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**EVALUATION OF FACTORS INFLUENCING**  
**THE UTILIZATION OF IOT-BASED**  
**WEARABLE DEVICE TECHNOLOGY FOR**  
**HEALTHCARE AMONG SOUTH INDIAN**  
**POPULATION**



**Griffith College**

**A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF**

**MSc in Medical Device Technology and Business (QQI)**

**Innopharma labs and the faculty of science**

**Dissertation Supervisor: Patricia Mooney**

**NANCY SINHA**  
**FEB 2024-JUN2025**

## CANDIDATE DECLARATION

I hereby declare that the dissertation entitled: “**EVALUATION OF FACTORS INFLUENCING THE UTILIZATION OF IOT-BASED WEARABLE DEVICE TECHNOLOGY FOR HEALTHCARE AMONG SOUTH INDIAN POPULATION**” submitted in partial fulfillment of a MSc in Medical Device Technology and Business is the result of my work and due acknowledgement given, I further confirm that I have not copied anyone else's work.

**Candidate Name: Nancy Sinha**

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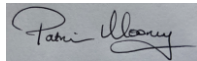
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**Supervisor Name: Patricia Mooney**

**Date: 12/05/2025**

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I wish to convey my heartfelt appreciation to God, whose grace and strength have served as my guiding light during this journey, for which I am forever grateful.

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**NANCY SINHA**

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## **ABBREVIATION**

1.	BI	Behavioral Intention
2.	CGM	Continuous Glucose Monitoring
3.	COVID 19	Coronavirus Disease 2019
4.	DBM	Digital biomarker monitoring
5.	ECG	Electrocardiograph
6.	EMG	Electromyograph
7.	GCEP	Griffith College Ethics Process
8.	GPS	Global Positioning System
9.	HVs	Health Values
10.	HWDs	healthcare wearable devices
11.	IoT	Internet of Things
12.	LED	Light Emitting Diode
13.	MCQ	Multiple Choice Questions
14.	mHealth	Mobile Health
15.	PBC	Perceived Behavioral Control
16.	PEOU	Perceived Ease of Use
17.	PU	Perceived Usefulness
18.	SN	Subjective Norm
19.	SpO2	Blood Oxygen
20.	TAM	Technology Acceptance Model
21.	TTF	Task Technology Fit
22.	UTAUT2	Unified Theory of Acceptance and Use of Technology 2
23.	WHDs	Wearable Health Devices
24.	WHO	World Health Organization

## **Abstract**

**Background:** In recent years, the healthcare sector has grown significantly, although according to the World Health Organization (WHO), chronic illnesses are responsible for 75% of global deaths and create significant economic hardships. IoT-based wearable devices offer an effective means for diagnosis, continuous monitoring, and management. The IoT-based wearable medical devices market in India is blooming due to a growing emphasis on healthcare technology and personal well-being. Despite its advantages, some hesitation and factors influence the adoption of wearable technology in public perception.

**Aim and Objective:** The study focused on assessing user behavioral intentions, usefulness, social influence, privacy concerns, and other external factors like infotainment, wearability, healthcare, style, and connectivity that will affect the utilization of wearable devices for healthcare in South Indian perception.

**Method:** The study incorporated TAM and TTF models with external factors to build a conceptual framework. The study was a quantitative, cross-sectional web-based survey that included participants aged 18-64 years. The survey included questions relating to socio-demographics and the factors affecting adoption. The Pearson correlation test and regression test were used to analyze the relationship between the variables.

**Results:** A total of 295 responses were obtained. In all, 51.2% were male users, and 59.3% of users were aged 26-50 years. 52% of users were highly qualified, and 78.9% of the middle to upper-middle income group were using wearable devices. Smart monitoring device was mainly used by females. PEOU and PU have a significant positive impact on BI. Social influence, fashionability, and wearability showed a positive influence on BI. Privacy concerns showed an insignificant effect on behavioral intention. TTF showed a strong positive correlation with PEOU and PU, while infotainment, connectivity, and healthcare had moderating effect on TTF.

**Conclusion:** The study found that the TAMs internal factors, namely perceived usefulness, perceived ease of use had significant correlation with intention to use wearable device and other factor showed positive medium to strong effect on adoption of wearable for healthcare. Future research should focus on larger, more diverse samples and cost reduction strategies, and privacy personalization paradox.

**Key words:** Wearable health device, Behavioral intention, TTF, perceived usefulness, South India, Adoption

# **CHAPTER 1: INTRODUCTION**

## **1.1 Background of the study**

Over the past few years, the healthcare sector has undergone rapid expansion, making significant contributions to both revenue and employment growth. A few years back, diagnosing diseases and abnormalities in the human body was only achievable following a physical examination in a hospital. Most patients needed to remain in the hospital for the duration of their treatment. This led to higher healthcare expenses and put pressure on healthcare facilities in rural and remote areas.(Pradhan *et al.*, 2021). According to the World Health Organization (WHO), chronic illnesses are responsible for 75% of global deaths and create significant economic hardships. Ongoing and real-time surveillance is crucial for improved care of individuals with chronic conditions, such as cardiovascular diseases, diabetes, and neurological disorders. Consequently, different approaches are necessary for the diagnosis and treatment of such ailments, and a successful approach has been initiated through the use of Health Wearable Devices. (Iqbal *et al.*, 2021).

In contemporary society, people face the pressing challenges of rapid learning, job obligations, and the intricacies of everyday living. Additionally, the occurrence of chronic conditions, like heart disease, is increasing, creating further challenges for overall health management. Simultaneously, healthcare providers are encountering numerous urgent challenges in the modern healthcare environment. These encompass dealing with an aging demographic, tackling the rising prevalence of chronic illnesses, managing the increasing expenses linked to hospital stays, and reducing the chances of medical mistakes. These wearable devices will be an aid to healthcare professionals, reducing their burden, as well as for patients by avoiding longer durations of hospitalization and having the ability to monitor their health in the comfort of their own space.(Singh and Jaiswal, 2023)

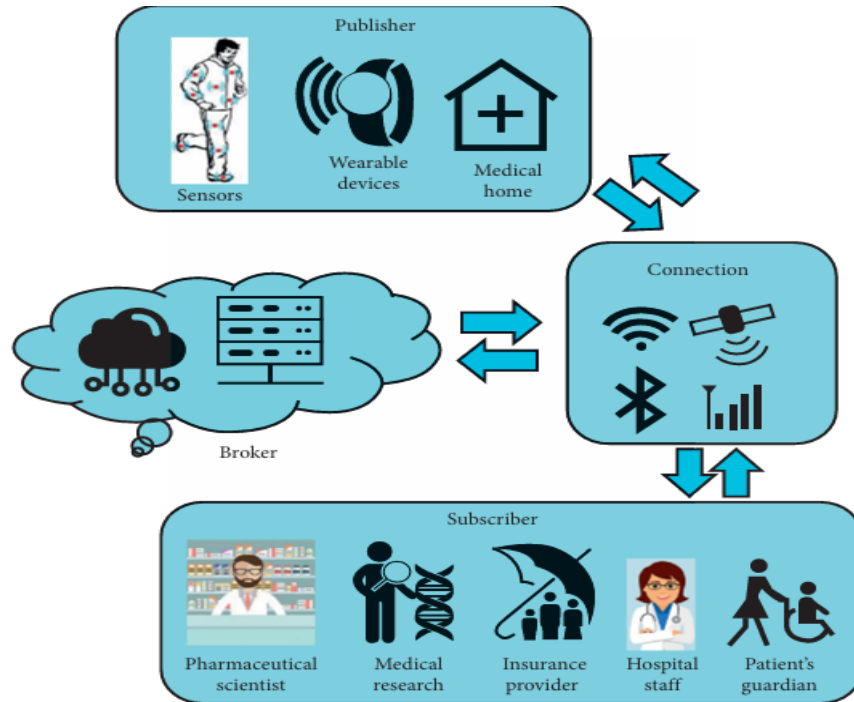
This perspective of healthcare technology has changed the hospital-focused healthcare system to patient-centric healthcare. For instance, numerous clinical assessments (like monitoring blood pressure, blood glucose levels, SpO2 levels, etc.) can be assessed at home without the assistance of a healthcare provider. Moreover, clinical information can be transmitted from remote locations to healthcare facilities via advanced telecommunication services. Combining these communication services with swiftly evolving technologies (such as machine learning, big data

analytics, Internet of Things (IoT), wireless sensing, mobile computing, and cloud computing) has enhanced the availability of healthcare services. IoT has not only improved independence but also broadened how humans can engage with the surrounding environment. IoT, aided by advanced protocols and algorithms, emerged as a key player in global communication. It links numerous devices with wireless sensors, household appliances, and gadgets to the Internet.(Pradhan *et al.*, 2021).

The IoT-based wearable medical devices market in India is blooming due to a growing emphasis on healthcare technology and personal well-being. These devices, equipped with sensors and data analysis, enable real-time health monitoring. The rise in health awareness and a tech-savvy population has significantly boosted their adoption. Key types of wearable devices include fitness trackers, smartwatches, heart rate monitors, and glucose monitors, aiding individuals in managing chronic conditions and enhancing overall health. Government initiatives and technological advancements further drive market growth, positioning the wearable medical devices sector for ongoing expansion in personalized health management and monitoring. It is predicted that the market rate will increase by 15.5 % by 2033.(IMARC, 2025)

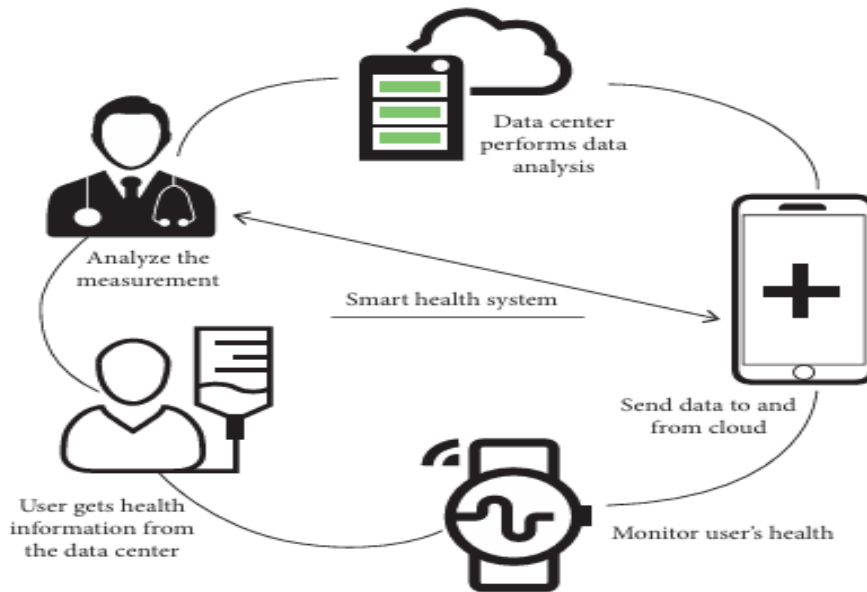
## **1.2 Importance of IoT-based wearable devices**

In the past decade, consumer engagement with technology and artificial intelligence has significantly grown, notably through the acceptance of wearable technology (Rahmani et al., 2022). Popular consumer services of the Internet of Things (IoT), including wearable gadgets and smartphones, are widely embraced for health tracking within smart medical care frameworks (Nia *et al.*, 2021). The IoT is a network of physical objects with sensors and software that connect and share data via the Internet, making devices smarter. In healthcare, IoT enables physicians to assist patients remotely through mobile health monitoring devices, facilitating personalized assessments and treatments. Despite rapid advancements, IoT's use in some medical areas is limited due to application challenges. Nevertheless, ongoing medical research indicates a bright future for IoT in healthcare, enhancing data generation, sharing, and innovative medical solutions through improved connectivity.(Marques *et al.*, 2021).



**Figure 1: Framework of IoT in Healthcare (Pradhan et al., 2021).**

IoT (Internet of Things) is crucial in healthcare, enhancing research and patient management through interconnected devices like sensors. It relies on four principles: data gathering, analog-to-digital signal conversion, cloud storage, and advanced analytics. Unlike traditional methods, IoT offers real-time data, including wearables that monitor vital signs for personalized care. For physicians, it facilitates patient connections and compliance tracking. Major hospitals incubate IoT solutions, addressing data variability. Ultimately, IoT promotes early illness detection, improves decisions, enhances quality of life, and boosts healthcare accessibility. (Marques *et al.*, 2021)



**Figure 2: Applications of Health IoT (Pradhan et al., 2021)**

Wearable medical devices operate autonomously and are designed for prolonged use on the body to monitor health conditions, providing valuable medical insights through data transmission. These lightweight and compact devices are user-friendly, making them accessible even to untrained patients. Recent technological advancements have enhanced their capabilities, enabling real-time data collection, alert systems, and wireless communication. Wearable healthcare devices fall into three categories: 1) disease prediction, 2) disease management, and 3) activity monitoring. Disease prediction helps identify undiagnosed conditions, contributing to a proactive healthcare system, especially for the elderly. Disease management focuses on long-term illnesses like diabetes. An example is the Continuous Glucose Monitoring System (CGM), which has revolutionized blood glucose tracking, replacing the traditional finger-prick method. CGMs use sensors to gather data and display results on a screen, allowing for easier diabetes management via Internet connectivity, especially crucial during the COVID-19 pandemic when remote health monitoring became essential. Moreover, Activity trackers focus on metrics like calorie expenditure and heart rate (Nia *et al.*, 2021)

### **1.3 Aims and Objectives**

The purpose of the study is to evaluate and understand the factors that affect the adoption, acceptance, and ongoing use of IoT-based wearable health devices. The study will focus on

assessing user behavioral needs, intentions, privacy concerns, and other external factors that will affect the utilization of wearables. Moreover, it aims to analyze the perspective of the South Indian user regarding wearable devices for managing individual health.

The objectives of the study are as follows:

1. To evaluate demographic variables (like Age, Gender, and Education level) and Economic status in wearable device users.
2. Assessing health management by analyzing perceived usefulness, behavioral use intentions, and perceived ease of use.
3. Evaluating the privacy concern and social influence of healthcare wearables devices.
4. Understanding subjective perceptions regarding technology and task fitness (connectivity, healthcare, infotainment, style, wearability).

#### **1.4 Justification of the study**

The adoption of wearable technologies has accelerated in developed nations but is just beginning in developing countries like India. India faces significant challenges related to chronic diseases like Diabetes and Cardiovascular Disease. IoT-based wearable devices can help manage these conditions by providing continuous monitoring and early detection of health issues. With a high patient-to-doctor ratio, Indian doctors can leverage data from wearable biosensors and mobile apps to enhance patient care. However, significant challenges exist in implementing these technologies, including high innovation costs and the need for increased customer awareness. (Singh and Jaiswal, 2023)

Studies have shown that factors like ease of use, perceived usefulness, and intention of use significantly influence the adoption of wearable technology. Moreover, other external factors like connectivity, social influence, fashion, and health motivation will affect the usage of wearable devices. The study disproportionately focuses on urban or suburban populations while neglecting rural areas, where healthcare infrastructure is less developed, and wearable technology may have unique challenges and opportunities. (Patil *et al.*, 2022).

Behaviors related to acceptance and adoption by individuals are essential for the success of technology-driven innovations like IoT-enabled wearables for health applications. When implementing new technologies in health management, the customer and the healthcare providers consistently worry about risks and unpredictability. Consequently, customers generally embrace new technologies at a later stage, once they find the device is safer to use. (Singh and

Jaiswal, 2023)

The high cost of digital health devices and the necessary infrastructure can be a barrier, particularly in limited-resource environments. Moreover, worries regarding data privacy and security are paramount. The collection and use of wearable medical devices raise significant ethical issues, and ensuring patient data protection is crucial for gaining patient trust and compliance. (Kaboré *et al.*, 2022). Therefore, a comprehensive evaluation framework will allow this study to tackle the proponents of the big challenges of the device which users explained in separate pieces of literature, it will enable us to highlight the gaps for uptake of wearable devices more generally, facilitate their integration into clinical practice, and ensure that they provide meaningful health management.

### **1.5 Structure of the Study**

The initial chapter prepares the foundation for the dissertation by clarifying the importance of the selected title and its necessity in future perspectives. It outlines the context of the project, explicitly defining the research objectives and aims and describing the general structure of the thesis. The literature review section provides thorough secondary research and analytically analyzes current research and related materials. It expands on the initial literature review by integrating details from articles that have undergone peer review, comprising research and review articles and online resources. The chapter on research methodology describes the research design and methods applied to gather primary data. It outlines the methodology, encompassing surveys and data gathering approaches, and explain the selected method. The segment outlines how the study design was executed, detailing the intended participants and discussing any ethical considerations. The result and discussion chapter analyzes the research results and makes practical and logical conclusions. Outline the complementary and contrasting outcomes with those from the literature review. Data will be presented with the help of graphs, charts, images, and tables for the demonstration. The last chapter, which includes conclusions and recommendations, encapsulates the study summaries and examines their present and prospective effects. It offers pragmatic references, limitations, and suggests future perspectives.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

The swift progress of Internet of Things (IoT) technology has transformed the healthcare sector, with wearable health devices becoming a significant breakthrough. These gadgets, encompassing smartwatches, fitness trackers, and medical-grade wearables, provide unmatched possibilities for remote patient supervision, chronic illness management, and preventive healthcare. Nonetheless, despite their potential, the extensive use and implementation of IoT-enabled wearable devices in healthcare encounter various challenges and obstacles. This literature review intends to assess the elements affecting the use of these wearable health devices, emphasizing technological, user-related, healthcare system, and social factors.

The literature review focuses on an overview of wearable devices based on IoT, discussing their types and importance in contemporary healthcare. It subsequently analyzes the essential elements influencing their use, such as user acceptance, ease of use, demographic influences, health literacy, social perceptions, style, and wearability. Furthermore, the review emphasizes using theoretical models to study the acceptance of technology by the device user and address the obstacles and difficulties to implementation, including privacy issues, technological restrictions, and financial limitations.

### **2.2 Overview of IoT-based Wearable health device**

The term "Internet of Things" (IoT), introduced by Kevin Ashton in 1999, refers to Internet-connected data within a global service framework. IoT enhances healthcare by connecting physical objects, facilitating remote control and communication between patients and providers, thereby improving care quality and reducing costs. This paper reviews various IoT-based healthcare monitoring systems that promote life quality via remote services and real-time observation with wireless sensors. Key benefits include reduced costs, fewer human errors, and timely chronic condition detection. Wearable technologies track health metrics, while platforms like Arduino and Raspberry Pi gather data for cloud transmission, using machine learning for accurate diagnostics. The review emphasizes the need for robust security and addresses data privacy, scalability, and energy efficiency challenges.(Abdulmalek *et al.*, 2022)

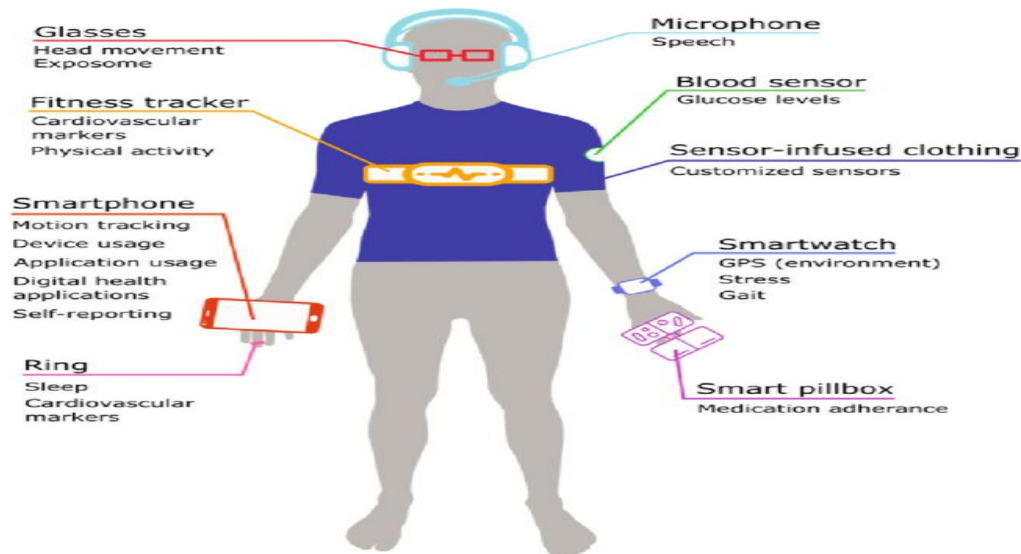
The COVID-19 pandemic severely stressed global healthcare systems, as a surge in infections

overwhelmed providers and necessitated quarantining due to the absence of effective treatments and vaccines. Quarantine makes it challenging for healthcare professionals to monitor, especially in cases that are mild or asymptomatic. To address this, an IoT-based wearable health monitoring system was proposed that tracks quarantined individuals' locations and vital signs, including body temperature, SpO<sub>2</sub>, and heart rate, in real-time. The data was uploaded to a cloud database for healthcare providers to analyze and offer early warnings. The validated system reduces healthcare burdens and enhances resource management, presenting a scalable solution for current and future pandemics. (Wu *et al.*, 2023)

In addition, these intelligent devices come in various forms and encompass a broad range of designs, including smart glasses, smart apparel, smart rings, smart accessories, skin patches, and much more, each aimed at addressing a facet of consumer health by efficiently gathering and analyzing data. Moreover, the ongoing digital tracking of human health in real-time stands out as a key advantage of employing IoT and wearable technology, which is fueling the growing popularity of wearables and enhancing the fusion of the physical and virtual worlds within the IoT sector. Nia *et al.*, (2021). T. Poongodi *et al.*, (2020) reported that, in 2020, over 33% of smartphone users will utilize at least five wearables. Wearables enhance the quality of human life in ways that smartphones alone cannot, and users are demonstrating remarkable enthusiasm for utilizing these devices in their daily lives. They encompass smart watches, jewelry, glasses, skin patches, and clothing. Capable of detecting and storing physiological data, wearables improve quality of life and perform micro-level tasks like checking messages and processing information efficiently. Additionally, they offer value-added services such as health monitoring, indoor positioning, IoT integration, navigation, healthcare insurance analysis, sports performance tracking, and financial transactions.

