RISING SCREEN TIME : ANALYZING ITS IMPACT ON HUMAN HEALTH AND BEHAVIOR

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Keywords

Figure 1: Keywords

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Introduction

The widespread use of digital devices in recent years has changed how people engage with the outside world. Because they facilitate easy communication, information access, and entertainment, smartphones, tablets, PCs, and smart TVs have become essential parts of modern life. Education, employment, and social connections are just a few of the areas that have changed as a result of this technological revolution. But this growing reliance on screens has led to a neglected but urgent problem: too much screen time and its negative impacts on behavior and human health.

Figure 2: Introduction

The issue of increasing screen time is especially worrisome because it has permeated both personal and professional spheres of life. Whether for work, social networking, or recreation, individuals are spending a lot of time in front of screens. Firsthand knowledge of the detrimental effects of prolonged screen use highlights the reality of this issue. Prolonged usage of screens has been linked to disturbed sleep habits, digital eye strain, and frequent headaches. Observations show increased stress and exhaustion, along with a noticeable decrease in

attention span. As more people describe comparable health and behavioral problems brought on by excessive screen time, these individual experiences represent a growing worldwide concern.

Aim

Rising screen time: Analyzing its impact on human health and behavior.

Figure 3: Aim

Objectives

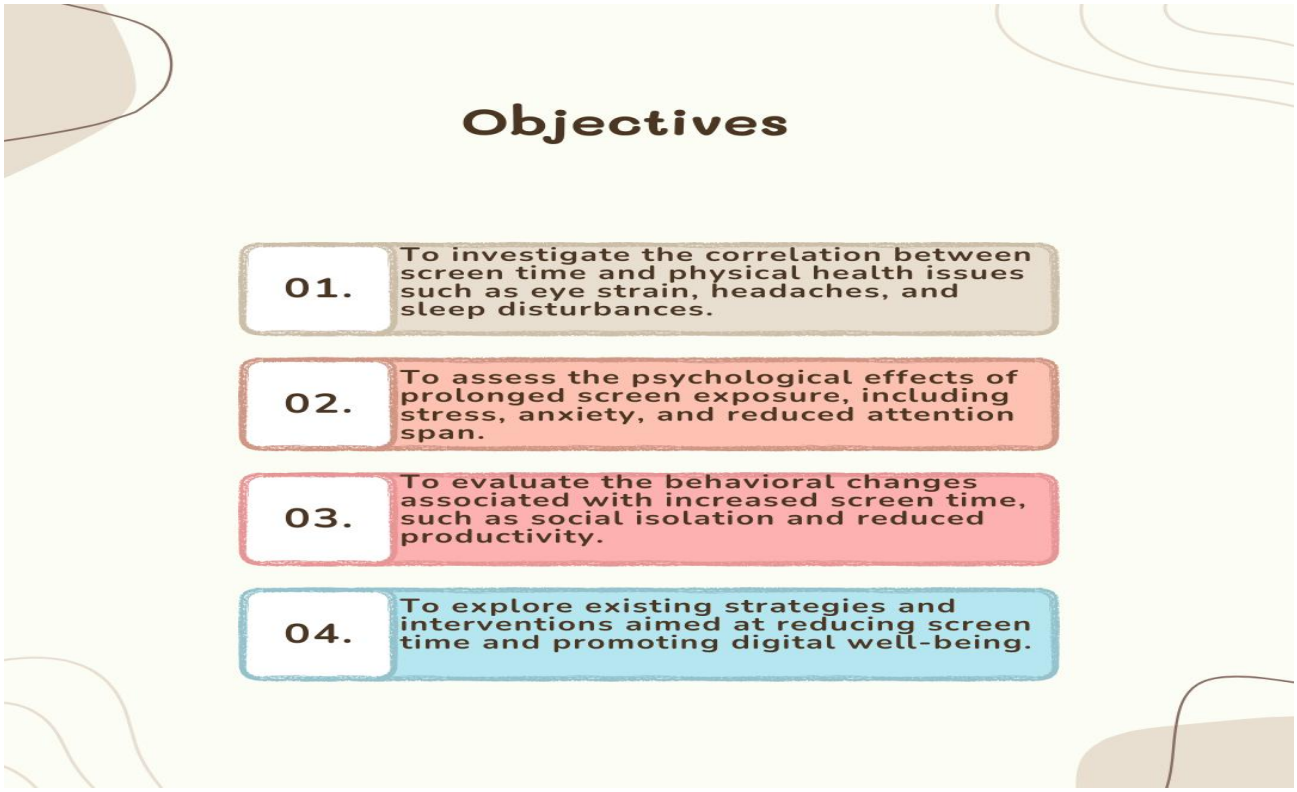

Figure 4: Objective

Statement of Purpose

The pervasiveness of digital gadgets in daily life has led to an increase in the problem of excessive screen time in contemporary culture. People now rely significantly on screens for business, education, communication, and enjoyment due to the quick development of technology. This digital revolution has increased efficiency and convenience, but it has also led to a number of behavioral and health issues. Long-term screen use frequently causes physical discomfort, including headaches, neck and back pain, digital eye strain, and sleep disruptions brought on by blue light emissions. In addition to physical health, people's mental health suffers as well, with increased stress, anxiety, sadness, and a shorter attention span among those impacted.

