	.006[b]	.004	.008			
Fisher-Freeman-Halton Exact Test	14.252			.006[b]	.004	.008			
Linear-by-Linear Association	5.450[c]	1	.020	.021[b]	.018	.025	.011[b]	.009	.014
N of Valid Cases	125								

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.48.

b. Based on 10000 sampled tables with starting seed 508741944.

c. The standardized statistic is -2.335.

FIG 5.11- Chi Square test between lack of physical interaction and trust (Self Analysis)

Test	Value	P-Value (2-Sided)	Interpretation
Pearson Chi-Square	13.507	0.009	Significant Association
Likelihood Ratio	14.956	0.005	Significant
Fisher-Freeman-Halton Test	14.252	0.006	Alternative To Chi-Square
Linear-By-Linear Association	5.450	0.020	Shows A Significant Trend
Monte Carlo (1-Sided)	-	0.011	Shows a Directional Significance

TABLE 5.4- Chi Square test between misleading advice and trust (Self Analysis)

sINTERPRETATION

- The Chi-Square results (χ^2=13.507, p=0.009) show a statistically significant relationship and association between lack of physical touch and trust level

- There was also a linear association test (χ^2=5.450, p=0.020) that was done which shows that there is a linear relationship, which means that as concerns increase the trust or likelihood to use AI in future will decrease.
- These analyses and findings show that addressing the concerns that the user has may directly improve the trust levels.
- So, the variables are not independent (p<0.01p<0.01), with evidence of a potential negative linear trend.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
TRUST * LessConfidenceOnEffectiveness	125	100.0%	0	0.0%	125	100.0%

TABLE 5.5- Chi Square test between confidence and trust (Self Analysis)

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Monte Carlo Sig. (2-sided)			Monte Carlo Sig. (1-sided)		
					99% Confidence Interval			99% Confidence Interval	
				Significance	Lower Bound	Upper Bound	Significance	Lower Bound	Upper Bound
Pearson Chi-Square	22.425[a]	4	<.001	<.001[b]	.000	<.001			
Likelihood Ratio	21.991	4	<.001	<.001[b]	.000	.001			
Fisher-Freeman-Halton Exact Test	21.236			<.001[b]	.000	<.001			
Linear-by-Linear Association	14.651[c]	1	<.001	<.001[b]	.000	<.001	<.001[b]	.000	<.001
N of Valid Cases	125								

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.28.

b. Based on 10000 sampled tables with starting seed 402218460.

c. The standardized statistic is -3.828.

TABLE 5.6- Chi Square test between confidence and trust (Self Analysis)

A chi-squared test was used to analyse the relationship between the confidence level of users in the effectiveness of AI and trust.

The results were statistically significant [$\chi^2(2, N = 125) = 9.966$, $p = .007$], which was also confirmed by a Monte Carlo simulation ($p = .009$). The significant Linear-by-Linear Association ($p = .003$) also shows that a directional relationship exists

between the variables. These findings suggest that confidence level in AI alters trust levels.

5.8) Delay In Hospital Visits And Convenience

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Monte Carlo Sig. (2-sided)			Monte Carlo Sig. (1-sided)		
				Significance	99% Confidence Interval		Significance	99% Confidence Interval	
					Lower Bound	Upper Bound		Lower Bound	Upper Bound
Pearson Chi-Square	9.966[a]	2	.007	.009[b]	.007	.012			
Likelihood Ratio	10.334	2	.006	.009[b]	.007	.012			
Fisher-Freeman-Halton Exact Test	10.005			.009[b]	.007	.012			
Linear-by-Linear Association	8.713[c]	1	.003	.004[b]	.002	.006	.002[b]	<.001	.003
N of Valid Cases	125								

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.20.

b. Based on 10000 sampled tables with starting seed 1437578359.

c. The standardized statistic is -2.952.