Smokovski, I. *et al.* (2024) described the significance of wearable devices as a biological biomarker for health management. The study highlights the rising global issue of Chronic non-communicable diseases (NCDs), which are leading causes of disabilities, morbidity, mortality, and socioeconomic challenges. Digital biomarker (DB) panels, tailored for specific conditions, have become critical for managing NCDs. DBs consist of measurable physiological, behavioral, and environmental data collected through advanced digital health technologies like wearables

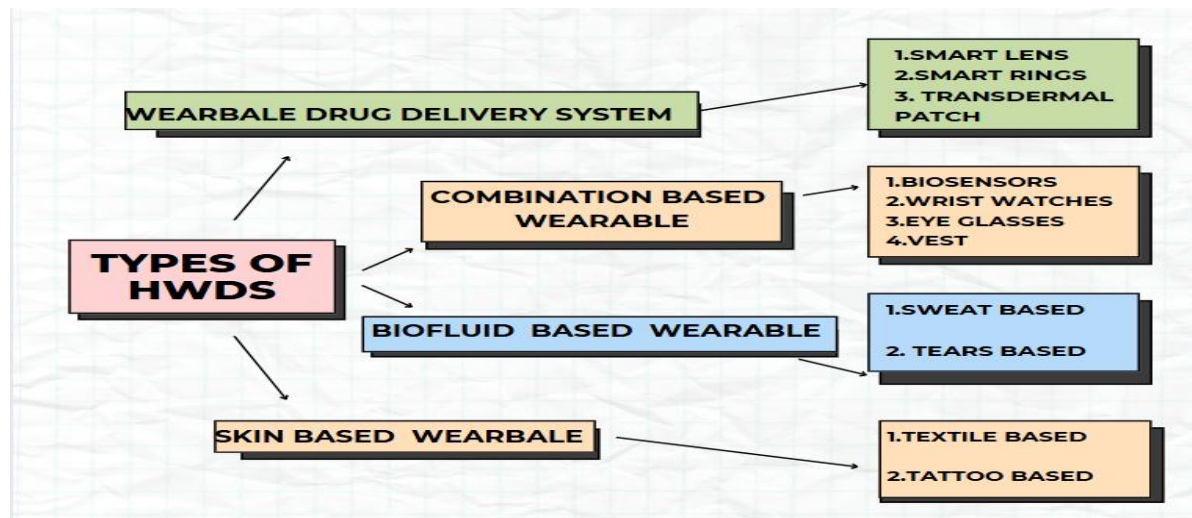
and sensors. This allows healthcare professionals to gather real-time insights, enabling proactive interventions for at-risk individuals. Digital biomarker monitoring (DBM) promotes enhanced healthcare quality and targeted prevention, ultimately improving quality of life and benefiting society.



**Figure 3: Customized wearable sensors for point-of-care, digital gadgets, and their uses in medical care (Smokovski et al., 2024)**

### **2.3 Classification of Healthcare Wearable Devices**

There are various noninvasive wearables such as skin-based devices, biofluidic wearables (like those using saliva, urine, and tears), Combination wearables, and wearables for drug delivery systems. (Iqbal *et al.*, 2021)



#### **Figure 4: Types of wearable health devices (Iqbal et al., 2021)**

Skin-based healthcare wearable devices (HWDs) encompass textile and tattoo forms that monitor physiological and psychological states, particularly for cardiovascular and neuromuscular health management. They facilitate disease diagnosis via skin excretion analysis. Textile-based HWDs feature embedded sensors in garments to track vital signs such as body temperature and heart rate. (Iqbal *et al.*, 2021)

(Jiang, 2020) and (Iqbal *et al.*, 2021) explained that an IoT device for rehabilitation, monitoring metrics like ECG and EMG, offers real-time feedback to improve treatment and manage health. Conversely, tattoo-based wearables, or e-skins, provide stable, comfortable monitoring of metrics like ECG and EEG, enhancing practicality for heart signal identification compared to traditional methods. Biofluids-based wearable devices (HWDs) utilize body fluids such as sweat, saliva, tears, and urine to extract crucial biomarkers for diagnostics through microfluidic systems and materials like polymers and microneedles. Sweat, a key indicator of internal changes, carries metabolites and electrolytes, enabling point-of-care metrics like glucose and lactate via smartphone colorimetric detection, which utilizes the camera and LED light found on a smartphone to characterize changes in color in a sample. Tears, important for disease diagnosis, especially diabetes, are monitored effectively through devices like Google Lens by Novartis. Additionally, advancements in biodegradable materials have led to drug delivery systems, exemplified by a polypropylene ocular ring, which gradually dispenses medications like bimatoprost for effective glaucoma treatment. Wearable devices encompass a range of biosensors, including smartwatches, vests, skin patches, and implantable devices, crucial for monitoring vital biomarkers like respiratory rates, particularly in managing heart failure. (Iqbal *et al.*, 2021)

These health wearable devices (HWDs) not only enable continuous monitoring but can also forecast heart failure outcomes. Innovations include an IoT fall detection system by (Saadeh *et al.*, 2019) and smart glasses by (Sciarrone *et al.*, 2021) for precise monitoring of eye blinks, enhancing neurological disorder detection

Authors	Dimensions	Key Findings
(Ozkan-Yildirim and Pancar, 2021)	Theoretical Model: TAM	<ul style="list-style-type: none"> <li>The TAM model Davis suggested depends on Perceived Usefulness (enhances the performance) and Perceived Ease of Use (free of effort). These two theories are predicted by Behavioral intention (Intention to use) to provide an actual result.</li> </ul>
(Cheung <i>et al.</i> , 2020)  (Gerold <i>et al.</i> , 2024)	PEOU, PU, and BI	<ul style="list-style-type: none"> <li>In their study on the acceptance of wearable health technology, they identified perceived usefulness as the most significant predictor of behavioral intention.</li> <li>Suggested research where the perceived ease of use positively affects three factors: perceived usefulness, attitude towards usage, and behavioral intention.</li> </ul>
(Aldhaban <i>et al.</i> , 2015)	TTF	<ul style="list-style-type: none"> <li>The Technology and task fitness (TTF) idea suggests that the attributes of tasks and the characteristics of technology merge to create task fit constructs, which ultimately predict an individual's performance and usage.</li> </ul>
(Cao <i>et al.</i> , 2024)  (Yadav, 2022)	Social Influence and Privacy Concern	<ul style="list-style-type: none"> <li>In that study, social influence significantly enhanced young adults' intentions to adopt mHealth. It indirectly boosted these intentions by positively influencing trust and health consciousness.</li> <li>The study demonstrated the potential of wearable health technology to create significant enhancements in public health while offering important insights into privacy concerns and data protection</li> </ul>
Patil <i>et al.</i> , (2022)	External Factors	<ul style="list-style-type: none"> <li>The study shows TTF revealed a notable positive correlation with connectivity, health care, communication, infotainment, perceived usefulness (PU), and perceived ease of use (PEOU).</li> </ul>

**Figure 5: Secondary Literature**

## **2.4 Theoretical Framework of Wearable Device Adoption**

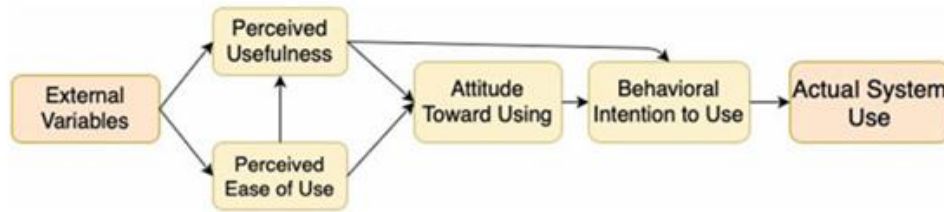
With the rising popularity of wearable technology (such as smartwatches) in society, it is believed to hold significant future potential. Research indicates that the adoption of wearable devices is rising within society, along with enthusiasm for this emerging technology. Concurrently, doubt regarding wearables diminishes, and consumers express greater optimism regarding the potential of wearables. Nonetheless, there are potential risks related to data usage and privacy issues that consumer faces. These issues could obstruct wearable technologies and therefore need to be considered, as the “Internet of Things and wearable technology will confront current social, economic, and legal standards”. (Wolf *et al.*, 2018)

Consequently, our study aims to pinpoint the factors influencing the adoption of wearable devices by utilizing the "Technology Acceptance Model" (TAM) established by Davis in 1985, which leads to the core research question of this paper.

### **2.4.1. TAM (Total Acceptance Model)**

(Ozkan-Yildirim and Pancar, 2021) adopted the model in their study depicting The TAM model suggested by Davis depends on two components Perceived Usefulness which means “*the degree to which a person believes that using a particular system would enhance his or her job performance*” and Perceived Ease of Use means “*the degree to which a person believes that using a particular system would be free of effort*”. These two theories used Behavioral Intention

“which is defined as a person’s perceived likelihood to engage in a given behavior, to get the actual result. Moreover, Davis established that there is a connection between perceived ease of use and perceived usefulness, as shown in the figure below.



**Figure 6: Technology Acceptance Model (Marques et al., 2021)**

Moreover, in 2000, Venkatesh and Davis expanded the TAM model by integrating new core constructs into two categories: social influence processes (subjective norm, voluntariness, and image) and cognitive processes (job relevance, output quality, and result demonstrability), alongside "Perceived Usefulness" and "Perceived Ease of Use." The TAM2 model captures individual connections through subjective norms, illustrating the roles of voluntariness and experience in technology adoption, proving effective in both voluntary and mandatory scenarios, particularly regarding mandatory cases.

(Wolf *et al.*, 2018) proposed a study to adapt the Technology Acceptance Model (TAM) for wearable devices, which includes five additional factors, focusing on two categories: perceived benefits and perceived risks. Perceived benefits include usefulness, enjoyment, and social image, while perceived risks encompass performance, financial, and privacy risks. The study found that these factors significantly influenced the overall perceived value of wearable devices, described as the customer’s perception based on benefits versus sacrifices. Stronger impacts of perceived benefits over risks suggest that positive experiences with smartphones enhance user acceptance of wearables. The social image was highlighted as a key factor for adoption, as wearables are often seen as fashionable accessories. Additionally, perceived usefulness and enjoyment emerged as crucial for perceived value, with users finding pleasure in wearables. Potential users, however, were more concerned with performance risk. Other factors like visual appeal and brand reputation were also noted as important for enhancing adoption through perceived enjoyment and social image.

#### **2.4.1.1 Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and Behavioral Intention (BI)**

The TAM model employs two main ideas, perceived usefulness and perceived ease of use, to predict the probability of users adopting a new technology. Perceived usefulness is described as “*the extent to which an individual thinks that usage of a specific system would improve his or her job performance.*” (Davis, 1989) Previous research has consistently identified perceived usefulness as a key factor influencing attitudes toward adopting wearable devices.(Sabbir *et al.*, 2020) . (Cheung *et al.*, 2020) In their study on the acceptance of wearable health technology, they identified perceived usefulness as the most significant predictor of behavioral intention. Despite the general agreement, some studies like (Tsai *et al.*, 2020) have indicated a non-significant connection between perceived usefulness and behavioral intention. However, the study shows that perceived usefulness indirectly affects behavioral intention via attitude. Thus, it can be inferred that perceived usefulness is the key element for the acceptance of wearable devices.

(Prayoga and Abraham, 2016) In their research, they seek to determine variables that they propose could potentially predict users' intention to use IoT health devices and combine them into a theoretical model. They analyzed users' technology acceptance from the perspective of the Technology Acceptance Model, using Perceived Usefulness as the major predictor of Behavioral Intention. They also incorporate Personality Traits and Facilitated Appropriation as elements to assess Perceived Usefulness. As a result, Perceived Usefulness can forecast the intention to utilize the device. Nevertheless, Personality Traits are considered unimportant in forecasting Perceived Usefulness. Only Facilitated Appropriation predicted Perceived Usefulness.

As per (Venkatesh and Davis, 2000), PEOU is characterized by the extent to which a person feels that utilizing a specific technology would involve minimal effort. As an individual's sense of how easy a specific technology is to use rises, their willingness to embrace it also expands.(Almaiah *et al.*, 2022) stated in his study that the perceived ease of use is one main key factor in adopting technology. Nearly all researchers agree on the significance and function of PEOU in technology adoption. Individuals embrace technology when they perceive it as easy to use and likely to

reduce their workload. In this study, PEOU refers to a user's perception that utilizing a Personal Health Record requires no mental or physical effort. (Alsyouf *et al.*, 2023). Previous studies have shown that the perceived ease of use significantly influences behavioral intention and directly or indirectly influences perceived usefulness. (Yin *et al.*, 2022).

(Gerold *et al.*, 2024) Suggested research where the perceived ease of use positively affects three factors: perceived usefulness, attitude towards usage, and behavioral intention. This indicates that 76% of 154 participants feel that wearables are easy to wear, with only a few showing disagreement or strong disagreement

Behavioral intention is a broad sign of a person's readiness to engage in a specific activity, along with the perceived probability of executing the behavior. It is regarded as a strong indicator of authentic behavior. In contrast to the original TAM model, this discussion posits that individuals' willingness to adopt wearables is shaped not only by their perceptions of using and acquiring them but also by the social norm and perceived behavioral control. A general principle indicates that an individual's intention to engage in specific behavior, namely the adoption of wearables in healthcare, is stronger when their attitude and subjective norm (SN) are more positive, along with a higher perceived behavioral control (PBC).(Singh and Jaiswal, 2023)

(Yin *et al.*, 2022) explored a study on the acceptance of wearable intelligent medical devices and the factors influencing their use, which have been under-researched. Key findings indicated that facilitating conditions (path coefficient =0.942,  $P < 0.001$ ) were essential for their utilization. Behavioral intention was a significant mediator for perceived risk, perceived cost, health expectation, perceived ease of use, and social influence (path coefficient =0.210,  $P < 0.001$ ). Notably, health expectation (0.860), perceived ease of use (0.289), and social influence (0.153) strongly predicted behavioral intention, while perceived cost (0.034) and perceived risk (-0.031) were less significant. Individuals with underlying diseases reported lower health expectations and perceived costs.

#### **2.4.2 TTF (Technology and Task Fitness)**

The TTF model was developed by Goodhue and Thompson (1995), They believe that adapting a new technology depends on an individual's task. The TTF model suggests that the alignment between task demands and technology capabilities results in the use of technology and improved performance outcomes. The TTF is described as “the extent to which a technology helps a person carry out their range of tasks.” Therefore, the TTF theory can address the lack of a TAM model. So far, various combined models of the TAM and the TTF framework have been created to clarify user behavior. The TTF was subcategorized as medical, lifestyle, infotainment, gaming, security/safety, medical, connectivity, sport/fitness, communication, and other. (Chang *et al.*, 2016). Moreover as per (Aldhaban *et al.*, 2015) The Task Fit Framework (TTF) idea suggests that the attributes of tasks and the characteristics of technology merge to create task fit constructs, which ultimately predict an individual's performance and usage. TTF might be a useful approach for assessing if an information system meets the requirements of its users.

#### **2.4.4 TAM- TTF Combined Model**

The TAM model combined with the TTF model analyzes technology through the user's perspective, focusing on adoption, acceptance, and performance outcomes. While TAM emphasizes intent to use, TTF centers on use outcomes, presenting contrasting views on technology utilization. The TTF-TAM extension maintains existing variable relationships but enhances literature by linking technology acceptance to attitude and behavior mechanisms, highlighting rational acceptance determinants like fitness and job performance. It addresses a research gap by acknowledging that users may accept technology despite poor attitudes if it enhances performance. Empirical validation shows that the combined model explains 51% of variation in utilization, outperforming separate models. (Davit Marikyan and Savvas Papagiannidis, 2023)

Patil *et al.*, (2022) conducted a study on factors affecting wearable health device technology in the Indian population. It was a web-based, cross-sectional survey that examined the perceptions influencing the adoption and use of wearable devices among individuals in India aged 16 and older. A sum of 495 responses was collected. Overall, 50.3% were aged 25–50, while 51.3% were

in the lower-income category. Although 62.2% of the respondents indicated they utilized wearable devices for health management, 29.3% used them daily. Technology and task fitness (TTF) revealed a notable positive correlation with connectivity, health care, communication, infotainment, perceived usefulness (PU), and perceived ease of use (PEOU). The intention to use wearable devices (BI) positively correlated with PEOU and PU. All factors influencing the use of wearable devices analyzed showed higher average scores among participants who were already utilizing wearable devices. Male participants exhibited notably higher average scores for BI and PEOU. Participants over 25 years old exhibited greater average scores for BI and Infotainment. The research revealed a notable connection with the uptake and approval of wearable technology for healthcare management in India

(Al-Emran, 2021) conducted a study that creates a combined theoretical framework by incorporating the Technology Acceptance Model (TAM), Task-technology Fit (TTF) factors, and the key quality aspects of smartwatches, specifically availability, and mobility, to examine students' intention to use smartwatches for educational purposes. The empirical findings showed that individual-technology fit, and task-technology fit has a positive effect on the perceived usefulness of smartwatches, whereas no positive effects were observed on the ease of use of these devices for educational purposes. The findings further indicated that accessibility and mobility enhance the perceived usability of smartwatches for educational purposes.

## **2.5 External Factors Influencing Adoptions of Wearable Health Devices**

### **2.5.1 Social Influence**

Social influence denotes the perceived pressure to engage in specific behaviors. A person's actions are frequently not just the result of their inner self. People evaluate themselves based on their social connections and behave according to these evaluations. (Chang *et al.*, 2016) Consequently, various research efforts have proposed social influence elements as precursors to usage behavior while adopting a new technology. (Wang and Chou, 2016)

(Ghazali *et al.*, 2020) stated in their study that the social influence greatly influences the adoption intention of users. In contrast, (Zhang, 2023) study concluded that the perceived quantity of peers and social representations impact social influences, accounting for 42.5% of its variance.

They discovered that social influences do not impact adoption intention. Their findings indicate that consumers' health motivations have a positive effect on their intention to adopt.

(Cao *et al.*, 2024) carried out research on how social influence affects young adults' intentions to adopt mHealth. In that study, social influence significantly enhanced young adults' intentions to adopt mHealth. It indirectly boosted these intentions by positively influencing trust and health consciousness. Trust and health consciousness are significant factors in the intricate multivariate connections between social influence and the intention to adopt mHealth behaviors.

Another study was conducted by (Irina CRISTESCU *et al.*, 2022) regarding social influence and elderly smartwatch adoption. This study shows that social influence has an indirect effect on Behavioral intention, while PEOU and PU (motivational factors) are both primes when determining whether to use smartwatches. It was noted that when deciding to use a smartwatch to monitor health status, older adults consider the opinions of friends and relatives. More importantly, the device helps stick to an exercise routine and helps to monitor their health status.

(Alanzi *et al.*, 2023) conducted a study that analyzed the behavioral intentions regarding wearable insulin biosensors among diabetes patients, focusing on factors influencing their usage and implications for healthcare outcomes. Using a cross-sectional survey, 248 participants completed a validated questionnaire assessing factors like performance expectancy, effort expectancy, social influence, and trust. Results indicated performance expectancy (Mean = 3.84) was the most influential, followed by effort expectancy (Mean = 3.78) and trust (Mean = 3.53). Statistically significant differences were found based on socio-demographic variables. Although perceptions of wearable sensors are generally positive for diabetes management, concerns about privacy and security may hinder their adoption.