Figure 5: Statement of Purpose/Problem Statement/Justification

Social conduct is also affected since excessive screen time reduces in-person contacts, increases loneliness, and erodes interpersonal bonds. Due to their developing brains' propensity to establish bad digital habits that might impede cognitive development and academic

achievement, children and teenagers are especially at risk. Even though these problems are becoming more widely recognized, there are still insufficiently effective remedies and many people are ignorant of the long-term effects. Because it seeks to examine the complex effects of increasing screen usage on human behavior and health, this study is crucial. The project aims to encourage healthy digital habits and aid in the creation of a more sustainable and balanced connection with technology by bringing attention to these consequences and investigating evidence-based remedies.

Research Questions

Figure 6: Research Questions

Literature Review

Desk Based Agile Strategy

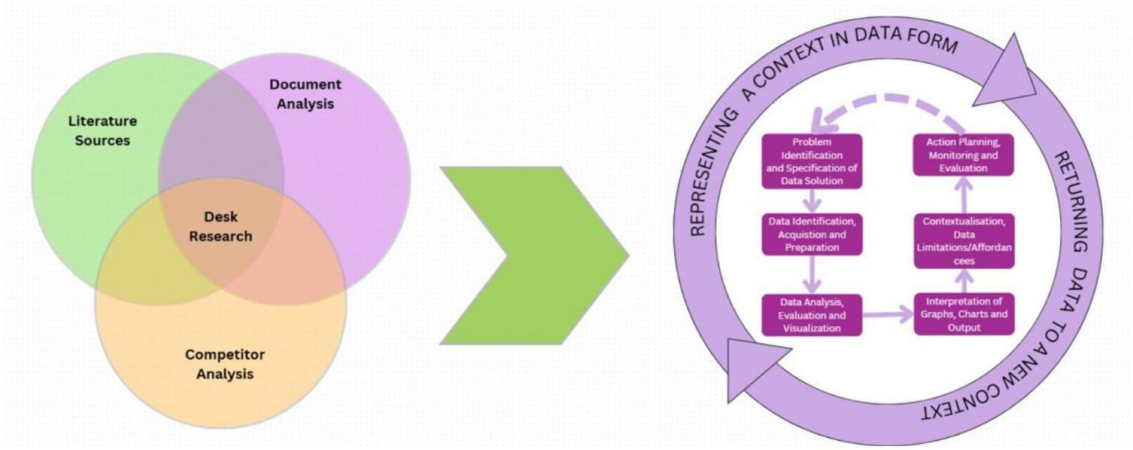

Figure 7: Desk Based Agile Strategy

In order to examine the effects of increased screen time on human behavior and health, this study will employ a desk-based agile strategy, which is a flexible and adaptive method of gathering and evaluating the body of current data and literature. The issue has previously been extensively researched, and there is a wealth of data from academic studies, health groups, and technology reports, so this approach is acceptable. The emphasis will be on compiling and combining current information to create a thorough understanding rather than collecting primary data.

The study will start by gathering preliminary information on screen usage trends and screen exposure-related health issues. After that, research on psychological consequences like stress, anxiety, and concentration impairments as well as physical health effects like eye strain, sleep disturbance, and musculoskeletal problems will be reviewed iteratively. We will also look at behavioral changes, such as decreased physical activity and social isolation.