TABLE 5.7- Chi Square test between Hospital visit delays and convenience (Self Analysis)

INTERPRETATION:

- The Pearson Chi-Square p-value (0.007) is less than the significance value of 0.05 which indicates towards a statistically significant relationship between the ability to delay hospital visits and the level of convenience that AI brings.
- The Monte Carlo simulation supports these results p-value of 0.009, which further contributes towards the reliability of the results.
- The Likelihood Ratio Test and Fisher-Freeman-Halton Exact Test also gave similar results, confirming the results. The Linear-by-Linear Association (p = 0.003) indicates a significant trend relationship between the delay and convenience.
- This shows that the more the convenience provided by these tools increases, respondents mentioned they could delay the hospital visits.

FIG 5.10- Responses (from Self-made questionnaire)

5.9) Linear Regression: Model For Future Adoption Prediction

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	.519	.507	.645

a. Predictors: (Constant), ACCURACYQ, FREQQ, TRUST

TABLE 5.8- Linear regression: Future Adoption (Self Analysis)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.327	3	18.109	43.579	<.001[b]
	Residual	50.281	121	.416		
	Total	104.608	124			

a. Dependent Variable: FUTUREQ

b. Predictors: (Constant), ACCURACYQ, FREQQ, TRUST

11 TABLE 5.9- Linear regression: Future Adoption (Self Analysis)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.976	.193		5.068	<.001
	FREQQ	.175	.054	.246	3.222	.002
	TRUST	.197	.063	.272	3.130	.002
	ACCURACYQ	.269	.069	.335	3.898	<.001

a. Dependent Variable: FUTUREQ

TABLE 5.10- Linear regression: Future Adoption (Self Analysis)

INTERPRETATION:

- Multiple regression analysis was conducted during the research project in order to determine whether the perceived accuracy, trust levels, and frequency of use significantly predict the tendency of future adoption and use of AI health tools. The overall model's result shows that the model was significant, [$F(3, 121) = 43.579$, $p < .001$], and it explained a considerable and significant part of the variance of 52% in future use intentions of the general user (R value of 72.1% and $R^2 \approx 52\%$). Among the independent variables, accuracy perceived by the user ($\beta = .335$, $p < .001$) had the strongest influence, followed by trust ($\beta = .272$, $p = .002$) and lastly frequency of use ($\beta = .246$, $p = .002$).
- These findings highlight the importance of ensuring that the AI tools are as accurate as possible and are trustworthy in order to encourage the future adoption of AI tools.

5.10) Linear Regression: Model For Predicting Frequency Of Usage

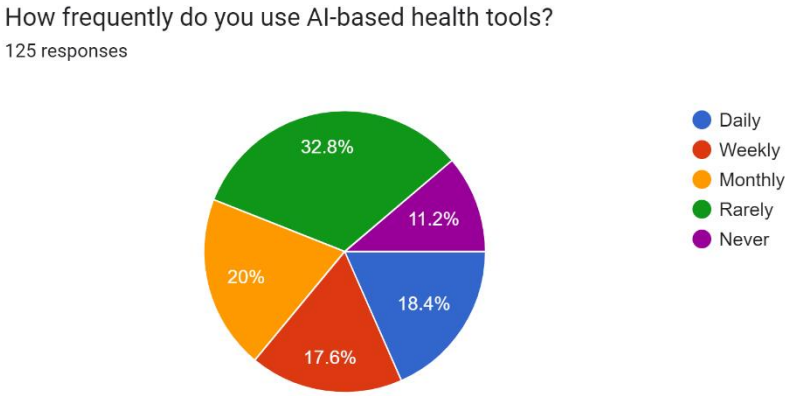

FIG 5.11- Responses (from Self-made questionnaire)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.629[a]	.395	.380	1.017

a. Predictors: (Constant), AwareQ, ACCURACYQ, TRUST

TABLE 5.11- Linear regression: Frequency of usage (Self Analysis)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.773	3	27.258	26.353	<.001[b]
	Residual	125.155	121	1.034		
	Total	206.928	124			

a. Dependent Variable: FREQQ

b. Predictors: (Constant), AwareQ, ACCURACYQ, TRUST

TABLE 5.12- Linear regression: Frequency of usage (Self Analysis)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.003	.355		.007	.994
	ACCURACYQ	.317	.105	.281	3.011	.003
	TRUST	.297	.095	.291	3.107	.002
	AwareQ	1.064	.277	.276	3.849	<.001

a. Dependent Variable: FREQQ

TABLE 5.13- Linear regression: Frequency of usage (Self Analysis)