### **2.5.2 Privacy Risk and Security Concerns**

Privacy concern refers to the extent to which consumers feel anxious or stressed about the opportunistic actions of healthcare wearable device vendors regarding their personal data. As a component of the IoT ecosystem, healthcare wearable devices gather substantial amounts of sensitive health and personal information about the users. In addition, healthcare wearable devices monitor users' locations through an integrated GPS feature. Observations show that unclear and unjust data collection and privacy policies are increasing consumers' worries about

privacy. Specifically, customers are worried about the unapproved secondary usage of their health and personal information by external parties (Caron *et al.*, 2016)

(Yadav, 2022) conducted a study that demonstrated the potential of wearable health technology to create significant enhancements in public health while offering important insights into privacy concerns and data protection. It emphasizes the importance of utilizing these technologies to address various cultural facets and global challenges in their implementation or application. The study highlights certain overlooked ethical and privacy issues, suggesting that further investigation is required. The methodology approach, encompassing data gathering, ethical guidelines, and case studies, provides an opportunity to learn how to navigate ethical dilemmas. Stakeholders must prioritize openness and teamwork to ensure that wearable health technology is implemented responsibly and with accountability.

(Fox, 2020) proposed a paper that explores privacy in health by analyzing how privacy concerns and perceived benefits affect individuals' acceptance of health technologies and the adoption of mobile health tools. Employing a two-stage sequential mixed-methods design, the first phase involves a quantitative survey of 447 citizens across two countries, while the second phase includes 50 qualitative interviews to clarify the roles of privacy concerns and benefits. The findings reveal a privacy paradox, although individuals prioritize privacy, they tend to focus more on perceived benefits when considering adoption due to limited privacy knowledge, a desire for immediate gratification, and misestimated risks. The study extends privacy calculus theory in health and emphasizes the need for privacy education to enhance awareness and mitigate the negative impacts of privacy concerns.

A review paper by (Alhajri *et al.*, 2022) highlights the necessity of implementing legal frameworks within the fitness-tracker ecosystem by evaluating data protection laws and related literature. It reveals significant privacy concerns tied to fitness apps, including issues like system transparency, privacy policy clarity, one-time consent, and consent management noncompliance. The paper discusses potential solutions, such as centralized and decentralized authorities, to enhance user control over fitness data. It suggests that blockchain's inherent features could effectively address these issues, though further research is essential to assess its feasibility for

user consent management.

(Cilliers, 2020) examines the privacy and data security concerns that users face while utilizing portable health gadgets. The finding shows fifty percent of the participants were unclear about the necessity of safeguarding health information. There seemed to be a lack of understanding among respondents regarding the security concerns related to their data gathered by wearable devices. Users lacked awareness regarding the privacy risks associated with their data and the measures taken to safeguard this data after collection. The study implied that Individuals using wearable gadgets that gather personal health information must be informed about the privacy and information security risks they face while utilizing these devices.

### **2.5.3 Price Value and Affordability**

Cost is a significant element in the acceptance of consumer technology. (Venkatesh *et al.*, 2012) proposed that price value is viewed favorably when the advantages of utilizing a technology are believed to surpass the associated costs. Despite the advantages wearable technology devices offer by tracking and showing health metrics for monitoring, the technology is too expensive for certain consumers.(Guo *et al.*, 2015).

As per (Ericsson, 2018) Wearable Technology Device consumer report, a third of non-users indicated they were reluctant to buy because of the technology's elevated price. Nonetheless, if consumers believe that the advantages of utilizing the technology are significant, regardless of cost, then the perceived value rises. This could encourage consumers to utilize WHDs.

On the other hand, (Sergueeva *et al.*, 2019) mention in the study that price value does not significantly affect individuals' intention to use wearable technology. From the previous study, we can conclude that price value can have positive and negative effects on user intention to use technology.

### **2.5.4 Socio-Demographical Variables**

Gender difference is a vital element of the socio-cultural factors influencing individuals' perceptions, attitudes, and behaviors. Men and women will react differently regarding technology adoption. Numerous influential studies have sought to examine the presence of gender differences concerning new technology adoption across various fields. Certain studies indicated that males were more likely to adopt new technology compared to females, such as in the realm

of e-learning or mobile internet and online shopping, whereas some showed that females are more inclined to embrace new technologies compared to males, particularly in the realm of information technology. The study analyzed the variations between genders in their choices related to wearable technology (e.g., smartwatches compared to fitness trackers). Information was gathered from 217 participants from Indian Facebook. The findings indicated that men favored smartwatches, while women leaned towards fitness trackers in India. Specifically, the connection between privacy worries regarding advertising and behavioral intention is influenced by gender. The findings also showed that privacy issues regarding Facebook advertising were inversely associated with adoption, and this connection was influenced by gender differences. (Manali Gupta *et al.*, 2024)

Socio-demographic factors have a crucial impact on the uptake of wearable technology. These aspects encompass age, income, educational attainment, gender. Alam *et al.*, (2020) discussed to explore the factors influencing the adoption of mHealth services in Bangladesh. It examines the gender variation in the intention to use and the actual usage behavior of users of mhealth services. The results confirmed that the respondents were primarily female (56%), with 67% aged 31–40 years. Most were graduates (71%), while 28% were post-graduates. A significant portion (61%) had 1 to 3 years of MHealth experience, and 86% had over 5 years of mobile phone experience. The relationship between performance expectancy (PE) and behavioral intention (BI) was stronger in females), but males showed a higher intention to adopt mHealth services. Gender moderated the effects of PE, effort expectancy, facilitating conditions, and price value on BI, but not social influence or perceived reliability.

Hossain *et al.*, (2021) the assessment aims to investigate the elements that affect users' willingness to adopt Continuous glucose monitoring (CGM) devices within Internet of Things (IoT) healthcare. The findings indicate that 68% of the sample is male and 32% female, suggesting predominant male usage of CGMs. Most respondents (41.2%) are aged 41-50, with fewer users in younger age groups, aligning with CGMs' focus on diabetes patients. The maximum usage duration is over 7 years, with many users having experienced having used it for over 3 years. This indicates that social influence and reliability are key predictors of attitudes toward wearable devices, demonstrating significant connections to the adoption of CGM devices.

### **2.5.5 Infotainment. Wearability and Style**

(Li *et al.*, 2019) Conducted a study where wearable devices are intended to be attached to the human body for extended periods, even minor discomfort can build up over time and negatively impact the user experience. Issues related to wearability, including comfort and weight, have been noted to significantly influence the development of adoption intentions among older adults. It was also noted that wearability has been identified as an important indicator of either utilitarian or hedonic value.

Some studies like (Keogh *et al.*, 2019) sought to evaluate various wearable sensors in a practical setting to determine their effectiveness for older individuals. The findings indicated that the opted participants were open to sacrifice comfort, device discretion, and accepted high charges if the devices were seen as beneficial, particularly through offering user feedback. Participants concurred that the intended purpose of usage is a crucial factor for sustained compliance. These opinions were especially observed by individuals who were not using an activity-tracking device at that time. Participants thought that wrist-worn sensors were the most flexible and user-friendly, making them ideal for extended use. Specifically, Actiwatch and Wavelet were notable for their ease of use.

Similarly (Talukder *et al.*, 2020) conducted a study that examined 325 Chinese elderly individuals with at least one year of experience using wearable devices to validate a comprehensive model comprising predictors associated with product, personal factors, social influence, and enabling conditions. Among the factors related to the product, they discovered that performance expectation (indicating the significance of functionality) and functional congruence (a composite term encompassing comfort, style, and price appropriateness) were positively linked to intention to use, while effort expectation (signifying ease of use) had no significant effect. Similarly, findings from (Manali Gupta *et al.*, 2024) indicated that the anticipated performance of the devices and the enjoyment gained from Facebook advertising are positively associated with consumers' willingness to adopt the wearable devices. Also, entertainment and privacy concerns play significant roles in developing users' positive intentions toward wearable acceptance.

(Adapa *et al.*, 2018) study investigated the factors influencing the adoption of smart wearable

devices, specifically Google Glass and Sony SmartWatch 3, through in-depth interviews using a laddering approach. The laddering technique is like the means-end chain model in that the attributes can be thought of as "means" and the values as "ends." The laddering technique, however, is different in that the means-end chain model places more emphasis on the importance of each consequence, while the laddering technique focuses on the importance of the attribute–consequence–value relationships. The research aimed to identify both the contributing and inhibiting factors linked to underlying personal values. Participants included college students and working professionals, who tested both devices before revealing their adoption decisions. For smart glasses, the primary factor was look and feel, while for smart watches, the availability of fitness apps played a crucial role. Image-related factors, reflecting personal values, were significant for both groups. Overall, the findings highlight the effectiveness of the laddering approach and provide insights into essential design criteria to meet user needs.

#### **2.5.6 Health Motivation**

Health Values (HVs) represent one's inclination to pursue health initiatives and an awareness of physical health risks. They reflect personal beliefs about the importance of health and the perceived benefits of healthy behaviors. These values motivate individuals to achieve their health goals, aligning these aspirations with overall well-being. HVs can shape beliefs about health issues, covering cognitive and emotional components like disease prevention, weight maintenance, and healthy habit adoption. Those who prioritize their health often use self-tracking devices to monitor metrics such as pulse rate and sleep patterns for better life transformation. The study findings highlight the importance of health values and motivation in forming individual health beliefs, which subsequently affect personal norms and understanding of consequences. Specifically, understanding consequences and assigning responsibility greatly influence individual norms. Personal and social norms significantly influence the intention to embrace IoT-enabled HWDs, ultimately leading to their real adoption. (Yang *et al.*, 2024)

This study involves all the factors influencing the adoption of wearable health devices mentioned above. The study aimed to explore the early phases of wearable device adoption by extending the Technology Acceptance Model (TAM) and Task-Technology Fit (TTF) with new latent variables, including task and technology characteristics, perceived privacy, and fashionability. A survey gathered user feedback, revealing key findings: Perceived Ease of Use (PEOU) influenced

Behavioral Intention (BI) more than Perceived Usefulness (PU), which did not mediate the relationship. Results indicated users prioritize ease of use over usefulness due to existing familiarity with similar devices. Connectivity and healthcare significantly impacted TTF, while communication was less relevant. Additionally, fashionability and perceived privacy considerably influenced BI, emphasizing aesthetic appeal in adoption decisions for wearable devices. The perception of privacy is not significantly impacting the adoption of wearable devices (BI), possibly due to users' belief that companies adequately address privacy issues or their indifference toward sharing data from these devices. This study verifies the reliability of integrated models and explores critical factors (TTF, perceived privacy, and fashionability) that influence adoption, highlighting the role of healthcare management in acceptance. (Misra *et al.*, 2023a)

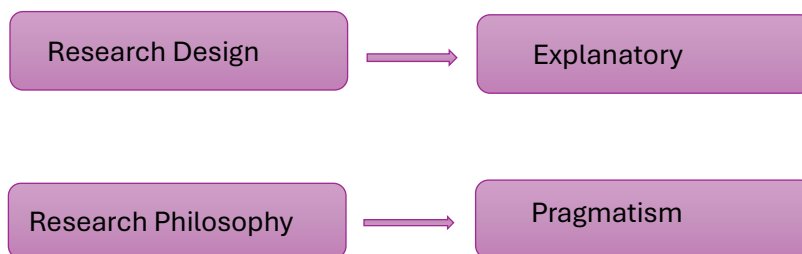
## **2.6 Conclusion:**

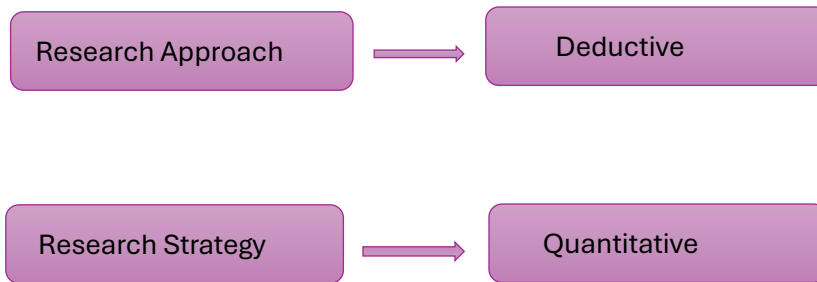
The reviewed literature indicates that several significant factors influence the adoption of wearable health devices. IoT-based wearable devices help patients manage their health and gather and transmit information between patients and healthcare providers. Studies have used theoretical models like TAM, TTF, and UTAUT2 to evaluate the factors influencing the adoption. However, there are limited studies where the TAM model is incorporated with the TTF model to attain a specific response regarding the acceptance of wearable health devices. Literature papers have information on wearable fitness devices, but few findings on wearable health devices. Even though the few studies depict that social influence, privacy issues, and cost are the primary challenges in adopting wearable health devices, some contrasting studies show that these factors might indirectly influence adoption. From the above studies, price value has a conflicting impact on user intention. Most of the factors discussed above have contrasting viewpoints, which depend on the subjective perspective and the purpose of the usage of wearable health devices. The findings, consequently, highlight the importance of continued research to tackle the current obstacles to adopting digital health and to further validate the efficacy of these wearable devices through continuous research. To enhance the acceptance of wearable health devices among patients, by integrating user-centered design features, comprehensive education programs for both patients and healthcare providers, addressing concerns about data privacy and device accuracy to reduce perceived risks, and enhancing the user intention for health management and fitness.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Overview of Methodology:**

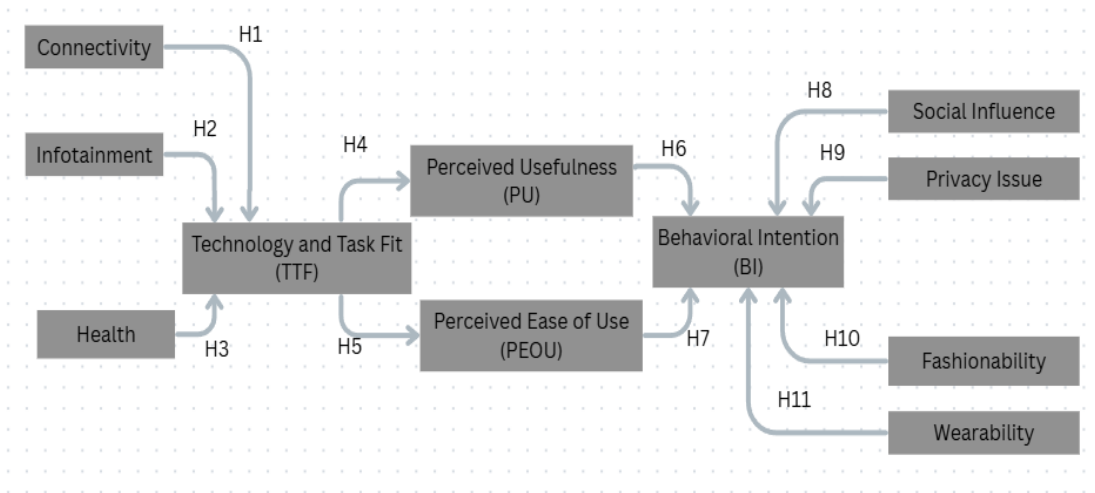
The chapter opens with a discussion of the conceptual framework, followed by research design, research philosophy, and strategy, detailing explanatory design, pragmatic philosophy and the reasons for adopting a deductive approach. Followed by a discussion of the research strategy, highlighting the quantitative cross-sectional aspect of the study and rationalizing the application of quantitative techniques for data collection and analysis. The data-gathering segment outlines the intended population, the sampling method, and the survey's design utilized to collect primary data. It also addresses the ethical aspects related to the research, making certain that the rights of participants and the protection of their data are upheld during the study. In conclusion, the data analysis segment details the statistical methods employed to assess the gathered data, encompassing descriptive statistics, frequency distributions, cross-tabulations, and regression analysis.





**Figure 7: Overview of Methodology**

### **3.2 Conceptual Framework**



**Figure 8: Proposed Research Model**

The figure above demonstrates the proposed research model in the study. The model is a combination of the TAM and TTF models. Furthermore, extending the original model includes external factors such as Connectivity, Health, Infotainment, Social Influence, Privacy concern, Fashionability, and Wearability. To align with the proposed objective, 11 hypotheses are proposed. Most of the research has found that there is a positive relationship between task features and technological features. (Chang *et al.*, 2016). Consequently, we propose that individuals with greater expectation regarding task and technology attributes tend to hold a more positive opinion of TTF. Drawing on these viewpoints, the following hypotheses are developed.

H1: Connectivity task has a positive influence on TTF

H2: The infotainment task has a positive influence on TTF

Task-technology fit serves as the theoretical foundation for assessing user satisfaction with electronic health record systems. The instrument for task-technology fit is confirmed through result analysis, backing the task-technology suitability as a framework for predicting performance effects in a healthcare environment. From the observations made, we developed the subsequent hypothesis. (Misra *et al.*, 2023a)

H3: Healthcare has a positive influence on TTF

Diving into prior research that employed a combination of the TAM and TTF models, a relationship between the two constructs was discovered, indicating that task-technology fit has a positive effect on perceived usefulness and PEOU. (Chang *et al.*, 2016)

H4: TTF has a positive influence on perceived usefulness

H5: TTF has a positive influence on perceived ease of use

As mentioned, numerous research studies have shown that PU and PEOU have a positive impact on BI, although the levels of significance vary. Furthermore, research has shown that the influence of PEOU on BI is facilitated by PU. Consequently, these connections could likewise be discovered in the context of adopting wearable devices. (Wolf *et al.*, 2018)

H6: Perceived usefulness has a positive influence on behavioral intention.

H7: Perceived ease of use has a positive influence on behavioral intention

Social influence is one of the main variables in adopting wearable health devices. Studies have shown that social influence has a positive effect on behavioral intention. (Ghazali *et al.*, 2020).

H8: Social influence has a positive influence on BI

Numerous research efforts have demonstrated that an individual's perception of the security of their data negatively affects their Behavioral intention. Hence, the subsequent hypothesis is proposed. (Adapa *et al.*, 2018)

H9: Privacy concern has a negative influence on BI

It is widely recognized how emotions operate in hedonic service settings, yet there is limited understanding of their functioning in utilitarian service environments. Lack of research regarding how the external features of wearable devices influence the intention to adopt them; this study seeks to fill that gap in understanding. Recent studies have shown a connection between fashionability and wearability to BI. (Misra *et al.*, 2023a) (Chang *et al.*, 2016). Based on this, we developed the subsequent hypothesis.

H10: Fashionability has a positive influence on BI

H11: Wearability has a positive influence on BI

### **3.3 Resign Design**

A research design is a structured and methodical blueprint created to guide a research investigation. It outlines the study's aims, the methods used, and the strategies to accomplish these goals. It serves as the framework for gathering, assessing, and analysis of data. Research design is the framework that directs the researcher in the process of gathering, analyzing, and interpreting observations. (Khanday and Khanam, 2023). For this study, an Explanatory research design is the most appropriate design. Explanatory research is also described as the investigative work on a specific subject that has been examined previously or was not adequately elucidated before in a suitable manner. The primary objective of this research design is to become familiar with the unfamiliar. Explanatory research design typically begins with a theory or hypothesis, and after collecting evidence, it either confirms or refutes the theory. The explanatory study consistently involves a collection of concepts that lead the researcher to seek the facts. (Akhtar, 2016)

A structured hypothesis-testing framework is essential for producing reliable knowledge, enabling research to examine key factors influencing the adoption of wearable health devices for health management. Given the scope of the study, an explanatory design helps to gain an understanding of the viewpoints of participants regarding the factors that tend to influence their intention to use wearable devices. By adopting an explanatory design, the study will not be manipulated by any variables, instead, it allows us to measure and interpret data in the natural environment. Moreover, using an explanatory research design allows for systematic testing of collected data, ensuring validity and reliability. An explanatory research design is perfect for outlining trends, behaviours, or attitudes within a population. Our research on IoT wearable devices in South India will use this method to decide who uses the technology, their reasons for usage, and the challenges they face in adopting wearable health technology.