Every stage will expand on earlier discoveries, enabling the study to adjust and narrow its emphasis as fresh information becomes available. The methodology will include a comparative review of international strategies for lowering screen time and fostering digital well-being. The end result will be a thorough comprehension of the negative impacts of screen time as well as useful suggestions for better digital practices. This agile methodology guarantees that the study stays adaptable, comprehensive, and data-responsive.

Case Studies

This study will include a number of case studies from various age groups and geographical locations to improve knowledge of the effects of increased screen time on human behavior and health. These case studies will present actual instances of people, groups, and institutions who have dealt with the drawbacks of excessive screen time as well as the results of putting management techniques into place.

Figure 8: Case Study

The "Digital Eye Strain Epidemic" that has been documented among office workers in major cities such as Tokyo and New York is one noteworthy case study. Workers who spent a lot of time on computers complained of headaches, neck pain, and impaired vision. As a response, businesses implemented the 20-20-20 rule, which states that you should gaze at something 20 feet away for 20 seconds every 20 minutes. This guideline has been shown to reduce eye strain complaints.

Students in South Korea, one of the world's most technologically advanced nations, are involved in another instance. High school pupils who used screens for more than seven hours a day reported higher stress levels, sleep deprivation, and focus problems, according to research. This prompted the government to implement "digital detox programs" in schools, which greatly enhanced pupils' concentration and mental health by boosting outdoor activities and limiting screen usage.

Additionally, an Australian case study looked at families that implemented "screen-free weekends." Reducing gadget use was associated with better family communication, more physical activity, and less anxiety among kids, according to parents.
Executives from Silicon Valley, especially tech chiefs from well-known firms like Apple and Google, have also been outspoken in their support of restricting their kids' screen time. Despite developing the very tools and platforms that are used all over the world, these executives were aware of the detrimental effects on cognitive growth and mental health. Their strategy, which included limiting the use of electronics at home and promoting artistic and outdoor pursuits, helped their kids' social and emotional growth.

Together, these case studies highlight how excessive usage of digital devices can negatively impact social behavior, mental health, and physical health even while they provide ease and connectedness. Additionally, they show how effective treatments like digital detoxification, screen breaks, and balanced screen usage may greatly reduce these harmful impacts and encourage healthier lifestyles.

Integration

In order to properly investigate and comprehend the effects of increasing screen time on human behavior and health, it is imperative to integrate sophisticated data analysis, machine learning, and visualization techniques. Python will be used as the main programming language for the project because of its versatility and strong libraries designed for statistical analysis and data processing.