INTERPRETATION:

- A multiple regression was performed to determine if perceived accuracy of results and provided recommendations, trust in tools, and the awareness of it, predicted the frequency of AI health tool usage.
- The overall model was statistically significant, as follows:
  - $F(3, 121) = 26.353$, $p < .001$, this meant that the model is successful in explaining a significant portion of the variance in frequency of use ($R^2 \approx 40\%$).
  - All independent variables : perceived accuracy ($\beta = .281$, $p = .003$), trust ($\beta = .291$, $p = .002$), and awareness ($\beta = .276$, $p < .001$)—were significant contributors.
- This suggests that user engagement is driven not only by positive perceptions of tool reliability but also by simple awareness of their existence.

5.11) Sentiment Analysis Of The Open-Ended Questions :(ANNEXURE C)

A sentiment analysis was done on the open-ended questions that were asked in the questionnaire. It was done using Transformers in Python, which provided the sentiment of the text and also the confidence level. Upon receiving the results the total number of negative and positive comments was summed in order to understand the general sentiment of respondents for that question.

1. What are your thoughts or feelings about using AI tools instead of directly visiting a doctor for basic health concerns? What will be your first reaction if you hear that someone used AI for health advice instead of a doctor?

RESULTS:

QUES 1	
NEGATIVE	75
POSITIVE	50

TABLE 5.14- Sentiment Analysis of Question 1 (Self Analysis)

- A larger number of negative responses shows that respondents in general had a negative sentiment towards the idea of prioritizing artificial intelligence-based recommendations over traditional visits to a doctor. This suggests that there is a significant prevailing scepticism and discomfort when it comes to traditional medicines being replaced by artificial intelligence-based health solutions.
- However, still a significant portion of respondents have mentioned positively about AI in Healthcare.
- This shows that there is a growing sense of openness towards artificial intelligence-based health solutions, but it is somewhat conditional, pertaining to the seriousness of the issue.
- As per the previous analysis, trust in reliability is one of the key concerns and hence contributes towards the negative sentiments of the respondents. This shows that there is a scope of education and awareness that could help shift the sentiments and perceptions.

2.Do you think the use of AI-based health tools will continue to grow in the future, or is it a short-term trend that may fade as people return to traditional healthcare methods? Please explain your viewpoint.

RESULTS:

QUES 2	
NEGATIVE	38
POSITIVE	87

TABLE 5.16- Sentiment Analysis of Question 2 (Self Analysis)

- There is a predominantly positive outlook which is shown by the significant majority of the responses received which expressed positive sentiments. This indicates that there is a strong belief that artificial intelligence-based health solutions will continue to grow in future and also reflect the confidence in its long-term relevance.
- There is still a small segment that shows negative sentiment and can be linked to scepticism, which can be due to concerns about reliability, lack of Personal touch, misleading advice, etc.
- Upon comparing these results with the results of the first question, It can be observed that despite the current hesitation about artificial intelligence in healthcare, they are still positive with regards to the advancements.