### **3.4 Research Philosophy and Approach**

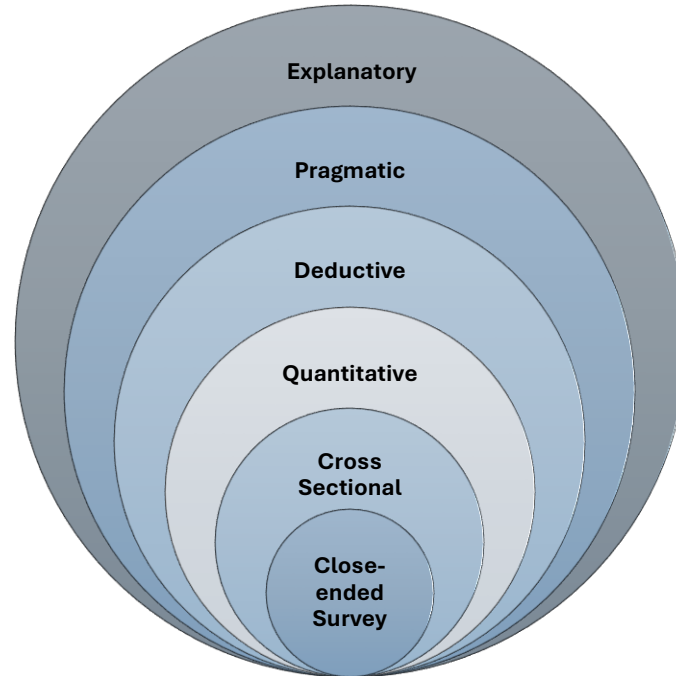
Research philosophy forms the essential assumptions and convictions that direct the researcher's approach to an investigation. It serves as the basis for methodology, research design, and data analysis. Choosing an appropriate research philosophy is crucial for guaranteeing that the study adheres to a logical and organized method to explore the research issue. Pragmatism was the

selected research philosophy for this investigation, highlighting practical results and real-world implementations. Pragmatism does not adhere to a single philosophical system or concept of reality and appreciates both objective and subjective perspectives. It emphasizes discovering solutions to issues through practical outcomes, rather than rigidly following a specific methodology. Moreover, pragmatism highlights the practical outcomes and value of concepts.(Legg and Hookway, 2024). In the realm of wearable technology, this involves emphasizing the effective adoption and utilization of devices to enhance health outcomes. This method was in harmony with the objective of the study to evaluate the factors influencing the utilization of IoT-based wearable devices for health management. The rationale for choosing pragmatism in this situation is based on its adaptability and emphasis on practical significance. This philosophy supports the use of quantitative data to detect trends and assess outcomes, ensuring that the results are practical and can directly inform healthcare practices. Pragmatists consider truth to be relative and dependent on context, which is suitable for examining technology adoption, where elements such as cultural background, user categories, and social norms are important factors. By emphasizing practical outcomes and real-world relevance, pragmatism helps to ensure that the research stays pertinent to both academic and clinical environments. A deductive method allows for a structured analysis of data, ensuring that the research adheres to a coherent sequence from theory to testing hypotheses. As per this study, hypothesis testing was established by theories such as the TAM model and TTF which have been widely used for technology adoption. It entails creating hypotheses derived from these theories and subsequently evaluating them with empirical data. For instance, hypotheses could encompass the effect of perceived utility, user-friendliness, and social pressure on the willingness to adopt wearable technology. Its approaches can provide subjective insights into generalized populations.

### **3.5 Research Strategy**

This study follows the quantitative strategy for evaluating the factors that influence the adoption of wearable health devices. Quantitative cross-sectional research acts as the foundation for evidence-based decision-making. Its significance cannot be exaggerated: quantitative techniques offer empirical strength, allowing preachers (academic), practitioners (industry), and policymakers (governments) to extract actionable insights from data. (Lim, 2024). It emphasizes objective assessments and the mathematical, statistical, or numerical examination of data collected via surveys (Creswell, 2009). According to Creswell (2009), quantitative research is

essential for evaluating objective theories through the examination of relationships between variables. (Creswell, 2008). The quantitative research approach involves the organized gathering and examination of numerical information through the Likert Scale and categorical data via Multiple Choice Questions (MCQs) and Yes/No questions to identify patterns, connections, and results. Essential characteristics of this approach encompass the use of organized tools like surveys with closed-ended questions, statistical evaluation to analyze and understand the data, and the capacity to extrapolate results to broader demographics. This approach is especially appropriate for this research as it seeks to assess the influence of factors that affect the adoption of wearable devices for health management by measuring variables such as perceived usefulness, perceived ease of use, and user intention. The structured nature of quantitative research allows for precise measurement and comparison of these variables, providing clear, objective insights into the effectiveness and adoption of wearable health technologies. Quantitative techniques provide numerous benefits for this research. Firstly, they facilitate the gathering of extensive data from various participants, providing a wide comprehension of the phenomena being studied. This is essential for recognizing trends and patterns in the application and effects of digital biomarkers. Additionally, statistical analysis facilitated thorough testing of hypotheses and confirmation of results, improves the reliability and validity of the outcomes. This method ensures that the results are both statistically meaningful and relevant in practical situations, aiding evidence-based choices in health management. Through the application of a quantitative approach, the research can produce robust, generalized data that guide best practices and policy suggestions.



**Figure 9: The research onion**

<b>Data Collection Method</b>	Structured survey
<b>Instrument Used</b>	Close-ended questionnaire based on Likert Scale
<b>Focus Areas</b>	South Indian Population
<b>Format Consistency</b>	Standardized structure ensures consistent responses for precise analysis
<b>Survey Mode</b>	Online distribution
<b>Benefits of Online Method</b>	Cost-effective, wider geographic reach, improved response rates
<b>Sample size</b>	250 -300 participants, confidence interval 95 %, and Margin of error 6%
<b>Sample collected</b>	295 responses were collected
<b>Inclusion Criteria</b>	The respondents must be 18 -64 years old. They must have knowledge and familiarity with wearable device technology for health care.
<b>Exclusion Criteria</b>	The respondents over 64 years of age are not targeted in the study.
<b>Ethics</b>	The informed consent form was taken from all the participants before filling in the questionnaire. The anonymity and confidentiality of all respondents are maintained as per the Griffith College Ethic Process.
<b>Data Analysis</b>	Data were analyzed using SPSS statistical software Used Frequency distribution, correlation analysis, and regression analysis. Data cleaning and validation were conducted to ensure accuracy
<b>Data presentation</b>	The data was presented as bar charts and tables

**Figure 10: Data Collection and Analysis**

### **3.6 Primary Data Collection**

A simple random sampling was employed to gather approximately 200 -300 participants for the survey, by calculating the sample size with a 95% confidence interval with a 6% margin of error. Simple random sampling is a non-probabilistic method for selecting a group of participants from a larger population, effectively reducing selection bias and guaranteeing that the study's results

apply to a wider audience. (Rahman, 2023). The target participants are the general population who are particularly familiar with or used wearable health devices, particularly from South India. These individuals have personal experience with wearable devices and the challenges of adopting the technology, making them the most appropriate respondents for this study. The study ensures that the responses reflect the subjective perspective on using wearable technology for health management.

An invitation for participation was sent via e-mail, social media, and professional associations' communication channels, which permitted a wide and relevant respondent group. The survey used closed-ended questions to get insight into the use and perception of wearable health devices in the management of health. Close-ended questions allow respondents to select from predefined answers, reducing ambiguity and aiding a higher level of response accuracy. The survey was structured and utilized for acquiring precise information on some elements of wearable devices including the trend of use, perceived usefulness, Perceived ease of use, and perceived privacy. The survey aimed to gather extensive quantitative data on the application of wearable devices and perspectives on their challenges to adopt. Likert scale questions were applied in the survey for the respondents to rate the extent to which they agreed with the effectiveness, ease of use, and accuracy of wearable devices. The questionnaire was pilot tested with a small group of business owners before the final survey to ensure usability and general understanding. Pre-testing will help in clarifying question wording, detecting any ambiguous items, and providing a correct interpretation of questions by participants. The research has a wider geographic reach and offers better response rates using an online survey technique.

### **3.7 Inclusion and Exclusion Criteria**

The respondents must be 18 -64 years old. They must have knowledge and familiarity with wearable device technology for health care. The respondents must be from South India, such as Kerala, Tamil Nadu, Andhra Pradesh, and Karnataka. The respondents over 64 years of age are not targeted in the study.

### **3.8 Ethical Consideration**

The study complied with the utmost ethical guidelines, which encompassed concepts of informed consent, the ability to opt out of the study, data privacy, and regard for human rights. The research

did not include vulnerable groups; therefore, ethical concerns associated with these populations were not relevant. The aim of the Griffith College Ethics Process (GCEP) was to evaluate research projects prior to their commencement to examine their ethical consequences and offer researchers guidance, support, and authorization regarding ethical matters. In this context, a Research Ethics Approval Form was filled out, prompting postgraduate students and staff to reflect on the ethical consequences of their research proposals and incorporate an information sheet within their ethics application. Informed consent was one of the principles directing this study. Participants received details about the study's purpose, procedures, risks, and benefits prior to taking part. They needed to provide their informed consent prior to finishing the survey. The consents utilized were clear and easy to understand, outlining the nature of the study, any identifiable risks, and the voluntary aspect of participation. Participants were made aware that they could exit the study at any moment without any negative consequences for them. To ensure participant privacy, all responses were made anonymous, and data were securely stored with encryption. Participants were guaranteed confidentiality or made aware of the limits of confidentiality, especially when the privacy of the shared information could only be safeguarded within legal constraints. The participants experienced no coercion, and there was no undue attempt to obtain consent.

The journey to obtain ethical approval started with filling out Griffith College's Ethics Approval Form, which was then reviewed and talked over with the research supervisor. The finalized application was reviewed, spell-checked, and authorized by the supervisor according to the ethics procedure before its submission to GCEP. Data collection did not occur until approval was finalized.

### **3.9 Data Analysis**

Quantitative data collected from the surveys were analyzed using various statistical techniques to give a broader overview of the data. The data was analyzed using primary statistical procedures: frequency distribution. This method was chosen to provide a good overview of the trends within the data collected and examine if the observed distributions deviated significantly from hypothesized uniform distributions in the various categories. Frequency distribution analysis summarizes the responses to every survey question. Frequency distributions were used to analyze the age, gender, education level, Income, usage trends, and type of wearable device.

Calculating the percentages for each response category provides the ability to identify the categorical variables for this study and present them graphically. Likewise, correlation analysis, specifically the Pearson correlation coefficient, was used in this study to evaluate the continuous data testing and used in identifying relationships between factors such as perceived usefulness, perceived ease of use, and behavioral intention. Moreover, it also examines the correlation between independent variables like social influence, infotainment, health, wearability, and style. The Pearson test compared the observed results with expected results based on a consistent distribution, allowing us to ascertain if any response categories were strongly preferred or inadequately represented. A p-value less than or equal to a predetermined significance level (often 0.01) indicates a statistically significant result, meaning the observed data provide strong evidence against the expected hypothesis (Saul McLeod, 2023). Regression analysis was incorporated to collectively analyze predictors that influence users' behavioral intention and TTF. The application of these data analysis methods was justified by their ability to provide comprehensive and insightful information regarding the factors affecting the usage of wearable health devices. Descriptive statistics and frequency distributions permitted an unambiguous presentation of the data, making it easier to detect trends and patterns. The statistical tool used in this study is IBM SPSS, which is widely recognized for processing and interpreting quantitative data. The structured approach begins with descriptive statistics to provide a general overview of the dataset. This method of assessing the trustworthiness and accuracy of the study's results offers insight into its practical uses and effectiveness. Finally, statistical visualizations such as graphs will be used to enhance the interpretation of results, making trends and relationships more accessible. These visual tools aid in ensuring that findings are both actionable and easily understood.

### **3.10 Conclusion:**

In summary, the research methodology used in this research was designed to assess the research issue. Utilizing a pragmatic philosophy and a deductive approach, this study was able to investigate emerging usage patterns and findings from the gathered data. The quantitative cross-sectional research strategy utilizing surveys enabled the gathering of extensive and measurable data from a broad range of participants from South India. The ethical issues were managed with great care to guarantee participant safety and data integrity. The application of sophisticated statistical methods like descriptive statistics, frequency distributions, correlation analysis, and

regression analysis facilitated a thorough data analysis to identify key relationships between the factors and connections. This methodological approach ensured that the research objectives were thoroughly addressed to offer reliable and valuable insights into the practical uses and challenges of adopting wearable health devices.

## **CHAPTER 4: RESULTS AND DISCUSSION**

### **4.1 Overview**

This chapter aims to showcase the empirical results of the research. Initially, the demographic sample is outlined. Secondly, descriptive statistics are presented, with associated graphs and tables. Subsequently, all the hypotheses undergo testing through correlation analysis called Pearson correlation and regression analysis. Followed by a discussion where the present study results are discussed and findings are compared to the existing literature.

### **4.2 Current Usage of Wearable Health Devices**

Among the 295 respondents, 69.2% (204 respondents) reported that they are currently utilizing wearable health devices, while 30.8% (91 respondents) indicated they were not currently utilizing WHDs

Category	Frequency	Percent
Yes	204	69.2
No	91	30.8
Total	295	100.0

**Table 1: Current usage of wearable devices**

### **4.3 Socio-Demographic Responses**

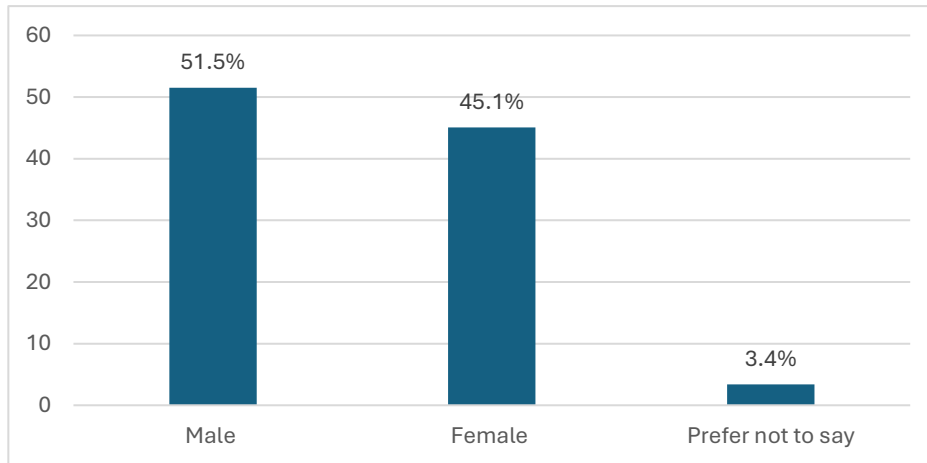
#### **4.3.1 Gender Distribution based on current utilization of wearable health devices**

Of the 295 respondents, 204 were currently using wearable devices. This population will be used for demographic and economic analysis of wearable device users. On a gender basis, male participants represented the majority at 51.5% (105 respondents), followed closely by female participants of 45.1% (92 respondents). A small portion, 3.4% (7 respondents), chose not to disclose their gender.

Category	Frequency	Percent
Male	105	51.5
Female	92	45.1
Prefer not to say	7	3.4

Total	204	100.0
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**Table 2: Gender Distribution**



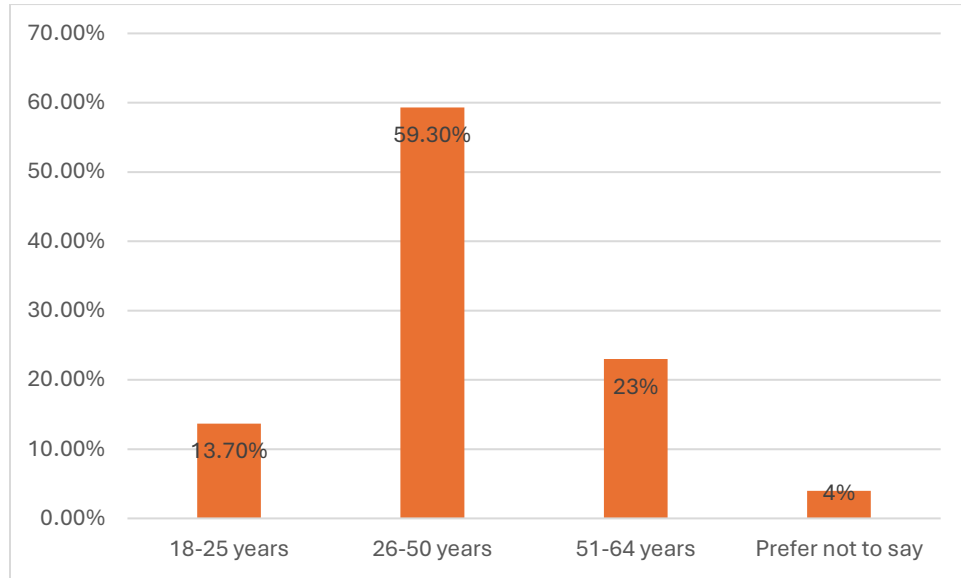
**Figure 11: Gender Distribution**

**4.3.2 Age Range Distribution based on current utilization of wearable health devices**

The age distribution of the 204 respondents who are currently using the wearable devices indicates that the majority fall within the 26–50 years age group, accounting for 59.3% (121 respondents). This is followed by the 51-64 years group with 23.0 % (47 respondents) and the 18-25 years group at 13.7 % (28 respondents). A small percentage, 4% (8 respondents), chose not to disclose their age.

Category	Frequency	Percent
18-25 years	28	13.7
26-50 years	121	59.3
51-64 years	47	23.0
Prefer not to say	8	4
Total	204	100.0

**Table 10: Age Range**



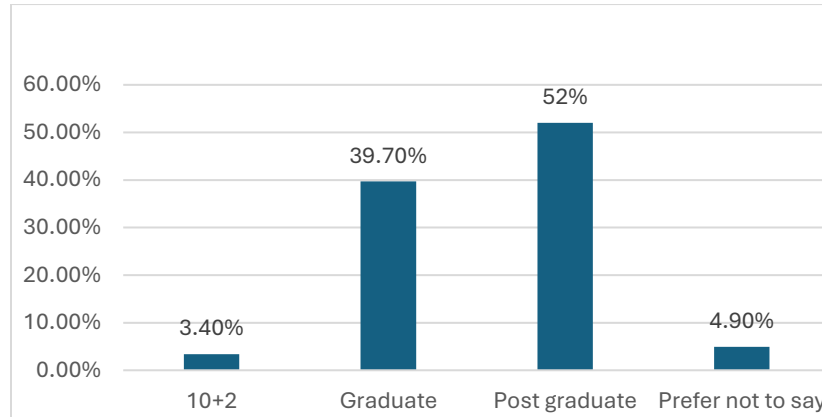
**Figure 12: Age Range**

**4.3.3 Education Level based on current utilization of wearable health devices**

The educational background of the current user, that is, 204 respondents, shows that the majority are highly qualified. Postgraduates make up the largest group at 52% (106 respondents), followed by graduates at 39.7% (81 respondents). A smaller portion, 3.4% (7 respondents), completed education up to 10+2 level, while 4.9% (10 respondents) preferred not to disclose their education level.

Category	Frequency	Percent
10+2	7	3.40%
Graduate	81	39.70%
Post graduate	106	52%
Prefer not to say	10	4.90%
<b>Total</b>	<b>204</b>	<b>100.0</b>

**Table 3: Education Level**



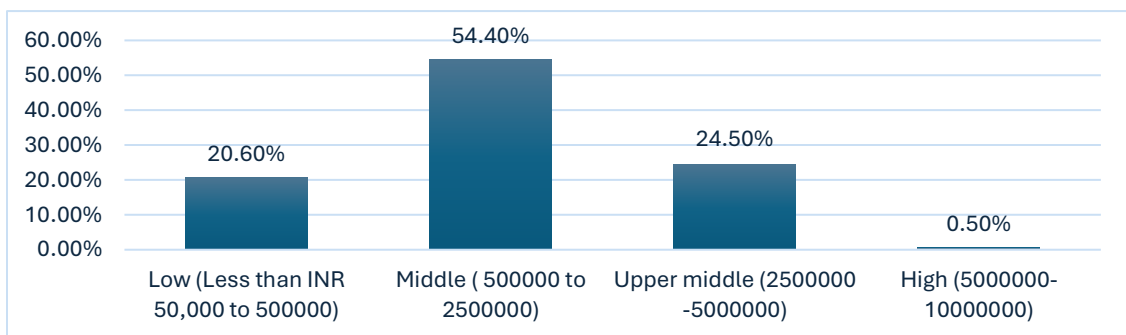
**Figure 13: Education Level**

**4.3.4 Economic Status based on current utilization of wearable health devices**

The economic status of the 204 respondents shows that the majority, 54.40% (111 respondents), fall into the middle-income group with an annual income between INR 500,000 and 2,500,000. This is followed by 24.50% (50 respondents) belonging to the upper middle, and 20.60% (42 respondents) classified as the low-income group. A tiny fraction, 0.5% (1 respondent), is in the high-income bracket.