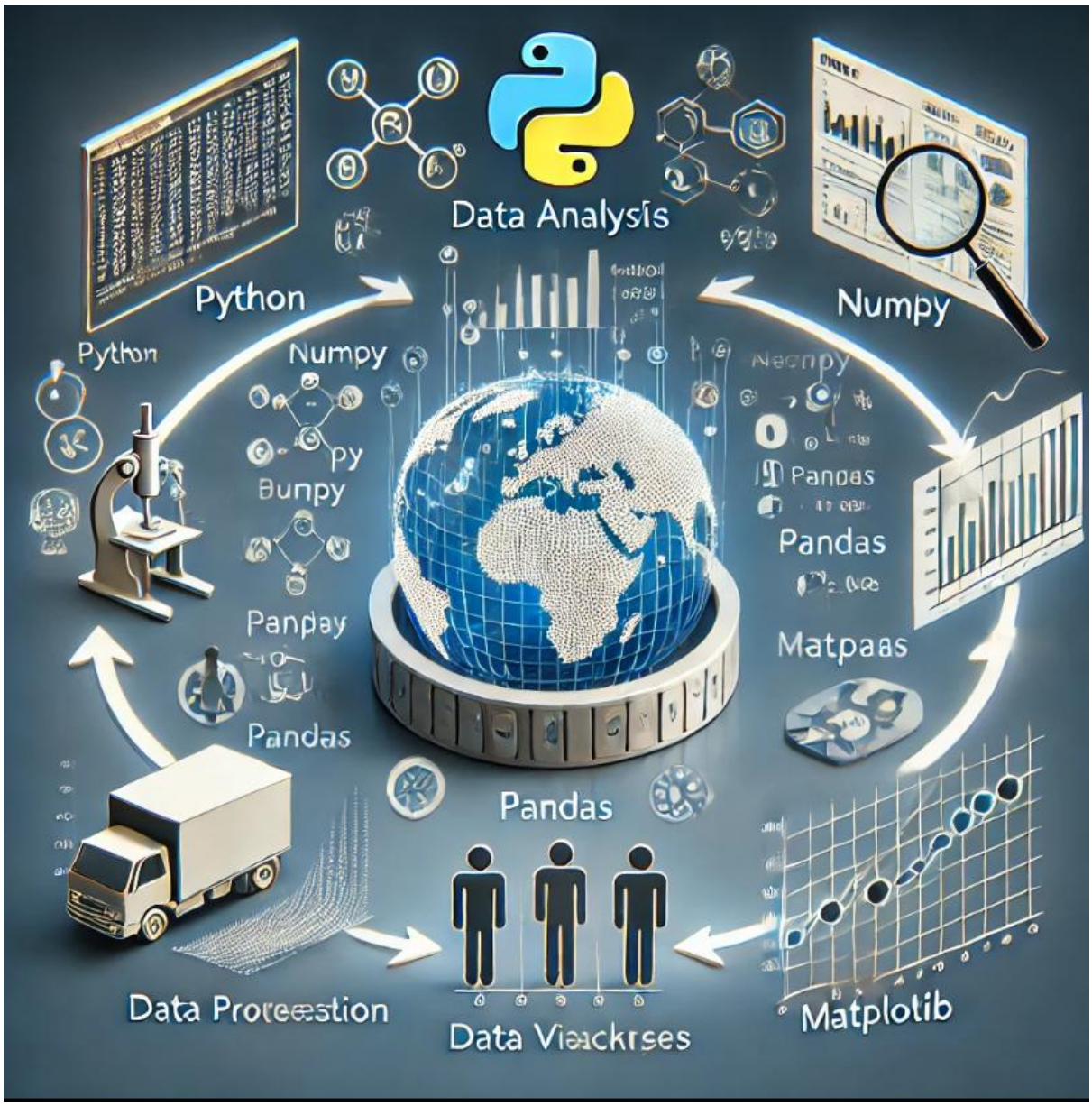

Figure 9: Integration

The study approach will use NumPy to manage and work with huge datasets pertaining to

screen time, sleep habits, and health surveys. It will enable effective matrix calculations and numerical operations, which are essential for finding trends and correlations in the data.

Pandas will be essential for organizing and purifying unprocessed data gathered from a variety of sources, including online questionnaires, digital behavior monitoring, and medical records. The data will be arranged into data frames to make it easier to explore and filter pertinent information.

Matplotlib will be used to create graphical representations of the study findings, including scatter plots, bar charts, and line graphs. These graphic outputs will make the data easier to understand and more accessible by clearly illustrating the connection between screen usage and physical or mental health concerns.
Pandas will be essential in organizing and purifying unprocessed data gathered from a variety of sources, including digital habit tracking, online surveys, and medical records. Filtering and exploring pertinent information will be made easier by arranging the data into dataframes.

The study findings will be shown using the integration of Matplotlib, which will provide graphical representations such scatter plots, bar charts, and line graphs. By clearly illustrating the connection between screen time and mental or physical health issues, these graphic outputs will make the data easier to understand and more approachable.

Tools and technologies

To enable effective data collecting, analysis, and visualization, a variety of techniques and technologies will be used in this study on increasing screen time and its effects on human behavior and health. These resources facilitate a data-driven method for analyzing trends, finding connections, and formulating forecasts.

 Python – A versatile programyhbming language known for its simplicity and extensive libraries, making it ideal for data analysis, statistical modeling, and automation.

 NumPy – A numerical computing library that facilitates the handling of large datasets, matrix operations, and statistical analysis, helping process data related to screen time and health metrics.

Figure 10: Tools and Technology

 Pandas – A data manipulation tool that allows for the cleaning, organizing, and analysis of datasets. It is particularly useful for structuring survey responses, screen usage data, and health reports.

 Matplotlib – A data visualization library used to create graphs, charts, and visual representations of trends. It aids in presenting the relationship between screen time and health indicators such as sleep quality and stress levels.