5.12) Perception about operational efficiency

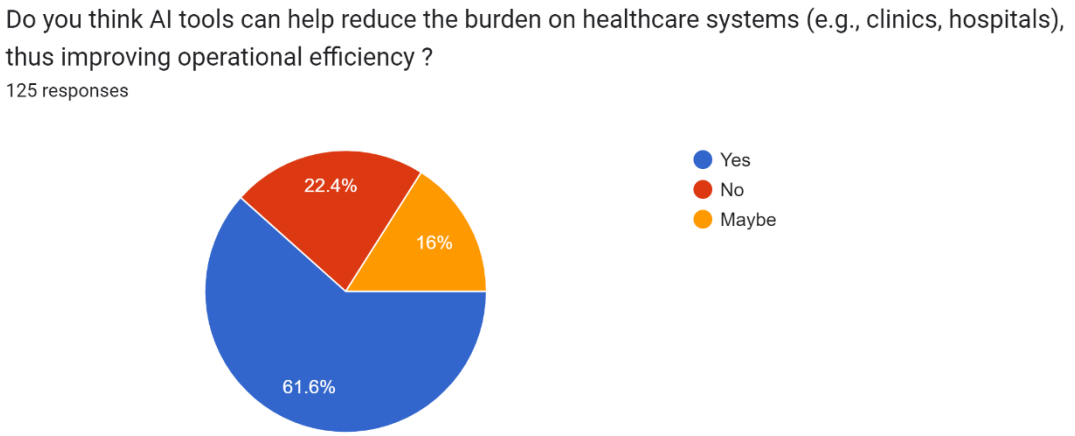

FIG 5.12- Responses (from Self-made questionnaire)

5.13) Limitations of the Study

- Sampling Bias: the sampling was done on a convenience sample of 125 respondents who likely over-represent the tech-literate and educated class and under-represent the older, less tech-savvy, less educated and low-income class with limited digital access and knowledge

- Self-Reported data: All data points collected were self-reported and hence can be at a risk of being socially desirable, etc These issues might lead to subjective perception.
- The data collected was cross-sectional.
- Non-response bias

CHAPTER 6: CONCLUSION

- This research project explored user behaviour, usage patterns, concerns, etc related to AI-based health tools. The study was focused on analyzing artificial intelligence tools adoption from the general user's perspective, including how they perceive, their trust level, the major concerns, frequently used tools and other behavioural analysis. A survey was conducted in order to gain insights from 125 respondents. Based on this survey data, crucial insights were derived to analyze the adoption, utilization, future perception, etc of artificial intelligence tools and healthcare to mean.
- The study revealed the most influential factors encouraging adoption, the most influential factors hindering adoption, the impact of trust on future perception and frequency of usage, and what influences trust levels.

AGE AND AWARENESS

- The study involved a diverse range of age groups from as young as below 18 to above 60. Out of the 125 responses ,109 respondents Said yes to being aware about the artificial intelligence tools whereas 16 mentioned that being unaware.
- The study revealed that as ages went up the awareness count decreased. This signifies that the younger population is moreover towards artificial intelligence healthcare tools whereas the elder population shows significant unawareness.
- This inside is significantly important when targeting a population or positioning the tool in the market.

FOLLOWING RECOMMENDATIONS

- 57.6% of respondents mentioned following an AI-based recommendation, and around 59% of respondents mentioned that the AI recommendation helped them.

TRUST

Trust is the core of the analysis. Its influence and what influences the trust levels have been greatly studied.

- As far as the class levels are concerned, The respondents were asked to score the Trust levels in AI On this scale of 1 to 5.
- The highest scored trust score was 3 which is neutral, And that is where most of the responses are clustered. However, the responses lean towards the positive side. This means that apart from being neutral, most of the respondents are positive towards trusting Artificial Intelligence but not strongly.
- The kurtosis and skewness scores represent the data being inclined and slightly skewed towards the right.

USER BEHAVIOUR ANALYSIS

- A user behavioural analysis was also conducted to understand the leading factors influencing or hindering AI adoption, the most used tool, etc
- According to the analysis, convenience is the leading factor that influences the use of artificial intelligence tools, whereas privacy concerns with doctors are the least influential factor towards the AI adoption
- The majority of the respondents who followed the AI recommendation tried having dietary or lifestyle-related changes. On the other hand, taking medication-based recommendations from artificial intelligence paste outputs remained the least accepted recommendation taking medication-based recommendations from artificial intelligence past outputs remained the least accepted recommendation. This signifies that users are OK with taking recommendations from artificial intelligence only for basic and smaller healthiest recommendations, but when it true something more complex, like medications, they tend to prefer Doctor visits. This shows that even though trust levels are there, they are only limited to when it is Only Limited to taking rest or having a diet change
- The majority mentioned that the reason for not adopting artificial intelligence tools frequently enough into their lifestyle was because of the preference for

traditional Doctor visits. This behavioural aspect had the least dispersed results, with almost all reasons getting scored from 30 to 48.