Category	Frequency	Percent
Low (Less than INR 50,000 to 500000)	42	20.60%
Middle (500000 to 2500000)	111	54.40%
Upper middle (2500000 to 5000000)	50	24.50%
High (5000000 to 10000000)	1	0.50%
Total	204	100.0

**Table 4: Economic Status**



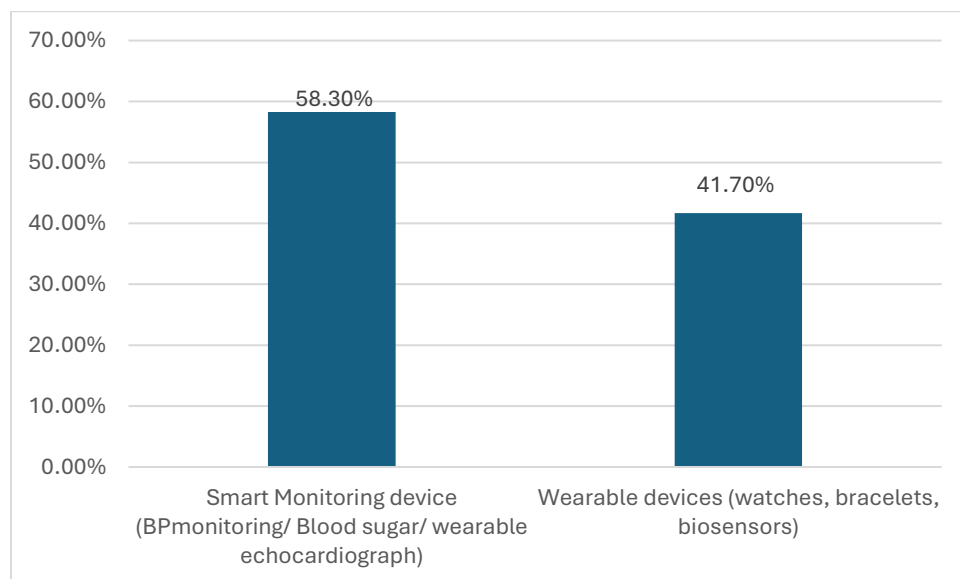
**Figure 14: Economic Status**

#### **4.3.5 Type of Wearable Devices Used**

The responses regarding the type of wearable health devices used show that 58.3% (119 respondents) are using smart monitoring devices such as blood pressure monitors, blood sugar monitors, or wearable echocardiographs. 41.7% (85 respondents) reported using general wearable devices like watches, bracelets, or biosensors.

Category	Frequency	Percent
Smart Monitoring device (BP monitoring/ Blood sugar/ wearable echocardiograph)	119	58.3%
Wearable devices (watches, bracelets, biosensors)	85	41.7%
Total	204	100.0%

**Table 5: Type of Wearable Devices**



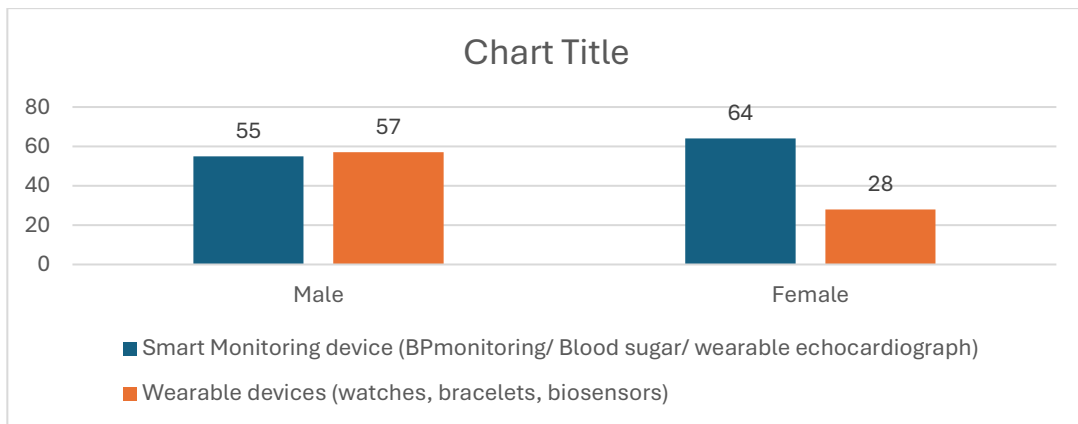
**Figure 15: Type of Wearable Devices**

#### **4.3.6 Utilization of Wearable Health Devices Based on Gender**

Out of 295 responses, 204 participants were using wearable health devices as mentioned above. Within these 204 responses, females were mostly using Smart Monitoring devices (BP Monitoring/ Blood sugar/ wearable echocardiograph), which is 64 (69.6%). However, it was seen that 57 (50.9%) males were using Wearable devices (watches, bracelets, biosensors).

Category	Male	Percent	Female	Percent
Smart Monitoring device (BP monitoring/ Blood sugar/ wearable echocardiograph)	55	49.1%	64	69.6%
Wearable devices (watches, bracelets, biosensors)	57	50.9%	28	30.4%
Total	<b>112</b>	100	<b>92</b>	100

**Table 6: Utilization of Wearable Health Devices Based on Gender**



**Figure 16: Utilization of Wearable Health Devices Based on Gender**

#### **4.3.7 Recommend the usage of wearable health devices**

The findings reveal a strong endorsement for wearable health devices among the 295 respondents. A large majority of 270 respondents recommend the usage of these devices, highlighting a widespread belief in their benefits for monitoring and managing health. In contrast, only 25 respondents expressed that they would not recommend their use. Among the 295 respondents, 270 marked "Not applicable" in response to reasons for not recommending, which corresponds to those who recommend wearable health devices. Among the remaining

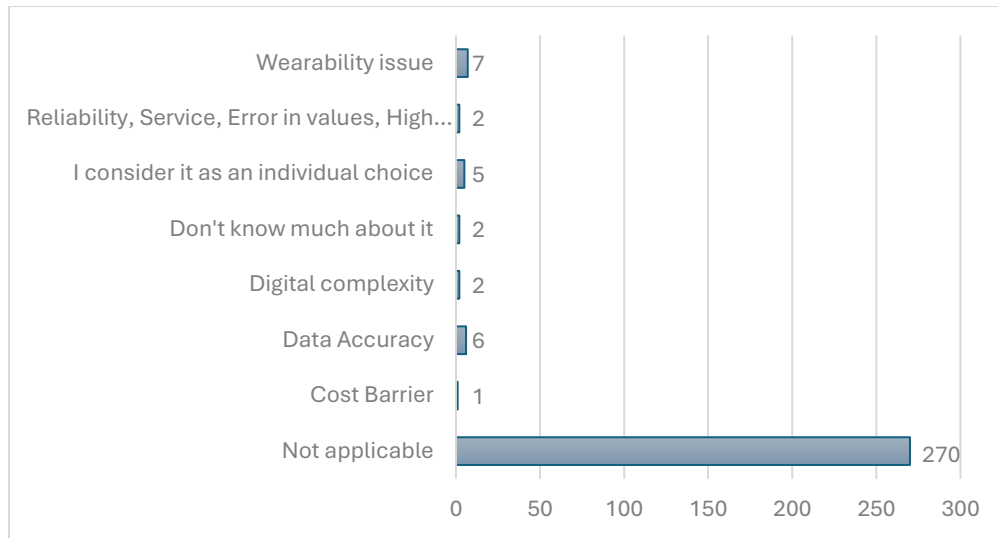
respondents who do not recommend them, the reasons varied: 7 cited wearability issues, 6 mentioned concerns over data accuracy, 5 considered it an individual choice, 2 pointed to digital complexity, another 2 indicated lack of knowledge about the devices, 2 raised concerns about reliability, service, errors in values, and high price, and 1 respondent identified the cost barrier.

Category	Frequency	Percent
Yes	270	91.5
No	25	8.5
Total	295	100.0

**Table 7: Recommend the usage of wearable health devices**



**Figure 17: Recommend the usage of wearable health devices**



**Figure 18: Reason for not recommending the usage**

#### **4.4 Descriptive Analysis of Variables**

The responses were collected from both users and non-users regarding the factors affecting the usage of wearable health devices, so we would be able to understand public perceptions on the adoption of wearable health devices, rather than just users. Total of 295 responses analyzed, including users and non-users

##### **4.4.1 Behavioral Intention**

The responses related to behavioral intention regarding the usage of wearable health devices highlight a generally positive tendency, with some variability in the strength of agreement across the different statements. For the statement "I try to use wearable health devices whenever I get the chance," most of the respondents agreed (95) or strongly agreed (86), suggesting a strong inclination to use the devices when possible. However, there were also 84 neutral responses and 20 who disagreed, indicating that not all individuals actively seek to use these devices, perhaps due to limited need or interest. When asked if they were likely to use wearable health devices in the future, the majority were positive, with 131 agreeing and 71 strongly agreeing. However, 70 respondents were neutral, and 23 disagreed/strongly disagreed, suggesting that some people are unsure about future usage, possibly due to concerns or lack of familiarity with the devices.

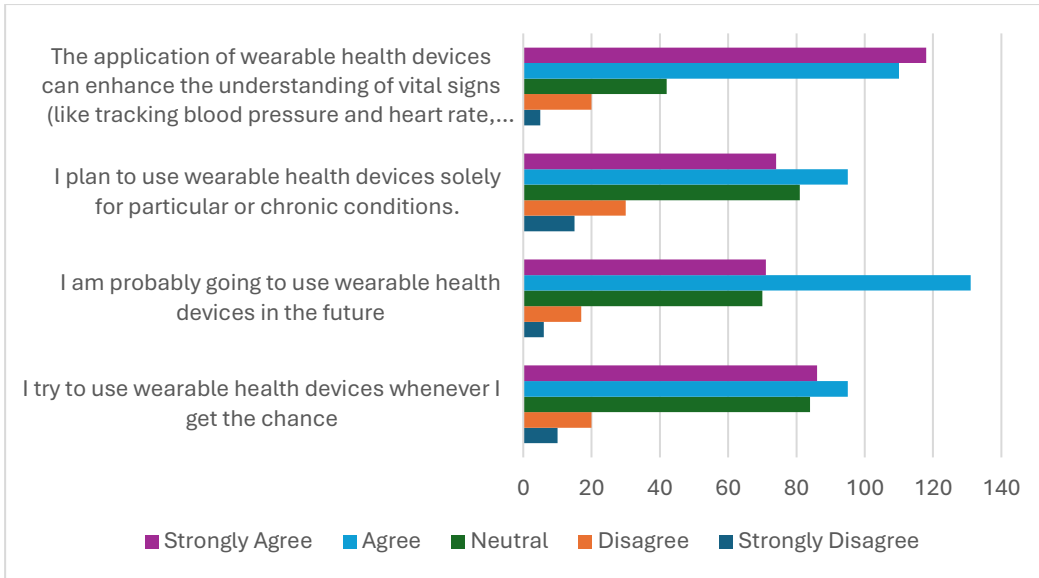
For the intention to use wearable health devices solely for particular or chronic conditions, 95

and 74 strongly agreed, indicating that a significant portion of the respondents see wearable devices as particularly useful for managing specific health issues. On the other hand, 81 respondents were neutral, and 45 disagreed/ strongly disagreed, reflecting some uncertainty or limited interest in using wearable devices exclusively for chronic conditions.

Finally, when it comes to the potential of wearable health devices to enhance the understanding of vital signs, a majority agreed (110) or strongly agreed (118), showing confidence in the devices' ability to help track important health metrics like blood pressure and blood sugar levels. However, there were 42 neutral responses and 25 who disagreed/strongly disagreed, suggesting that not all respondents are convinced of their ability to enhance health monitoring in this way.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I try to use wearable health devices whenever I get the chance	10	20	84	95	86
I am probably going to use wearable health devices in the future	6	17	70	131	71
I plan to use wearable health devices solely for particular or chronic conditions.	15	30	81	95	74
The application of wearable health devices can enhance the understanding of vital signs (like tracking blood pressure and heart rate, respiration, Blood sugar level, SPO2)	5	20	42	110	118

**Table 8: Results of Behavioral Intention**



**Figure 19: Results of Behavioral Intention**

#### **4.4.2 Perceived Usefulness**

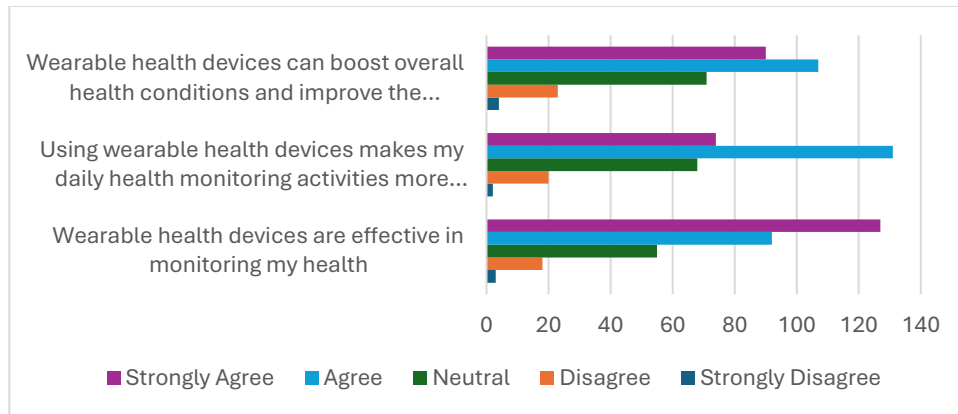
The responses related to the perceived usefulness of wearable health devices reflect a generally positive outlook, with some variation in the strength of agreement. Regarding the effectiveness of wearable health devices in monitoring health, most respondents agreed (92) or strongly agreed (127), while a smaller group expressing neutral views (55), and only 21 disagreed/strongly disagreed.

For the question of whether using wearable health devices makes daily health monitoring activities more efficient, 131 respondents agreed, and 74 strongly agreed. However, 68 respondents didn't have any opinion on that, and 22 disagreed/strongly disagreed. When asked if wearable health devices could boost overall health conditions and improve the quality of life, 107 participants agreed, and 90 strongly agreed, reinforcing the positive perception. However, there were 71 neutral responses, and 27 who disagreed/strongly disagreed, indicating that not all users are fully convinced of the devices' impact on improving their quality of life. Overall, while the majority perceive wearable health devices as useful, but some may not find them effective

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Wearable health devices are effective in monitoring my health	3	18	55	92	127
Using wearable health devices	2	20	68	131	74

makes my daily health monitoring activities more efficient					
Wearable health device can boost overall health conditions and improve the quality of life	4	23	71	107	90

**Table 9: Results of Perceived Usefulness**



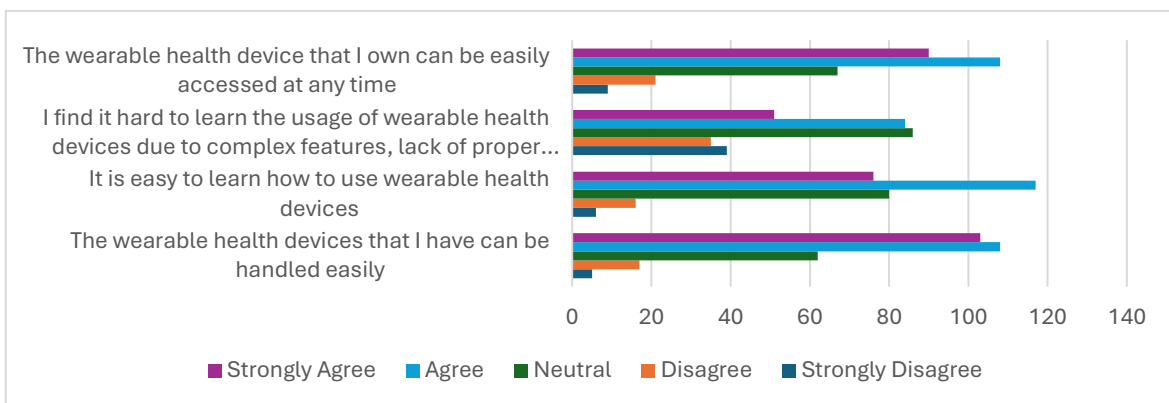
**Figure 20: Results of Perceived Usefulness**

#### **4.4.3 Perceived Ease of Use**

The survey responses on the perceived ease of use of wearable health devices indicate a predominantly positive perception, though concerns about complexity and usability persist. A significant number of respondents agreed (108) or strongly agreed (103) that their devices are easy to handle, but 62 remained neutral, and 17 disagreed, suggesting some users might struggle with usability. Regarding the ease of learning to use these devices, 117 agreed and 76 strongly agreed, yet 80 were neutral and 16 disagreed, highlighting that not all users find the learning process straightforward or may face challenges in getting acquainted with the devices. When asked about difficulties due to complex features or lack of guidance, the majority disagreed, with 39 strongly disagreeing and 35 simply disagreeing. However, 86 were neutral, and 135 agreed /strongly agreed. This suggests that while some users experience difficulties, such challenges are not universal. Those who agree or strongly agree may be facing issues such as complexity or a lack of clear instructions. Lastly, concerning accessibility, 108 agreed and 90 strongly agreed that their devices are easy to access, but 67 remained neutral and 21 disagreed, revealing some users may struggle with timely access or may face challenges in accessing their devices quickly or conveniently.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The wearable health devices that I have can be handled easily	5	17	62	108	103
It is easy to learn how to use wearable health devices	6	16	80	117	76
I find it hard to learn the usage of wearable health devices due to complex features, lack of proper instruction, overwhelming functions, least familiar with technology	39	35	86	84	51
The wearable health device that I own can be easily accessed at any time	9	21	67	108	90

**Table 10: Results of Perceived Ease of Use**



**Figure 21: Results of Perceived Ease of Use**

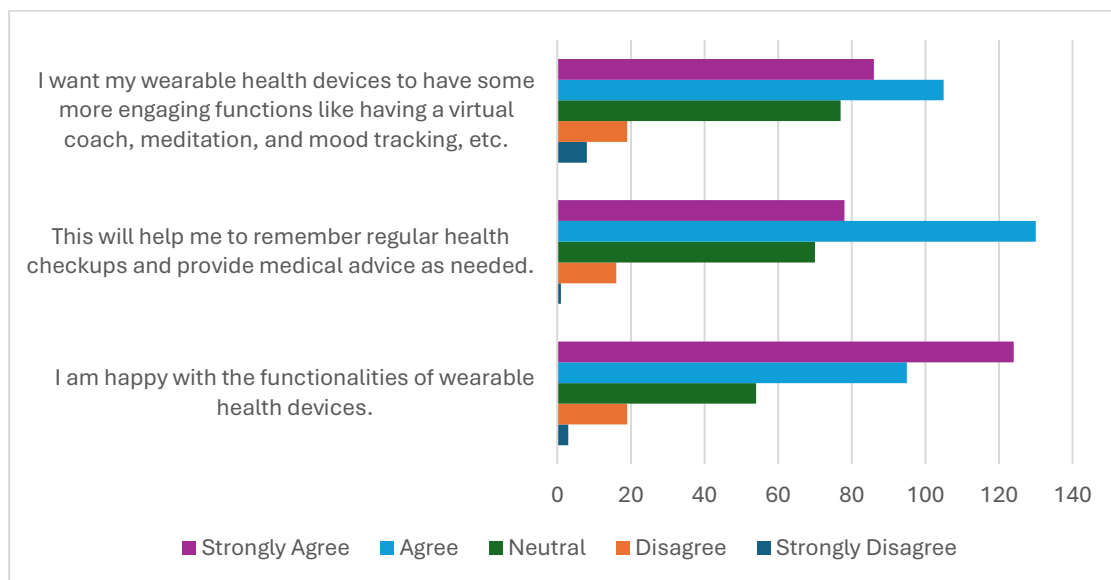
#### **4.4.4 Technology and Task Fitness**

The response of the question, “happy with the functionalities of wearable health device” showed, 95 respondents agreed and 124 strongly agreed that they are happy with the functionalities, though 54 were neutral and 22 disagreed/strongly disagreed, implying some users find them lacking. Additionally, 130 agreed and 78 strongly agreed that these devices aid in remembering health checkups and providing medical advice, although 70 remained neutral and 17 disagreed/strongly disagreed, highlighting mixed perceptions. Many users expressed interest in

more engaging features, such as virtual coaching and mood tracking, with 105 agreeing and 86 strongly agreeing. Conversely, 77 were neutral, and 27 disagreed/strongly disagreed, indicating varying levels of interest in these additional functionalities among users.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am happy with the functionalities of wearable health devices.	3	19	54	95	124
This will help me to remember regular health checkups and provide medical advice as needed.	1	16	70	130	78
I want my wearable health devices to have some more engaging functions like having a virtual coach, meditation, and mood tracking, etc.	8	19	77	105	86