- As far as the concerns towards AI are concerned, privacy of health data and accuracy of diagnosis are the most mentioned concerns from the user's perspective, whereas over-reliance by users is the least mentioned concern. Lack of personal touch is also an important concern affecting trust and adoption.
- As far as the most used tools are concerned, fitness apps are the most commonly used form of AI in personal Health, and mental health chatbots are the least used tools.

FACTORS REDUCING TRUST LEVELS

- There is a strong relationship between the misleading advice provided by AI and reduced treatment levels.
- The chi-square test showed that a statistically significant relationship exists between the variables. This was strengthened by a Monte Carlo test.
- This can be concluded as: the correctness of the output matters to the user. They need to have correct and appropriate outputs since it is about something as significant as health. So, as the tendency to show misleading and inaccurate advice increases, it will significantly alter the trust levels, thereby reducing future adoption and frequency of usage.
- Another significant relationship was decreasing trust and a lack of physical touch. Many responded that the lack of physical touch, physical observation, and physical diagnosis is their reason for not trusting and adopting AI tools.
- Lack of confidence in the effectiveness of the tools is also significant in trust levels

FACTORS INFLUENCING ADOPTIONS

- As per the analysis done using SPSS, the significance levels show that trust and accuracy are the strongest attributes influencing the adoption of AI.

- Multiple factors were taken into consideration out of which two of the most significant factors found were trust levels and accuracy of the tools in terms of the output they generate.
- Public acceptance of artificial intelligence tools has greatly influenced my trust and accuracy and hence Increases adoption with increase in trust and accuracy levels of artificial intelligence tools. This means that users who trust the effectiveness and accuracy of the tools output are more likely to use them again.

FREQUENCY OF USE AND ADOPTION

- The frequency of use increases as awareness and past positive outcomes increase. Awareness and the effectiveness of the past outcomes significantly impact usage frequency by increasing it.
- Awareness about the tools greatly impact the increased adoption, this can be interesting and useful while trying to build up strategies to increase user adoption and targeting consumers.
- The effectiveness and accuracy of the past outcomes significant impacts on whether or not the user will reuse the tool.
- Awareness, accuracy of tools, and trust levels drive usage frequency.

FUTURE ADOPTION

- Accuracy of the tool, frequency of use, and trust levels define the majority of future adoption. In other words, the more accurate, frequently used, and trustworthy a tool is, the greater is its tendency to be adopted in future.

CONVINIENCE

Results showed that respondents have had delayed visits to doctors due to the convenience that the AI tools bring. It can be assumed that when the issue is not major or is related to diet or exercise, etc. , respondent tend to lean towards taking advantage of the tools.

SENTIMENT ANALYSIS

- Mixed feelings about replacing doctors with AI (more negative than positive).
- Strong belief that AI will grow and complement traditional healthcare.

FROM THE MANAGEMENT AND BUSINESS PERSPECTIVE:

- From the management's perspective, a clear shift can be seen in the user perception. They wish to adopt, but the significant concerns hinder adoptions. It is important of the new age business and entrepreneurs to work on the concerns and strengthening the positives. It is important for them to continually work towards building user trust levels by understanding what matters most.
- It is important to focus on what the user wants to adopt instead of focusing on what they might adopt. This is significant because in a field as sensitive as healthcare, building trust is difficult, and hence building it on something whose base is already laid down by the user is easier.
- Focus:
  - Design Transparency
  - Demographic Targeting
  - Develop age-specific campaigns: gamified apps for youth, simplified interfaces for seniors.
  - Partner with community centres to educate older adults on AI tool benefits.
  - Accuracy Validation
  - Pursue third-party certifications and clinical validations.
  - Privacy Assurance (by adopting to GDPR/CCPA compliance frameworks, etc.)
  - User-Centric Design is essential
  - Trust and Privacy should be treated as Core Pillars
  - Complement and not replace: Sentiment data suggests that users are more willing to supplement traditional healthcare with AI tools rather than replace it entirely. Businesses and developers should focus on hybrid models that integrate AI without replacing or removing the influence of human professionals.

Upon knowing and understanding what users want, what is hindering the widespread usage, etc., organizations that work towards building AI tools can significantly focus on what matters. This will help ease the road to adoption for the users, and they will feel more at ease while adopting tools. This also helps decide future investments in terms of campaigns, infrastructure development, policy changes, etc. By this, they can also gain a competitive advantage in terms of service delivery, patient engagement, and efficiency in operations

ANNEXURE

ANNEXURE A - Circulated Questionnaire

SECTION A: Demographic Information

Name *

Your answer

Age *

- Under 18
- 18-25
- 26-35
- 36-45
- 46-60
- Above 60

Gender *

- Male
- Female
- Other/Prefer not to say

Education Level *

- Undergraduate Degree
- Postgraduate Degree
- Other: _____

Occupation *

- Student
- Working Professional
- Homemaker
- Retired
- Unemployed

SECTION B: Awareness & Usage of AI-Based Health Tools

Are you aware of AI-based health recommendation tools (e.g., symptom checkers, fitness/nutrition bots, mental health apps)? *

- Yes
- No

Which of the following have you used? (Select all that apply) *

- [ ] Symptom checker (e.g., WebMD, Practo)
- [ ] Fitness/nutrition app (e.g., HealthifyMe, Possible,etc)
- [ ] Mental health chatbot (e.g., Elomia Health)
- [ ] Online self-diagnosis tools (e.g., Amaha)
- [ ] None of the above
- [ ] Other: _____

How frequently do you use AI-based health tools? *

- ◯ Daily
- ◯ Weekly
- ◯ Monthly
- ◯ Rarely
- ◯ Never

If used, what factor(s) made you use AI-based health tools? *

- ☐ Convenience
- ☐ Cost Saving
- ☐ Lack of access to healthcare professionals
- ☐ Curiosity/self-check
- ☐ Privacy concerns with doctors
- ☐ To Avoid visiting a Doctor
- ☐ Other: _____

SECTION C: Behavioral Patterns and Perception

On the scale of 1 to 5, How much trust do you place in AI-driven health tools to provide accurate health information? *
(1 -> No trust – I do not rely on AI tools for any health-related decisions
3 -> Moderate trust – I consider AI suggestions but cross-check them with other sources
5 -> A lot of trust – I rely on them as much as I would a doctor's advice)

	1	2	3	4	5	
No Trust	◯	◯	◯	◯	◯	A Lot of trust

If 1 to 3, What factors makes your trust levels lower and *
If 4 or 5, what makes you have high trust levels on AI ?

Your answer _____

Have you ever followed a health recommendation provided by an AI tool? *

- ◯ Yes
- ◯ No
- ◯ Maybe

If yes, what type of recommendation did you follow? *

- ☐ Take rest / self-care
- ☐ Try over-the-counter medication
- ☐ Consult a doctor
- ☐ Lifestyle or diet change
- ☐ Other: _____

What was the outcome of following the AI recommendation? *

- It helped
- No change
- It made things worse
- Not Sure
- Never Used

What is the main reason you have not/ rarely used AI health tools? *
(If you are a frequent user please mention it in the "Other" option)

- [ ] Lack of trust in the technology
- [ ] Lack of awareness about available tools
- [ ] Preference for traditional doctor visits
- [ ] Concerns about data privacy and security
- [ ] Not confident in the effectiveness of AI-based solutions
- [ ] Other: _____

Would you consider following an AI recommendation again in the future? *

- Definitely
- Maybe
- Unlikely
- Never

SECTION D: Operational & System-Level Reflections

Did using an AI tool help you delay or avoid a visit to a doctor? *

- Yes
- No
- Not Sure

Do you think AI tools can help reduce the burden on healthcare systems (e.g., clinics, hospitals), thus improving operational efficiency ? *

- Yes
- No
- Maybe

In your opinion, how accurate are AI-driven health tools? *

- Very accurate
- Somewhat accurate
- Neutral
- Not very accurate
- Not accurate at all