**Table 11: Results of TTF**



**Figure 22: Results of TTF**

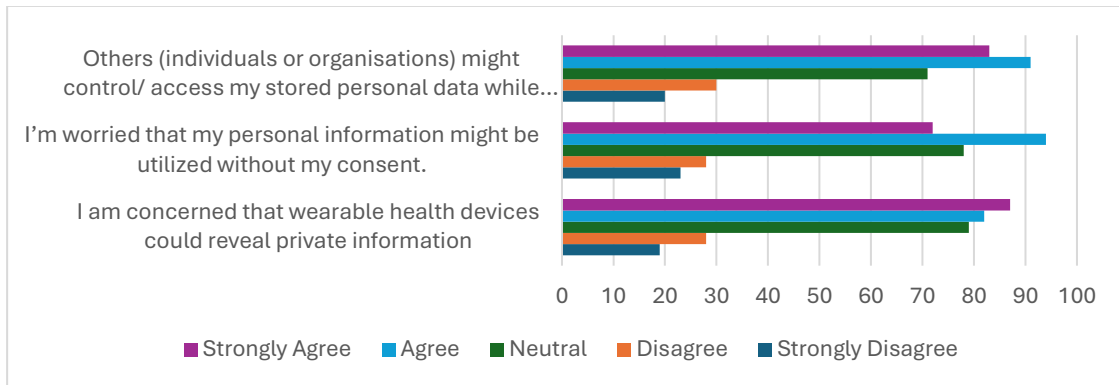
#### 4.4.5 Privacy Concern

The responses regarding privacy concerns related to wearable health devices reveal a significant level of concern among users about the security and confidentiality of their personal information. For the statement, "I am concerned that wearable health devices could reveal private

information," 82 respondents agreed, and 87 strongly agreed, indicating that a substantial number of users are worried about the potential for their private data being exposed. However, 79 respondents were neutral, 28 disagreed and 19 strongly disagreed suggesting that some users are either less concerned or unsure about this issue. Regarding the concern of personal information being utilized without consent, 94 respondents agreed, and 72 strongly agreed, highlighting that many users are apprehensive about their personal data being used improperly. On the other hand, 78 respondents were neutral, and 51 disagreed/strongly disagreed, indicating that not all users feel the same level of concern about this issue. For the statement, "Others (individuals or organisations) might control/access my stored personal data while using wearable health devices," 91 respondents agreed, and 83 strongly agreed, pointing to a major concern about external organization or third parties accessing their stored personal and health data. Meanwhile, 71 respondents were neutral, and 50 disagreed/strongly disagreed, suggesting that a smaller portion of users is less worried or unconcerned about this potential risk

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am concerned that wearable health devices could reveal private information	19	28	79	82	87
I'm worried that my personal information might be utilized without my consent.	23	28	78	94	72
Others (individuals or organisations) might control/ access my stored personal data while using a wearable health device.	20	30	71	91	83

**Table 12: Results of Privacy Concern**



**Figure 23: Results of Privacy Concern**

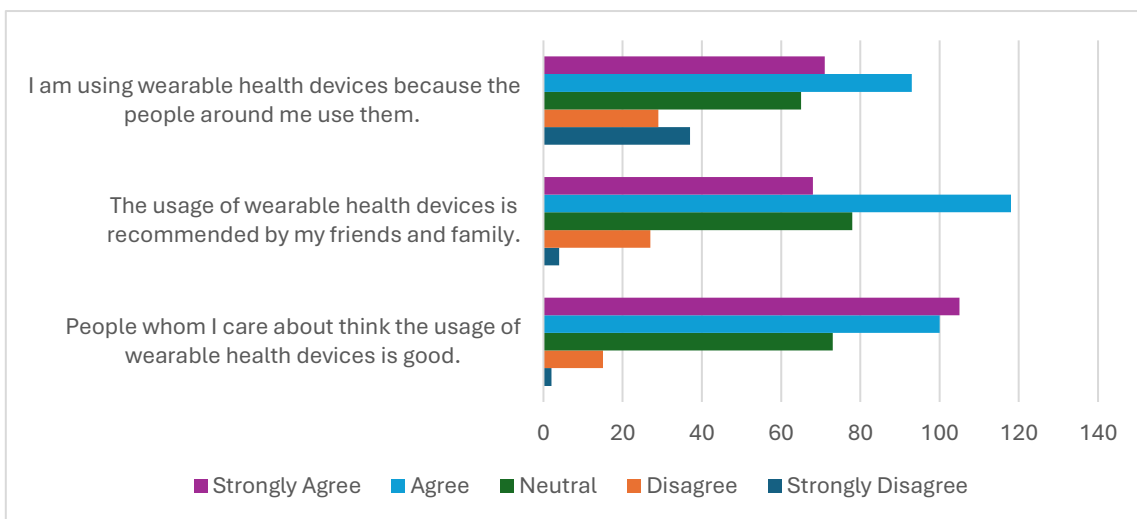
**4.4.6 Social Influence**

The data on social influence regarding wearable health devices shows varying degrees of influence from people within respondents' social circles. For the statement, "People whom I care about think the usage of wearable health devices is good," 100 respondents agreed, and 105 strongly agreed, suggesting that a significant portion of users believe that the people they care about view the use of wearable health devices positively. However, 73 respondents were neutral, and only 15 disagreed, indicating while the potential of social influence is generally positive. With, some opinions or thoughts are not influenced by social pressure. When asked if the usage of wearable health devices is recommended by friends and family, 118 respondents agreed, and 68 strongly agreed, showing that many users are encouraged to use wearable health devices by their social networks. However, 78 respondents were neutral, and 27 disagreed, suggesting that while some people receive recommendations, others do not experience this influence strongly. Regarding the statement, "I am using wearable health devices because the people around me use them," 93 respondents agreed, and 71 strongly agreed, indicating that social influence plays a role in users' decisions to adopt wearable health devices. However, 65 respondents were neutral, and 66 disagreed/strongly disagreed, suggesting that some individuals may be making their decision about using wearable devices independently of social pressures.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
People whom I care about think the	2	15	73	100	105

usage of wearable health devices is good.					
The usage of wearable health devices is recommended by my friends and family.	4	27	78	118	68
I am using wearable health devices because the people around me use them.	37	29	65	93	71

**Table 13: Results of Social Influence**



**Figure 24: Results of Social Influence**

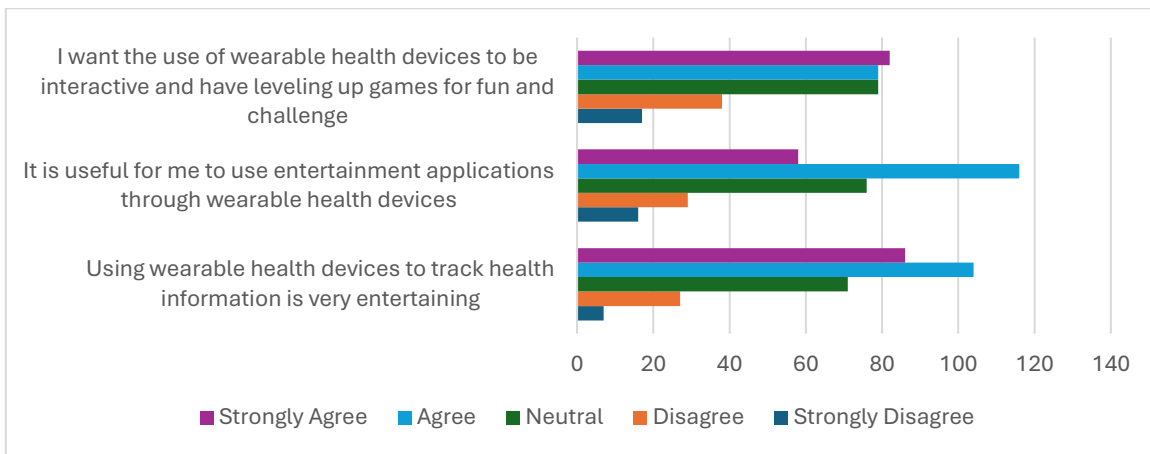
#### **4.4.6 Infotainment**

Data on the entertainment aspects of wearable health devices reveals varied user responses. When asked if tracking health information is entertaining, 104 agreed and 86 strongly agreed, indicating some users enjoy it; however, 71 remained neutral and 27 disagreed, suggesting that not all users find it entertaining, and some may see it purely as a functional tool. Regarding entertainment applications, 116 participants agreed and 58 strongly agreed, demonstrating a notable interest in integrating entertainment with health monitoring. Despite 76 respondents being neutral and 29 disagreeing, which implies that while some users see value in using entertainment apps, there is a portion of the population that may not view this as essential or useful. For gamified experiences, 79 agreed and 82 strongly agreed on the desire for interactive challenges. Still, 79 were neutral and 17 strongly disagreed, indicating that while many are interested in gamification, others prefer

a straightforward health-focused experience.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using wearable health devices to track health information is very entertaining	7	27	71	104	86
It is useful for me to use entertainment applications through wearable health devices	16	29	76	116	58
I want the use of wearable health devices to be interactive and have leveling up games for fun and challenge	17	38	79	79	82

**Table 14: Results of Infotainment**



**Figure 25: Results of Infotainment**

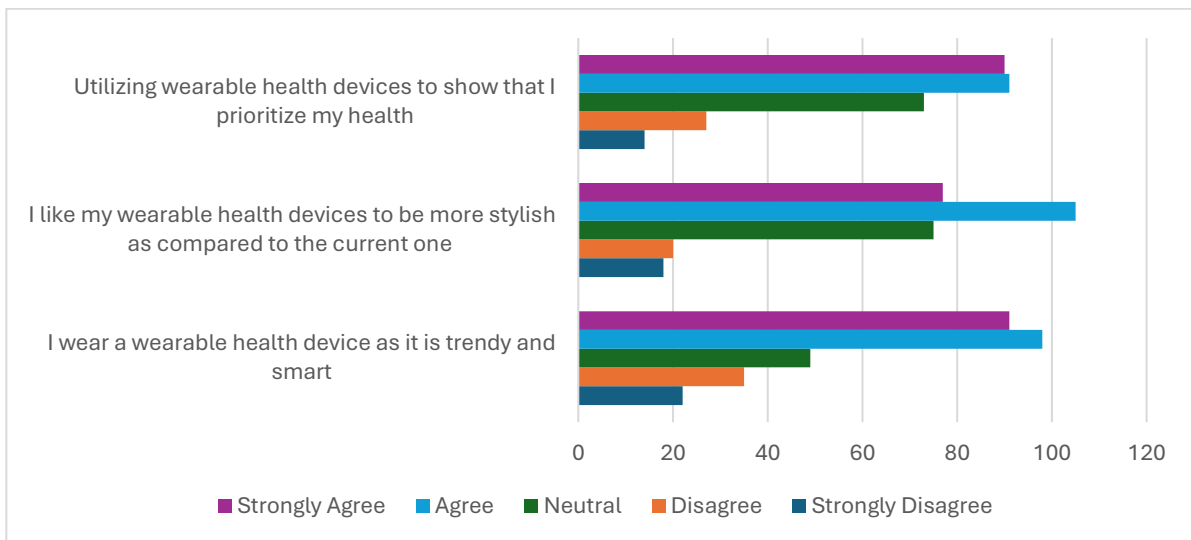
#### **4.4.7 Fashionability (Style)**

The analysis of responses regarding the fashion appeal of wearable health devices reflects varied perspectives on aesthetics and social significance. A notable 98 respondents agreed and 91 strongly agreed that these devices are trendy, illustrating a strong perception of fashionability among users. Conversely, 49 were neutral and 57 disagreed/strongly disagreed, indicating some do not prioritize trendiness. When asked about the need for more stylish options, 105 agreed and 77 strongly agreed, suggesting considerable interest in visually appealing designs; nonetheless,

75 remained neutral and 38 disagreed/strongly disagreed, showing that functionality can outweigh style for some. Finally, 91 agreed and 90 strongly agreed using these devices signifies health prioritization, but 73 were neutral and 41 disagreed/strongly disagreed, revealing differing views on their role in health consciousness.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I wear a wearable health device as it is trendy and smart	22	35	49	98	91
I like my wearable health devices to be more stylish as compared to the current one	18	20	75	105	77
Utilizing wearable health devices to show that I prioritize my health	14	27	73	91	90

**Table 15: Results of Fashionability**



**Figure 26: Results of Fashionability**

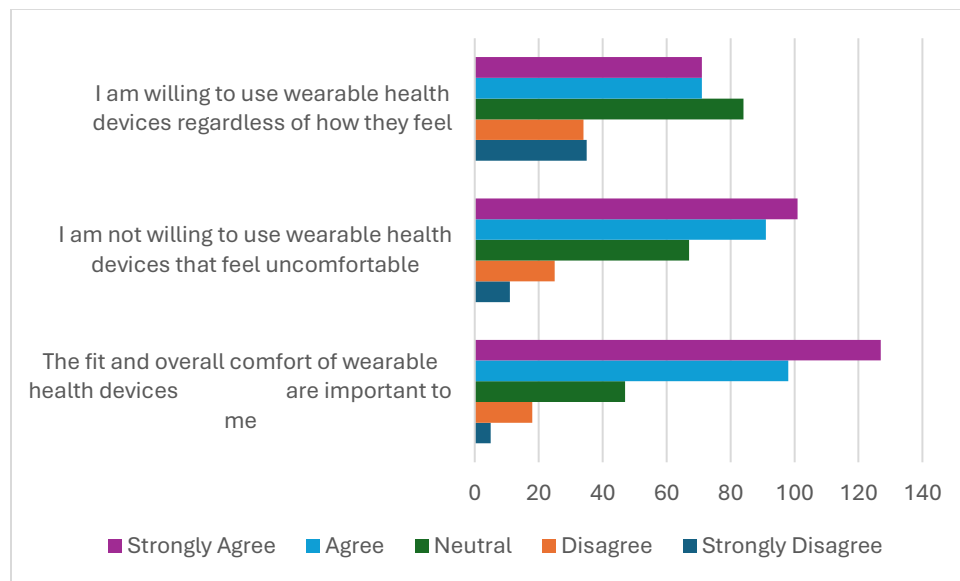
#### **4.4.8 Wearability**

Responses about wearability indicate that comfort and fit are crucial for many users of wearable health devices. Among those surveyed, 98 agreed and 127 strongly agreed that comfort is significant, although 47 were neutral and 18 disagreed, showing it may not be a priority for everyone. Regarding discomfort, 91 agreed and 101 strongly agreed that they wouldn't use uncomfortable devices, while 67 were neutral and 25 disagreed, indicating some prioritize

functionality over comfort. In response to the idea of using devices regardless of how they feel, opinions were mixed, 71 agreed and 71 strongly agreed, with 84 neutral and 34 disagreeing, suggesting that there are users who are not overly concerned about the comfort of wearable devices, possibly because they value other features, such as health monitoring capabilities.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The fit and overall comfort of wearable health devices are important to me	5	18	47	98	127
I am not willing to use wearable health devices that feel uncomfortable	11	25	67	91	101
I am willing to use wearable health devices regardless of how they feel	35	34	84	71	71

**Table 16: Results of Wearability**



**Figure 27: Results of Wearability**

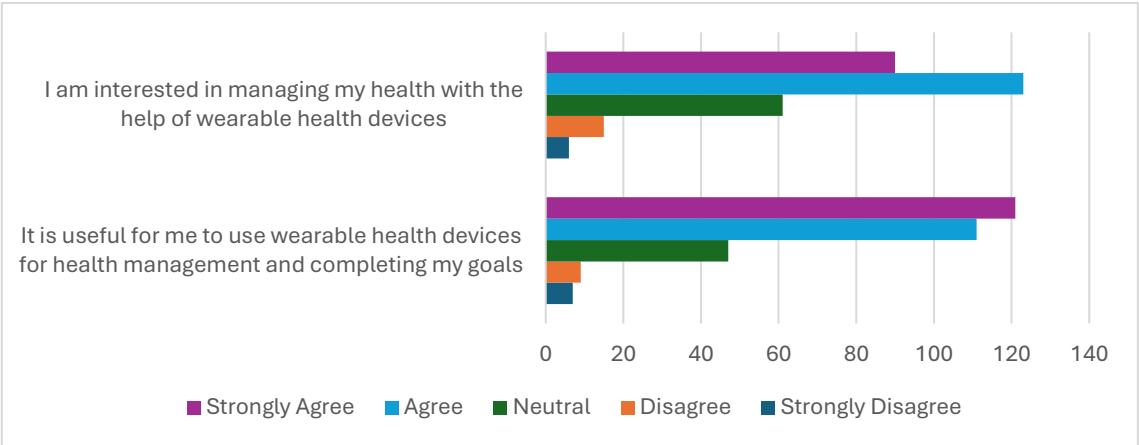
#### **4.4.9 Healthcare**

The responses regarding healthcare indicate a positive outlook on the use of wearable health devices for health management among most participants. In response to the statement, "It is

useful for me to use wearable health devices for health management and completing my goals," 111 respondents agreed, and 121 strongly agreed, indicating a strong belief in the utility of wearable health devices for health management. A smaller portion, 47 respondents, were neutral, and only 16 disagreed/strongly disagreed, suggesting that most users find value in using these devices for tracking and managing health goals. Similarly, when asked, "I am interested in managing my health with the help of wearable health devices," 123 respondents agreed, and 90 strongly agreed, further demonstrating a strong interest in utilizing wearable technology for health purposes. 61 respondents were neutral, while 21 disagreed/strongly disagreed, indicating that while most participants are interested, there is still a portion of users who are either indifferent or not interested in using wearable devices for health management.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
It is useful for me to use wearable health devices for health management and completing my goals	7	9	47	111	121
I am interested in managing my health with the help of wearable health devices	6	15	61	123	90

**Table 17: Results of Healthcare**



**Figure 28: Results of Healthcare**

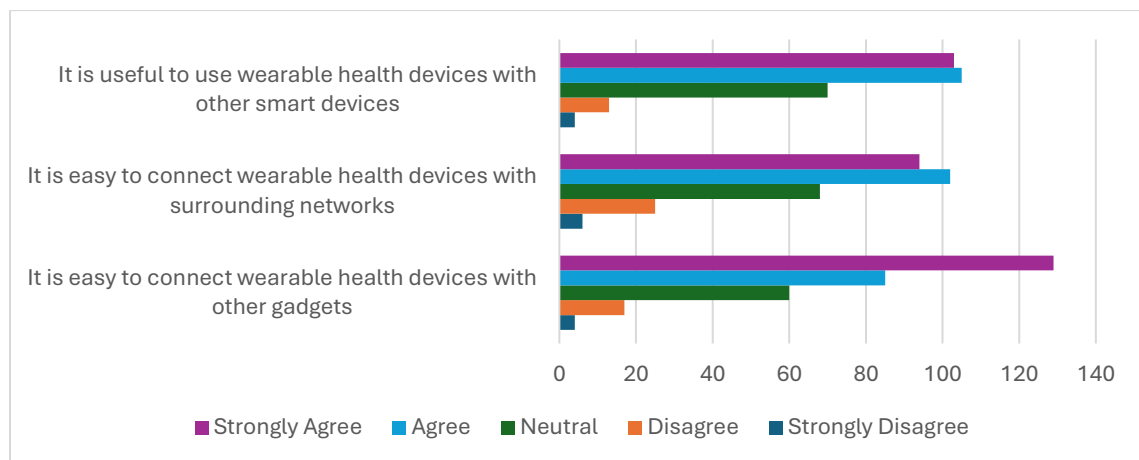
**4.4.10 Connectivity**

Responses on connectivity reveal that a large portion of users generally find it easy to connect

wearable health devices to other gadgets and networks, though opinions vary. For the statement, "It is easy to connect wearable health devices with other gadgets," 85 agreed and 129 strongly agreed, indicating a strong perception of ease. However, 60 were neutral, and 21 disagreed/strongly disagreed, suggesting some experience challenges. Regarding network connectivity, 102 agreed and 94 strongly agreed, showing simplicity in establishing connections, though 68 were neutral and 31 disagreed/strongly disagreed, highlighting potential issues for some. Finally, on the importance of integrating wearable devices with smart gadgets, 105 agreed and 103 strongly agreed, while 70 were neutral and 17 disagreed, indicating that most see value, though not all.