What concerns do you have about AI health tools? (Select all that apply) *

- [ ] Privacy of health data
- [ ] Accuracy of diagnosis
- [ ] Lack of personal touch
- [ ] Misleading advice
- [ ] Over-reliance by users
- [ ] None
- [ ] Other: _____

Section E: Your Final Thoughts

Would you recommend AI health tools to others? *

- ( ) Yes
- ( ) No
- ( ) Maybe

What are your thoughts or feelings about using AI tools instead of directly visiting a doctor for basic health concerns? What will be your first reaction if you hear that someone used AI for health advice instead of a doctor? *

Your answer

Do you think the use of AI-based health tools will continue to grow in the future, or is it a short-term trend that may fade as people return to traditional healthcare methods? Please explain your viewpoint. *

Your answer

What advancements or changes do you believe are needed for AI health tools to become a central part of personal healthcare in the future? Do you think they will eventually replace traditional healthcare methods or complement them? *

Your answer

Submit Clear form

ANNEXURE B) Sentiment Analysis

	A	B	C	F	G	H	K	L	M
1	Text_1	Sentiment_1	Confidence_1	Text_2	Sentiment_2	Confidence_2	Text_3	Sentiment_3	Confidence_3
2	Not intere	NEGATIVE	0.9998	Short term	NEGATIVE	0.9934		POSITIVE	0.9541
3	It's really	POSITIVE	0.9995	Yes,by new te	POSITIVE	0.9185	Yes,it may	NEGATIVE	0.9948
4	I am no pi	NEGATIVE	0.9897	No	NEGATIVE	0.9964	Yes	POSITIVE	0.9998
5		POSITIVE	0.9541		POSITIVE	0.9541		POSITIVE	0.9541
6	AI is good	POSITIVE	0.9998	Yes its grow	POSITIVE	0.9993	Yes ai rep	POSITIVE	0.9645
7	For basic	NEGATIVE	0.9943	Yes I think he	NEGATIVE	0.9917	No both a	NEGATIVE	0.9968
8	Not sure	NEGATIVE	0.9997	Maybe	NEGATIVE	0.8917	Adding in	POSITIVE	0.9998
9	AI tools c	NEGATIVE	0.9994	Yes, AI-based	NEGATIVE	0.8851	To becom	NEGATIVE	0.9808
10	self know	POSITIVE	0.999	yes	POSITIVE	0.9998	yes	POSITIVE	0.9998
11	It's great	POSITIVE	0.9999	AI based hea	POSITIVE	0.9973	Yes it will	POSITIVE	0.9983
12	Using AI f	NEGATIVE	0.9993	AI-based hea	POSITIVE	0.9983	AI health	POSITIVE	0.9882
13	AI can be	POSITIVE	0.952	Just like any	POSITIVE	0.9979	Anything	POSITIVE	0.9985
14	As of now	POSITIVE	0.9058	Yes I think AI	NEGATIVE	0.9731	As I am n	NEGATIVE	0.9484
15	This save	POSITIVE	0.9952	We can conti	POSITIVE	0.9978	It's help s	POSITIVE	0.9881
16	I would re	NEGATIVE	0.9975	It it surely wi	NEGATIVE	0.9928	It has to v	NEGATIVE	0.9832
17	I would re	NEGATIVE	0.9929	AI-based tool	NEGATIVE	0.8765	Increased	POSITIVE	0.9992
18	Are you m	NEGATIVE	0.9965	it may grow i	POSITIVE	0.9217	100% acc	POSITIVE	0.9997
19	Using AI t	NEGATIVE	0.9795	The use of AI-	POSITIVE	0.9979	For AI hea	POSITIVE	0.9641
20	Usage of A	NEGATIVE	0.9919	I think that A	NEGATIVE	0.9989	According	NEGATIVE	0.9957
21	Using AI t	NEGATIVE	0.9965	I believe the	POSITIVE	0.9989	For AI hea	POSITIVE	0.9903
22	Advice hi	POSITIVE	0.9265	Yes	POSITIVE	0.9998	Yes they c	POSITIVE	0.9723
23	I'd be a bi	POSITIVE	0.9923	I think it will	NEGATIVE	0.9822	I don't thi	POSITIVE	0.9968
24	AI	NEGATIVE	0.9986	A	POSITIVE	0.9873	A	POSITIVE	0.9873
25	OMG	NEGATIVE	0.9754	Will continue	POSITIVE	0.9987	Maybe so	POSITIVE	0.9342
26	Awesome	POSITIVE	0.9999	Yes	POSITIVE	0.9998	Voice acti	POSITIVE	0.9709
27	If conditi	NEGATIVE	0.9741	Long term he	POSITIVE	0.9943	Will beco	NEGATIVE	0.9895
28	It's very v	POSITIVE	0.9997	I think use of	POSITIVE	0.9959	Neel to be	POSITIVE	0.9543
29	Using AI f	NEGATIVE	0.9825	While the AI	POSITIVE	0.9988	AI health	NEGATIVE	0.9757
30	I am a wo	NEGATIVE	0.995	They will con	NEGATIVE	0.9973	Although	POSITIVE	0.9989
31	Currently	NEGATIVE	0.9997	They'll defini	POSITIVE	0.9998	They need	NEGATIVE	0.9992
32	I could pc	POSITIVE	0.9765	Yes, as AI bec	POSITIVE	0.9896	Better con	POSITIVE	0.9954
33	Never use	POSITIVE	0.8808	Currently AI	POSITIVE	0.9972	Well in m	POSITIVE	0.6281
34	Do not ha	NEGATIVE	0.9994	Yes it will	POSITIVE	0.9998	I think the	POSITIVE	0.9986
35	It is very	NEGATIVE	0.9931	Yes, I believe	POSITIVE	0.9937	No, not ex	POSITIVE	0.9838
36	My first r	NEGATIVE	0.9864	AI-based hea	POSITIVE	0.9915	AI health	POSITIVE	0.9855
37	Visit a do	NEGATIVE	0.9978	AI based hea	POSITIVE	0.9764	It can con	NEGATIVE	0.9981
38	Makes se	NEGATIVE	0.8015	Yes I do think	POSITIVE	0.982	For AI too	NEGATIVE	0.9736
39	I would bi	NEGATIVE	0.9986	Considering t	POSITIVE	0.8835	A broader	NEGATIVE	0.7744
40	I think AI	NEGATIVE	0.9934	I think the us	POSITIVE	0.9841	better acc	POSITIVE	0.963
41	Na	NEGATIVE	0.9811	Na	NEGATIVE	0.9811	Na	NEGATIVE	0.9811

QUES 1		QUES 2		QUES 3	
NEGATIVE	75	NEGATIVE	38	NEGATIVE	52
POSITIVE	50	POSITIVE	87	POSITIVE	73

ANNEXURE C) Python Code for Sentiment Analysis

```python
import pandas as pd
from transformers import pipeline
from google.colab import files
import io

uploaded = files.upload()
file_name = next(iter(uploaded))

df = pd.read_excel(io.BytesIO(uploaded[file_name]), sheet_name=0)
print("Detected columns:", df.columns.tolist())

sentiment_pipeline = pipeline("sentiment-analysis", model="distilbert-base-uncased-finetuned-sst-2-english")

target_columns = [1, 2, 3]

for col in target_columns:
    if col not in df.columns:
        print(f"Column {col} not found. Skipping.")
        continue

    sentiments = []
    confidences = []

    for review in df[col].astype(str):
        result = sentiment_pipeline(review)[0]
        sentiments.append(result['label'])
        confidences.append(round(result['score'], 4))

    result_df = pd.DataFrame({
        f'Text_{col}': df[col],
        f'Sentiment_{col}': sentiments,
        f'Confidence_{col}': confidences
    })
    output_file = f"sentiment_column_{col}.xlsx"
    result_df.to_excel(output_file, index=False)
    files.download(output_file)
```

Choose Files ALL SENT.xlsx