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
It is easy to connect wearable health devices with other gadgets	4	17	60	85	129
It is easy to connect wearable health devices with surrounding networks	6	25	68	102	94
It is useful to use wearable health devices with other smart devices	4	13	70	105	103

**Table 18: Results of Connectivity**



**Figure 29: Results of Connectivity**

#### **4.5 Hypothesis Analysis**

Variables		TTF
Perceived Usefulness	Pearson Correlation	.727**

	Sig. (2-tailed)	.000
Perceived Ease of Use	Pearson Correlation	.621**
	Sig. (2-tailed)	.000
Infotainment	Pearson Correlation	.406**
	Sig. (2-tailed)	.000
Healthcare	Pearson Correlation	.558**
	Sig. (2-tailed)	.000
Connectivity	Pearson Correlation	.421**
	Sig. (2-tailed)	.000
**. Correlation is significant at the 0.01 level (2-tailed).		

**Table 19: Correlation of Technology and Task Fitness**

Variables		Behavioral Intention
Perceived Usefulness	Pearson Correlation	.625**
	Sig. (2-tailed)	.000
Perceived Ease of Use	Pearson Correlation	.474**
	Sig. (2-tailed)	.000
Privacy Concern	Pearson Correlation	.089
	Sig. (2-tailed)	.129
Social Influence	Pearson Correlation	.414**
	Sig. (2-tailed)	.000
Wearability	Pearson Correlation	.410**
	Sig. (2-tailed)	.000
Fashionability	Pearson Correlation	.432**
	Sig. (2-tailed)	.000
**. Correlation is significant at the 0.01 level (2-tailed).		

**Table 20: Correlation of Behavioral Intention**

The correlation analysis results reveal how various factors influence behavioral intention and TTF regarding the use of wearable health devices.

H1: Connectivity task has a positive influence on TTF: Accept the hypothesis

Connectivity shows a moderate positive correlation ( $r = 0.421$ ,  $p < 0.01$ ) with Technology and Task Fitness, indicating that the ability to connect wearable health devices with other devices or networks enhances their utilization and effectiveness in health-related tasks.

H2: The infotainment task has a positive influence on TTF: Accept the hypothesis

Infotainment demonstrates a moderate positive correlation ( $r = 0.406$ ,  $p < 0.01$ ) with Technology and Task Fitness. This suggests that the entertainment or infotainment features of wearable health devices, such as games or fun elements, can contribute to their perceived effectiveness in completing tasks, although it is a lesser influence compared to other factors.

H3: Healthcare has a positive influence on TTF: Accept the hypothesis

Healthcare has a moderate positive correlation ( $r = 0.558$ ,  $p < 0.01$ ) with Technology and Task Fitness, implying that users who view wearable health devices as useful for managing and improving their health are likely to consider these devices as fitting well into their health management routines.

H4: TTF has a positive influence on perceived usefulness: Accept the hypothesis

Perceived Usefulness shows a strong positive correlation with Technology and Task Fitness ( $r = 0.727$ ,  $p < 0.01$ ). This suggests that as users perceive wearable health devices as more useful, they also find the devices to be better suited to their tasks and health management. The greater the usefulness, the better the fit of the technology for their health-related tasks.

H5: TTF has a positive influence on perceived ease of use: Accept the hypothesis

Perceived Ease of Use also exhibits a strong positive correlation ( $r = 0.621$ ,  $p < 0.01$ ), indicating that the easier users find wearable health devices to use, the more effective these devices are in helping them perform health-related tasks. User-friendly devices contribute significantly to task fitness.

H6: Perceived usefulness has a positive influence on behavioral intention: Accept the hypothesis

Perceived Usefulness shows a strong positive correlation with behavioral intention ( $r = 0.625$ ,  $p < 0.01$ ). This suggests that as the perceived usefulness of wearable health devices increases, the likelihood of individuals intending to use them also increases. Users who find the devices useful are more likely to adopt them.

H7: Perceived ease of use has a positive influence on behavioral intention: Accept the hypothesis

Perceived Ease of Use also shows a positive correlation with behavioral intention ( $r = 0.474$ ,  $p <$

0.01), though the strength of the correlation is slightly weaker than perceived usefulness. This implies that the easier users find wearable health devices to use, the more likely they are to intend to use them.

H8: Social influence has a positive influence on BI: Accept the hypothesis

Social Influence exhibits a moderate positive correlation with behavioral intention ( $r = 0.414$ ,  $p < 0.01$ ), indicating that the opinions of family, friends, or peers do influence individuals' intentions to use wearable health devices. The stronger the social influence, the higher the likelihood of adoption.

H9: Privacy concern has a negative influence on BI: Reject the hypothesis

Privacy Concern has a very weak and statistically insignificant correlation with behavioral intention ( $r = 0.089$ ,  $p = 0.129$ ). This suggests that consumers are not as concerned about privacy when using WTDs for managing personal health.

H10: Fashionability has a positive influence on BI: Accept the hypothesis

Fashionability also displays a moderate positive correlation with behavioral intention ( $r = 0.432$ ,  $p < 0.01$ ), indicating that the aesthetic appeal and trendiness of wearable health devices contribute to individuals' behavioral intention to use them

H11: Wearability has a positive influence on BI: Accept the hypothesis

Wearability shows a moderate positive correlation with behavioral intention ( $r = 0.410$ ,  $p < 0.01$ ). This suggests that the comfort and fitness of the wearable health devices significantly influence users' intention to adopt them

In summary, when analyzing individual factors as per the given hypothesis, perceived usefulness and perceived ease of use were the most influential factors in their intention of usage of wearable devices and determining how well wearable health devices fit into health management tasks. While Infotainment, Healthcare, and Connectivity also play a role in influencing the devices' task fitness, making them more integrated into users' health routines. Privacy Concern seems to have an insignificant impact on the intention of use. Factors like Social Influence, Wearability, and Fashionability also positively influence behavioral intention, with wearability and style playing notable roles.

**4.6 Relationship between the Intention of Use and factors affecting the adoption of wearable health devices.**

Model	Unstandardized Coefficient		R Square	F Value	P Value
	B Value	Std. Error			
(Constant)	1.055	.218	.431	36.293	0.001
Perceived Usefulness	.438	.054			
Perceived Ease of Use	.116	.068			
Privacy Concern	-.029	.032			
Social Influence	.017	.054			
Fashionability	.064	.046			
Wearability	.110	.058			
(Constant)	1.055	.218			
a. Dependent Variable: Behavioural Intention					

**Table 21: Relationship between the intention of use and factors affecting the adoption of wearable health devices**

The regression analysis of Behavioral Intention to use wearable health devices reveals that the model explains 43.1% of the variance in Behavioral Intention (R Square = 0.431), which indicates a moderate fit. The overall model is statistically significant (F-value = 36.293,  $p = 0.001$ ), showing that the independent variables collectively influence Behavioral Intention. Among the predictor, Perceived Usefulness has the strongest positive effect, with a coefficient of 0.438 ( $p < 0.01$ ), suggesting that individuals are more likely to intend to use wearable health devices if they perceive them as useful. PEOU have a positive impact but less in number as compared to PU. ( $B = 0.116, p > 0.05$ ). Privacy Concern ( $B = -0.029, p > 0.05$ ) shows weak and non-significant effects, implying that privacy is not a matter of concern in the intention to use wearable health devices. On Collective analyzing social influence has minimum impact ( $B = 0.017, p > 0.05$ ) when compared as individual factor. Similarly, Fashionability ( $B = 0.064, p > 0.05$ ) and Wearability ( $B = 0.110, p > 0.05$ ) have positive but non-significant impacts

Model	Unstandardized	R	F	P
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	Coefficient		Square	Value	Value
	B Value	Std. Error			
(Constant)	0.437	.178	.612	90.990	0.001
Perceived Usefulness	0.478	.047			
Perceived Ease of Use	0.292	.054			
Infotainment	.082	.034			
Healthcare	.096	.045			
Connectivity	-.040	.044			
a. Dependent Variable: Technology and Task Fitness					

**Table 22: Relationship between technology and task fitness and factors influencing the adoption of wearable health devices**

The regression analysis of Technology and Task Fitness indicates that the model explains 61.2% of the variance in Technology and Task Fitness (R Square = 0.612), suggesting a strong fit. The overall model is highly significant (F-value = 90.990,  $p = 0.001$ ), meaning that the independent variables collectively have a considerable influence on Technology and Task Fitness. Perceived Usefulness 0.478 ( $p < 0.01$ ) and Perceived Ease of Use ( $B = 0.292$ ,  $p < 0.01$ ), emerge as the most influential factor, indicating that higher perceptions of the usefulness and ease of use of wearable health devices significantly enhance Technology and Task Fitness. Infotainment ( $B = 0.082$ ,  $p < 0.05$ ) and Healthcare ( $B = 0.096$ ,  $p < 0.05$ ) both have positive and significant effects. Connectivity ( $B = -0.040$ ,  $p > 0.05$ ) does not significantly contribute to Technology and Task Fitness, indicating that the ability to connect the wearable devices with other gadgets or networks has little impact on their task-related activities.

#### **4.7 Discussion**

The topic of wearable technology in healthcare has generated significant interest from both businesses and scholars. This heightened focus stems from its ability to offer a novel method for ongoing health monitoring beyond traditional clinical environments and its promise for automated prediction, prevention, and intervention of health events. Additionally, wearable technology can potentially enhance communication between patients and healthcare providers. (Mieronkoski *et al.*, 2017). This study aimed to evaluate factors influencing the adoption and use of IoT-based wearable health devices in South Indian population for health management,

focusing on user behavior intentions, privacy concerns, social influence, and other external factors mentioned in the study. The following discussion discusses based on given objectives

### **1.To evaluate demographic variables (like Age, Gender, and Education level) and Economic status in wearable device users**

The present study shows that males (51.5%) are high in usage of wearable devices, followed by females (45.1%). Similar findings from previous studies depict that the gender distribution of using wearable health devices is higher in males than in females.(Manali Gupta *et al.*, 2024) (Hossain *et al.*, 2021). This may be due to, men being keener to adapt to modern technology. However, some studies have a contrasting opinion that says women are more likely to adopt wearable health devices due to their concerns regarding health management.(Chandrasekaran *et al.*, 2025)

The age range mostly using wearable devices is from 30-50 years, as the prevalence and prognosis of non-communicable diseases like diabetes, hypertension etc. are common in these age groups, which aligns with the present study. (Huan-Ming Chuang, 2016) (Hossain *et al.*, 2021). The present study showed that the majority of the participants were well qualified, as the majority of the users were postgraduate, followed by graduate. (Huan-Ming Chuang, 2016) has also identified in his study that individuals with higher educational levels have more knowledge about wearable health technology.

(Huan-Ming Chuang, 2016) (Chandrasekaran *et al.*, 2025)These studies line up with the present study from an economic status perspective, where a significant portion of wearable health device users (79%) belong to the middle to upper middle group. It is because wearable devices are costly, and household with efficient earning can strongly correlates with increased adoption of healthcare wearables. Cost remains a significant barrier for lower-income groups, limiting access and uptake. In contrast, a study (Patil *et al.*, 2022) was developed where (51.3%) of users were from the lower income group, as many use these devices for health management. The growing availability of cost-effective wearable devices has made them accessible for usage for lower and middle-income groups to adopt wearables when they perceive these devices as useful and easy to use, regardless of the cost barrier.

In our present study, smart monitoring devices (BP monitoring/ Blood sugar/ wearable echocardiograph) were mainly used, followed by Wearable devices (watches, bracelets,

biosensors). Furthermore, from the primary data, it was seen that 69.6% of women were using smart monitoring devices (BP monitoring/ Blood sugar/ wearable echocardiograph), while 50.9% of men utilized Wearable devices (watches, bracelets, biosensors). A similar study from Manali Gupta and Md. Shahinur Rahman suggests the same, where women prefer monitoring devices while men tend to use fitness trackers and smart watches more. For this reason, women frequently favor devices that assist in health monitoring related to lifestyle and the management of chronic conditions. Women show a greater willingness to use sensors for health tracking and generally display more involvement with devices that offer ongoing feedback and encouragement for health objectives. However, men tend to favor devices that support physical activity and fitness tracking, which are often associated with higher physical activity levels and goal-oriented health tracking.(Manali Gupta *et al.*, 2024) (Rahman *et al.*, 2024).

## **2.Assessing health management by analyzing perceived usefulness, behavioral use intentions, and perceived ease of use**

This research offers empirical evidence for the hypothesis that the factors derived from the TAM and TTF models and other variables influence the usage of wearable devices for health care. Based on the TAM model, two key factors affecting users' acceptance of new technology are PU and PEOU. Both factors influence attitudes toward using technology, which in turn influences BI, which determines the actual usage of devices. From our present study, it was shown that perceived usefulness has a significant influence on behavioral intention ( $r = 0.625$ ,  $p < 0.01$ ), as compared to perceived ease of use on behavioral intention ( $r = 0.474$ ,  $p < 0.01$ ). (Chang *et al.*, 2016) The findings align with the present study, indicating that customer expectations regarding wearable devices are influenced more by their usefulness than by their ease of use. This is because users are accustomed to smart devices like smartphones and tablet computers and consider them easy to operate. However, it is crucial that a wearable device can benefit the user. Therefore, it is hard to anticipate that consumers will adopt a wearable device unless it offers more advantages than they have previously encountered.

## **3. Evaluating the privacy concern and social influence of healthcare wearables device**

This study indicates about social influence, which is moderately impacting in adopting wearable healthcare devices ( $r = 0.414$ ,  $p < 0.01$ ). This aligns with the study done by (Cao *et al.*, 2024)

where there was a positive relationship between social influence and behavioral intention ( $\beta = 0.407, p < 0.001$ ), emphasizing that more social influence can significantly increase people's behavioral intention to adopt mHealth. Moreover, the results align with other studies, (Talukder *et al.*, 2020), (deter and Md. Rakibul Hoque, 2020), (Krishnan Gopinath *et al.*, 2019) suggesting that creating, launching, and advertising social forums and social events via wearable devices to successfully engage social groups was found to be significant for the acceptance of wearable devices in society. In contrast, (Zhang and Mao, 2023) discovered that social influences do not impact adoption intention, the findings indicate that consumers' health motivations positively affect their intention to adopt the wearable health device.

Surprisingly, the finding showed that privacy concern has a non-significant influence on behavioral intention. This finding contrasts with previous studies that indicated privacy issues adversely affected behavioral intentions. (Guo *et al.*, 2016), (Dhagarra *et al.*, 2020), and (Guo *et al.*, 2012). However, Sergueeva and Yin's study aligns with the finding that indicates that consumers are not as concerned about privacy when using WHDs for managing personal health. One potential reason is that consumers have become familiar with disclosing their personal health data to their healthcare provider and insurance. In a healthcare setting, consumers utilize wearable devices to share health data with providers, yet they typically do not own this data. The manufacturer collects and stores it, offering consumers only personalized health results. Anonymity reassures consumers, often leading them to give up their privacy for tailored insights into their health. (Sergueeva *et al.*, 2019) and (Yin *et al.*, 2022)

#### **4. Understanding subjective perceptions regarding technology and task fitness (connectivity, healthcare, infotainment, style, wearability)**

Research combining TTF with TAM indicates that patients' intention to adopt healthcare technology is affected not only by perceived usefulness (PU) and perceived ease of use (PEOU), but also by the technology's compatibility with their healthcare tasks. (Misra *et al.*, 2023b). From our present study, TTF measures are significantly correlated to perceived usefulness ( $r = 0.727, p < 0.01$ ) and perceived ease of use ( $r = 0.621, p < 0.01$ ). This finding is supported by prior study with similar values of PEOU ( $r = 0.800$ ) and PU ( $r = 0.792$ ). This suggests that when users believe wearable devices fit effectively with their health-related tasks, they consider these devices to be more beneficial and user-friendly. (Patil *et al.*, 2022)

Results from the present study show that connectivity, infotainment, and healthcare have a positive correlation with TTF. This finding is supported by prior studies (Chang *et al.*, 2016) (Misra *et al.*, 2023b). Bluetooth connectivity is crucial for the operation of wearable devices. Therefore, it is an important element. Additionally, healthcare aspects greatly influence the intention of use by highlighting the health-protective aspects features of wearable, which have become vital during life-threatening events like the COVID-19 pandemic, also indicate a notable influence of both the protective and utilitarian aspects on the intention of use of these devices. Similarly, (Patil *et al.*, 2022) showed that connectivity ( $r = 0.716$ ), infotainment ( $r = 0.598$ ), and healthcare ( $r = 0.780$ ) have a strong influence on intention of use.

Fashionability and wearability show a positive relationship with behavioral intention, which aligns with other studies (Misra *et al.*, 2023b) It was discovered that the attractiveness and style of the device significantly influence the acceptance of the device. The study demonstrated that visual attractiveness plays a significant role in deciding whether to adopt a wearable device. Wearable devices are still in the initial adoption phase, and aesthetic and visual appeal can be viewed as a significant foundation for consumer decision-making. According to (Jeong *et al.*, 2021). wearable devices are considered fashion items, their elegant appearance and distinct design enhance users' intention to adopt. In contrast, a study demonstrates that fashionability did not influence BI, but wearability had a strong correlation with BI, focusing on wearable devices that must be designed for comfort. Users didn't expect wearable health devices to be fashion products; rather, their primary concern was the usefulness of the device. The above findings suggest that the factors positively influence the subjective perception of adopting wearable devices. (Chang *et al.*, 2016)

## **CHAPTER 5: CONCLUSION AND RECOMMENDATIONS**

The study on the factors influencing the utilization of IoT-based wearable health devices in South India highlights public preferences and adoption rates. The summary of the main findings and implications for the research are as follows

Socioeconomic factors significantly influence the acceptance of wearable health devices in South India. According to data, most wearable health device users are males (51.5%) as compared to females. The findings showed that females were using smart monitoring devices (BP Monitoring/ Blood sugar/ wearable echocardiograph) more than Wearable devices (watches, bracelets, biosensors). It shows women are more concerned about managing their health, and men lean towards fitness and maintaining health. The age range of 26-50 years was more likely to use devices as they are prone to non-communicable disease like diabetes, hypertension or heart disease due sedentary life style choices and other underlying causes like genetics etc, driven to proactive health management, technological comfort, and lifestyle factors.

Education and income level play a pivotal role in shaping individuals' openness to adopting these services. 52 % of highly qualified users preferred the wearable device, as qualified individuals often show greater awareness of health and a strong desire to track and enhance their well-being. In contrast, acceptance tends to be lower in individuals with limited education, caused by reduced exposure to digital platforms and a smaller disposable income for investing in technological resources. The other factor that influences the adoption of wearable health devices is the cost. The study shows that 78.9% middle to upper-middle income group was highly prone to adopt wearable health devices. Cost is a barrier for lower lower-income group, which weakly influences the intention of use. These results highlight that socioeconomic status plays a crucial role in the adoption of wearable technology in South India.

Initially, we combined the principal theoretical models (i.e., TAM and TTF); the extended combined model was utilized in the context of wearable devices. The comprehensive conceptual model was created for the adoption of wearable health devices based on theoretical connections derived from existing literature. The hypothesis was effectively tested utilizing the statistical

framework. Findings confirmed perceived usefulness and perceived ease of use as notable predictors of behavioral intention to adopt wearable health devices. It suggests users of wearable devices are more inclined to adopt and maintain the usage of these technologies when they view them as beneficial for their health requirements and simple to use and user-friendly.

Social influence has a moderate impact on behavioral intention. It shows that social influence is one of the key factors in adopting wearable technology in South India, as this societal influence or environment can inspire people, particularly non-users or newcomers, to embrace wearable technology. In South India, people value the words and recommendations from social circles like friends and family regarding the usage or adoption of wearable technologies.

Fashionability and wearability have a positive impact on the adoption of wearables. The user expects the wearable device to be aesthetic, apart from health management functionalities. The attractiveness of wearable gadgets increases when they are stylish and practical, matching individual tastes while ensuring comfort and convenience.

Privacy concern has an insignificant impact on intention of use. In the context of South Indian population, they were least concern about the privacy related to wearable device. This may be due to lack of knowledge regarding security issues and breaches, or they may trust the manufacturer with their data, especially with personal and health data, as they are reassured by the anonymity of the data being collected, they may be willing to give up their privacy to access personalized results. If that's the case, it removes privacy as an obstacle to offer a more customized engagement.

This study also contributes to the theory of task and technology fitness by unraveling the impact on perceived usefulness, perceived ease of use, connectivity, infotainment, and healthcare. Perceived ease of use and perceived usefulness have a high impact on TTF. Connectivity, infotainment, and healthcare attributes have a moderating impact on TTF. Healthcare influences the TTF relationship by prioritizing user requirements like data privacy, integration of workflows, and reduction of errors. These elements affect users' perceptions of fitness and, consequently, their intention to adopt and actually use healthcare technologies. Users are

attracted to devices which have a sort of entertainment as they increase the engagement value with wearable devices, making them not only tools for health tracking but also sources of entertainment and social connection. Connectivity facilitates immediate communication, data exchange with healthcare professionals, and integration with various digital platforms, thereby improving the technology's capability to assist with intricate health management responsibilities. This enhanced support increases the alignment between the technology and the user's health-related activities, positively affecting usage and performance results.

### **5.1 Implications**

Decision-makers in the wearable device industry should consider these key factors for ensuring adoption. Firstly, it is crucial that wearables provide useful functions that align with consumer desires, necessitating market research and effective marketing to highlight these features. Furthermore, ease of use is vital, devices must have intuitive hardware and software to avoid overwhelming users with complexity. Complicated designs and confusing interfaces can hinder acceptance.

Social status also plays a significant role, implying that wearables should not only be functional but also aesthetically pleasing, as they are visible accessories often worn with everyday clothing. Consequently, crafting attractive designs can enhance appeal. A strong, recognizable brand can further influence purchase decisions.

Lastly, enjoyment is paramount; wearables should integrate enjoyable elements, making them more appealing. For instance, health-related applications could benefit from gamification, incorporating competitive aspects to enhance user engagement. By addressing these factors, functionality, design, brand recognition, and enjoyment, companies can significantly improve the adoption and satisfaction rates of their wearable devices.

To enhance wearable device adoption, decision-makers must acknowledge the potential risks involved in purchasing such devices, particularly focusing on their promised functionalities. Engineers and managers should ensure that the devices perform as marketed, as failure to meet expectations may deter potential consumers. Financial risk perception must also be addressed by emphasizing the benefits offered to mitigate concerns about monetary loss or poor investment. Privacy concerns emerge as the most significant risk factor, especially with the rise of the Internet of Things (IoT). Thus, companies developing wearables must rigorously assess and adhere to

privacy policies to protect user data and comply with country-specific regulations. Raising awareness through educational forums and training are necessary. Ultimately, wearable device acceptance hinges on various factors, with usability and user enjoyment being key influences. The findings suggest that the advantages of using wearables generally outweigh the associated concerns. Therefore, decision-makers should focus promotional efforts on highlighting the benefits of wearables while prioritizing user-friendly designs in both hardware and software.

## **5.2 Limitation**

The survey was mainly distributed to professionals focused on technology and personal healthcare technology, which might lead to a sampling bias. As we focused solely on a limited segment of the population within South India, the applicability and interpretation can be extended to other parts of India or diverse social backgrounds. As we took the responses from users and non-users and collectively analyzed their responses, we did not compare their subjective perception on the adoption of wearable devices. Additionally, every questionnaire answer is self-reported and represents personal perceptions regarding factors and thus might be influenced by interpretation bias from the participants. The older and elderly people were excluded from the study, as we were not able to study their perception of wearable devices, as they might not be familiar with new technology. The cross-sectional design of the study offers a glimpse into public preferences and obstacles at one specific moment. This method fails to account for shifts in attitudes or behaviors over time, which may be affected by advancing technology, health policies, or public awareness initiatives. Our study used TAM and TTF models, but there are other models like UTUAT1 and UTUAT2 to be explored. There are many factors, like hedonic motivation, performance expectancy, etc., to be studied.

## **5.3 Future Perspective**

To enhance the results of this study and tackle its limitations, subsequent research should broaden the geographic range beyond South India to encompass various areas throughout the nation. This wider perspective will assist in identifying regional variations in wearable device uptake and offer a more complete insight. Boosting the sample size and diversity is vital, guaranteeing that individuals from different age brackets, income ranges, educational levels, and both rural and urban regions are included. This will improve the reliability and applicability of the results. Longitudinal studies must be carried out to monitor shifts in public perceptions of adopting

wearables over time, providing an understanding of the enduring impacts of technological progress and policy developments. Furthermore, a deeper investigation into socioeconomic factors is essential to comprehend how income, education, and job status affect access to healthcare and digital literacy. Special attention must be directed towards older adults, who were not adequately represented in this research, along with the influence of technological literacy among all age demographics.

Future studies should focus on the privacy personalization paradox to understand the subjective awareness regarding security and its consequences, and additionally include external elements like government regulations, healthcare systems, internet access, cost reduction strategies, which are essential for wearable device adoption and acceptance. Ultimately, qualitative techniques such as interviews and focus groups need to be used to obtain a deeper understanding of the factors influencing public preferences and obstacles, enhancing quantitative findings and offering a more nuanced perspective on wearable technology acceptance.

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## APPENDICES

### Appendix A - Online survey

#### Evaluation of Factors Influencing the Utilization of IoT-based Wearable Device Technology for Healthcare among South Indian Population

Dear Participant

I'm Nancy Sinha, pursuing a Master's in medical device business and technology at Griffith College Dublin. You are invited to be involved in this study called Evaluation of Factors Influencing the Utilization of IoT based Wearable Device Technology for Healthcare among the South Indian Population. It aims to focus on which influences adopting the usage of health wearable devices, socio-economic differences in the willingness to use, and the level of public knowledge and awareness regarding the same.

The survey has sets of questions where you must provide specific answers. The survey will take approximately 10-12 minutes. The questions are framed in an easily understandable way. The participant's responses and confidentiality will be kept private as per the General Data Protection Regulation (GDPR). The involvement of the participant is entirely voluntary. You are allowed to withdraw or refuse participation at any point in time during the survey.

If you have any questions or concerns, feel free to contact:

[nancy.sinha@student.griffith.ie](mailto:nancy.sinha@student.griffith.ie)

Thank you in anticipation for your valuable time and response.

Kindly confirm you understand the purpose of the study. Yes/No

Do you agree to participate in this study? Yes/No

To participate in this study, you must be between the ages of 18 -64 years. Please confirm. Yes/No


Are you familiar with wearable health devices? (It is a wearable device that monitors vital signs and advanced health conditions like Blood Pressure Monitoring, Blood Sugar, ECG (Electrocardiograph), etc.) Yes/No

**Evaluation of Factors Influencing the Utilization of IoT-based Wearable Device Technology for Healthcare among South Indian Population. - A Questionnaire**

**Questions**

**Socio-economic Details**

- 1) Gender -
  - Male
  - Female
  - Prefer not to say
- 2) Age-
  - 18-25 years
  - 25-50 years
  - 50-64 years
  - Prefer not to say
- 3) Education level:
  - 10+2,
  - Graduate,
  - Postgraduate
  - Prefer not to say
- 4) Economic status?
  - Low (Less than INR 50,000 to 500000)
  - Middle ( 500000 to 2500000)
  - Upper middle (2500000 -5000000)
  - High (5000000- 10000000)
- 5) Are you currently utilizing wearable health devices (It is a wearable device where it monitors vital signs and advanced health conditions)?
  - Yes
  - No
- 6) What type of wearable health devices are you using?
  - Smart Monitoring device (BP monitoring/ Blood sugar/ wearable echocardiograph)
  - Wearable devices (watches, bracelets, biosensors).
- 7) Would you recommend the usage of wearable health devices to someone?
  - Yes
  - No
- 8) If not why?
  - Wearability issue
  - Digital complexity
  - Data Accuracy
  - Cost Barrier
  - Others \_\_\_\_\_

<b>Likert Scale Scoring:</b>		<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>For all statements, please rate your agreement or disagreement using a scale of 1 to 5 as follows</b>						
<b>5- Strongly Agree</b>  <b>1- Strongly Disagree</b>						
<b>1. Behavioural Intention (BI)</b>						
BI1	I try to use wearable health devices whenever I get the chance					
BI2	I am probably going to use wearable health devices in the future					
BI3	I plan to use wearable health devices solely for particular or chronic conditions.					
BI4	The application of wearable health devices can enhance the understanding of vital signs (like tracking blood pressure and heart rate, respiration, Blood sugar level, SPO2)					
<b>2. Perceived Usefulness (PU)</b>						
PU1	Wearable health devices are effective in monitoring my health					
PU2	Using wearable health devices makes my daily health monitoring activities more efficient					
PU3	Wearable health devices can boost overall health conditions and improve the quality of life					
<b>3. Perceived Ease of Use (PEOU)</b>						
PEOU1	The wearable health devices that I have can be handled easily					
PEOU2	It is easy to learn how to use wearable health devices					
PEOU3	I find it hard to learn the usage of wearable health devices due to complex features, lack of proper instruction, overwhelming functions, least familiar with technology					
PEOU4	The wearable health device that I own can be easily accessed at any time					
<b>4. Technology and Task Fitness (TTF)</b>						
TTF1	I am happy with the functionalities of wearable health devices.					

TTF2	This will help me to remember regular health checkups and provide medical advice as needed.					
TTF3	I want my wearable health devices to have some more engaging functions like having a virtual coach, meditation, and mood tracking, etc.					
<b>5. Connectivity</b>						
CON1	It is easy to connect wearable health devices with other gadgets					
CON2	It is easy to connect wearable health devices with surrounding networks					
CON3	It is useful to use wearable health devices with other smart devices					
<b>6. Privacy Risk</b>						
PR1	I am concerned that wearable health devices could reveal private information					
PR2	I'm worried that my personal information might be utilized without my consent.					
PR3	Others (individuals or organisations) might control/ access my stored personal data while using wearable health device.					
<b>7. Healthcare</b>						
HEA1	It is useful for me to use wearable health devices for health management and completing my goals					
HEA2	I am interested in managing my health with the help of wearable health devices					
<b>8. Infotainment</b>						
GRA1	Using wearable health devices to track health information is very entertaining					
GRA2	It is useful for me to use entertainment applications through wearable health devices					
GRA3	I want the use of wearable health devices to be interactive and have leveling up games for fun and challenge					

<b>9. Fashionability</b>					
FAS1	I wear a wearable health device as it is trendy and smart				
FAS2	I like my wearable health devices to be more stylish as compared to the current one				
FSA3	Utilizing wearable health devices to show that I prioritize my <u>health</u>				
<b>10. Wearability</b>					
WEA1	The fit and overall comfort of wearable health devices are important to me				
WEA2	I am not willing to use wearable health devices that feel uncomfortable				
WEA3	I am willing to use wearable health devices regardless of how they feel				
<b>11. Social Influence (SN)</b>					
SN1	People whom I care about think the usage of wearable health devices is good.				
SN2	The usage of wearable health devices is recommended by my friends and family.				
SN3	I am using wearable health devices because the people around me use them.				

**Appendix B - Ethics Form**



**Ethics Application & Declaration Form**

DISSERTATION TITLE: EVALUATION OF FACTORS INFLUENCING THE UTILIZATION OF IOT BASED WEARABLE DEVICE TECHNOLOGY FOR HEALTHCARE AMONG SOUTH INDIAN POPULATION

RESEARCHER NAME: NANCY SINHA

PROGRAMME OF THE STUDY: MSc. In Medical Device Technology and Business

SUPERVISOR'S NAME: PATRICIA MOONEY

**DECLARATION:**

The information in this application form is accurate to the best of my knowledge. I undertake to abide by the principles outlined by Innopharma/Griffith College ethics policy in my research dissertation. I confirm that I have completed a full ethics assessment for my research dissertation as per the college guidelines. I will not begin my primary research until such approval from my supervisor and/or ethics Committee has been obtained.

I pledge to carry out my research according to the Innopharma/Griffith College academic integrity standards. Any results presented in my dissertation will be from my own, original research, I will reference and/or acknowledge any material or sources used in its preparation and I will not plagiarise the work of anyone else.

For	Student:
 _____	
STUDENT SIGNATURE:	
DATE: 28/03/2025	

The research contained within this research dissertation proposal has been approved.

For Supervisor:			
Ethics Committee Approval Required:	Yes	No	<input type="checkbox"/> <input type="checkbox"/>
SUPERVISOR SIGNATURE:			
DATE:			

For Ethics Committee (if required):	<input type="checkbox"/>	<input type="checkbox"/>
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Ethics Committee Approval Given:	Yes	No
ETHICS COMMITTEE MEMBER SIGNATURE:		
DATE:		

**NOTE: Supervisors are responsible for ensuring their students fill in this form correctly and that all ethical areas have been considered.**

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**SECTION 1: DESCRIPTION OF RESEARCH STUDY**

**1.1 Purpose and objectives of research:** The purpose of the study is to identify, assess, and analyze the main factors that impact the adoption and use of IoT-enabled wearable technology in healthcare. The IoT refers to a network of physical objects equipped with sensors, software, and technologies that connect and share data with other devices via the Internet, transforming ordinary devices into smarter ones. Healthcare is a prominent area for IoT applications, enabling physicians to assist patients online. Mobile IoT health wearable devices bridge the gap between patients and physicians, allowing personalized health assessments and tailored treatment plans. This study aims to highlight the factors that could influence a user’s intention to utilize wearable health devices, which will help to gain a deeper understanding regarding continuous advancement and expansion in the wearable healthcare device sector. The study will focus on assessing user behavior needs and how frequently the user is using the wearable devices. Moreover, it aims to analyze the perspective of the Indian user regarding wearable devices for managing individual health.

Objectives:

- To evaluate demographic variables (like Age, Gender, and Education level) and Economic status in the wearable device user
- Assessing health management by analyzing perceived usefulness, behavioral use intentions, and perceived ease of use.
- Evaluating the privacy concern and social influence of healthcare wearables devices.
- Understanding subjective perceptions regarding technology and task fitness (connectivity, healthcare, infotainment, style, wearability)

**1.2 Research Methodology:** The research methods can be carried out by gaining insight from individuals using wearable devices for health management. This research is subject to take place as a cross-sectional study. This study will be a quantitative survey-based study with online questionnaires designed in an anonymized Google form platform. The survey will be framed under the technology acceptance model (TAM) and technology and task fitness (TTF) models for technology adoption. The TAM model depends on two components: Perceived Usefulness, which means “*the degree to which a person believes that using a particular system would enhance his or her job performance*” and Perceived Ease of Use means “*the degree to which a person believes that using a particular system would be free of effort*”. These two theories used Behavioral Intention, which is defined as a person’s perceived likelihood to engage in a given behavior, to get the actual result. Task-Technology Fit (TTF) is defined as the extent to which technology assists a person in accomplishing a particular task. The survey will be a closed-ended question that allows the collection of quantitative data, which will be quantified statistically to identify the factors and trends influencing the usage of IoT in wearable health devices. The statistical approach like categorical variables, frequency distributions, cross-tabulation, Correlation, or regression analysis. This Electronic survey will be circulated among individuals between the ages of 18 to 64 years who have sufficient knowledge of wearable health devices, The survey will be done on the South Indian population

## SECTION 2: POSSIBLE ETHICAL ISSUES

Answer 'yes' or 'no' to the following questions.

### SUBJECT MATTER

#### Does the research proposal involve:

Research into specific company activities that would be deemed sensitive or confidential	No
Research into politically and/or racially/ethnically and/or commercially sensitive areas	No
Sensitive, personal, professional or corporate issues	No

### RESEARCH PROCEDURES

#### Does the research proposal involve:

Research that might damage the reputation of companies or participants	No
Research that may negatively affect the reputation of Griffith College/Innopharma	No
Use of personal records without consent	No
Use of company data without consent	No
The offer of any inducements to participate recording without consent	NoAudio or visual
Using a language other than English	No

### PARTICIPANTS

#### Does the research proposal involves:

People who are not competent and/or fluent in English	No
Does your research group include any of the following vulnerable groups	No

*(Adults with psychological impairments; Adults with learning difficulties; Adults under the protection/control /influence of others (e.g. in care/prison); Relatives of ill people (e.g. parents of sick children); Hospital or GP participants recruited in a medical facility; persons under the age of 18)*

**If you have answered NO to ALL questions, please go straight to Section 4.**

**If you have answered YES to ANY question in SECTION 2, you must fill in SECTION 3.**

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## SECTION 3: STEPS TAKEN TO AVOID ETHICAL ISSUES

*[Only fill in this section if you answered YES to ANY of the questions in Section 3. For example, if you answered yes to including participants who are not fluent in English, you might put forward a plan that offers your survey in two languages to take this into account. Another example could be a study where the researcher wants to include information about the care received by children with a long-term condition but it would not be ethical to approach the children directly but it might be acceptable to instead ask parents questions about their child's care. If these plans are acceptable to your supervisor, you may not need to apply for ethical approval from the Ethics Committee].*

- 3.1. If your ethics relates to **Subject Matter**, outline your action plan to work around any sensitive issues.
- 3.2. If your ethics relates to **Research Procedures**, outline your action plan to deal with possible ethical issues in your research procedures.
- 3.3. If your ethics relates to **Participants**, outline how you will protect vulnerable persons or those that do not have English as their first language.

## SECTION 4: ABOUT YOUR PARTICIPANTS

### 4.1. Outline your participant profile and why you have chosen them for this study:

The study is based on the South Indian population so selecting the participants based on that criteria.

The participant should be fluent and able to understand English.

The individual should have knowledge and understanding about wearable health devices and their purpose.

The participants between the ages of 18 to 64 years

### 4.2 How do you plan to gain access to/contact/approach your participant(s)?

We will identify and engage with online communities or platforms specific to individuals using wearable health devices. The survey will be shared through posts or direct messaging within these communities, ensuring compliance with the community rules and administrator approvals.

To reach a broader audience, targeted circulation on social media platforms such as Facebook, Instagram, Twitter, and LinkedIn will be used

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## SECTION 5: INFORMATION, CONSENT AND CONFIDENTIALITY

### 5.1 Participant Information Letter (PIL) for participants

**Please confirm below that your information letter covers:**

Description of the research topic and method	Yes
Details of what participation will involve	Yes
Rights to anonymity	Yes
Confidentiality	Yes
Rights to withdraw from the research	Yes
The contact details of the researcher and supervisor (if necessary)	Yes

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## SECTION 6: STORAGE OF DATA

*[Please ensure that you are abiding by GDPR and the national Data protection laws <https://www.hrb.ie/funding/gdpr-guidance-for-researchers/gdpr-and-health-research/>].*

*The student is responsible for storage of data and this will be handed over to the college in an electronic format as part of the thesis submission i.e. primary data and completed ICFs where applicable will be added to the primary data folder on moodle. The rationale is to keep data **as long as it is still useful** and there is an intention to use it further **for research** so if this is not the case then this can be stipulated here and a shorter retention period given.]*

### 6.1. How will you store the research data and for how long? How will you manage data protection issues?

Signed consent forms will be safely kept on the authorized OneDrive platform of Griffith College. Access will be limited to the lead researcher and supervisor. The information will be kept for one and half years following my completion, from Feb 2024 to Jun 2025. Following this timeframe, all information will be entirely eradicated to guarantee the protection of your privacy. After finishing the research, all primary data accompanied by signed consent forms will be submitted to the university in a digital format as a component of the thesis submission. This information will be transferred to the main folder for data on Moodle. The study will diligently comply with the General Data Protection Regulation (GDPR) and the national data laws for protection. This involves acquiring clear permission from participants for the collection, storage, and application. Participants will receive complete information regarding the study's purpose, the type of their involvement, and how their information

will be utilized. All identifiable personal information will be deleted from the transcripts to maintain anonymity. Participants and their jobs will be classified and shown in the results reporting to avoid any identification. The information will be kept on a secure, password-protected Griffith College-sanctioned OneDrive platform, with access restricted to the main researcher and supervisor. Data that is not anonymized, like consent forms with signatures and audio recordings will be stored in a locked cabinet and on a protected server.

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## SECTION 7: NON-DISCLOSURE AGREEMENT & STUDENT CONSENT

### 7.1 Non-Disclosure Agreement (NDA)

Will the final dissertation contain any information pertaining to any source what would warrant the use of a Non-Disclosure Agreement (NDA) e.g. industry-based research?

No

### 7.2 Student consent

If a Non-Disclosure Agreement (NDA) is not required, does the Student consent to allow their completed dissertation to be held/published by Innopharma/Griffith College?

Yes

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## SECTION 8: RECORDING AND RETENTION OF DISSERTATION VIVA

### 8.1 Viva Recording

The Dissertation viva will be recorded. This recording may be used to facilitate assessment by Innopharma staff, a third reader if necessary and/or if requested by the external examiner for the Programme. The recording will be held in line with current GDPR guidelines and will not be made publicly available.

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## SECTION 9: DOCUMENT CHECKLIST

**NOTE:** Applicants must attach the following documents in electronic format to the appendix.

**Which documents are added to the appendix? Please tick N/A if not applicable:**

- |                                                                                        |     |
|----------------------------------------------------------------------------------------|-----|
| 9.1 Participant Information Letter (PIL) for participant                               | Yes |
| 9.2 Informed Consent Form (ICF) for participant                                        | Yes |
| 9.3 Questions/survey for interviewees/focus groups etc ( <i>can be in draft form</i> ) | Yes |
| 9.4 Any other documents e.g. Non-Disclosure Agreement                                  | N/A |

I confirm that this application is complete and all required documents are included in the appendix.

For Student:

STUDENT SIGNATURE:



DATE: DATE: 28/03/2025