 TensorFlow – An open-source machine learning framework that supports building predictive models to analyze patterns in screen time and forecast potential health risks.

 PyTorch – Another machine learning library, known for its flexibility and ease of use. It can also be used for pattern recognition and behavioral analysis related to screen exposure.

 GitHub – A version control platform that allows collaboration, tracking progress, and sharing data analysis codes, ensuring the research process is organized and transparent.

 Visual Studio Code (VS Code) – A widely used integrated development environment (IDE) that streamlines coding, debugging, and integrating the aforementioned tools into a unified workspace.

By facilitating effective data processing, displaying results, and utilizing machine learning techniques to identify trends in the impact of screen time on human behavior and health, these technologies work together to help the study process.

Project Plan

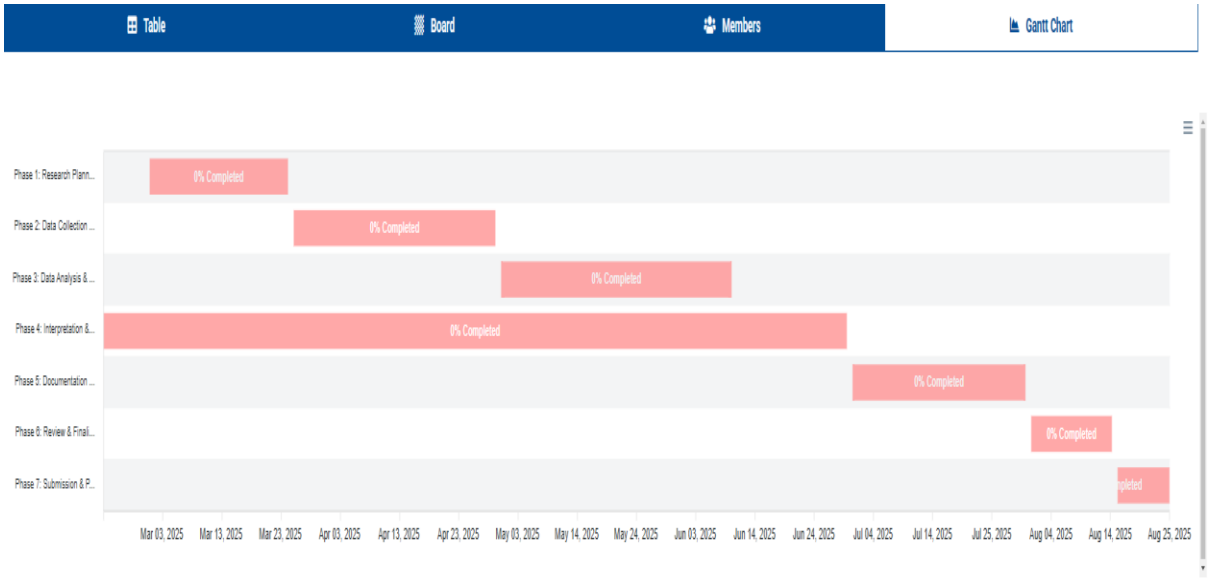

Figure 11: Grant Chart

Risk Analysis

Rank	Risk Name	Occurrences	Impact	Plan b
1	Difficulty finding reliable screen time data	Frequently	Mild	Use multiple data sources, including surveys, case studies, and existing research papers.
2	Time Management	Rare	High	Create a research schedule with milestones. Use time-tracking and project management tools.
3	Limited Knowledge of Data Analysis	Frequently	High	Take online courses in Python, Pandas, and data visualization. Seek expert guidance.
4	Ethical and Privacy ConcernsFrequently	Occasionally	High	Anonymize collected data, obtain informed consent, and follow ethical research guidelines.

Figure 12: Risk Analysis

Conclusion

The sharp increase in screen time has raised serious concerns since it has a profound impact on behavior and human health. The physical, psychological, and behavioral effects of extended screen time have been examined in this study, with particular focus paid to problems including digital eye strain, irregular sleep patterns, diminished attention span, and elevated stress levels. A balanced approach to screen usage is essential as digital gadgets continue to take over daily life. Through the integration of data analysis, case studies, and sophisticated technologies like TensorFlow, Pandas, and Python, this study offers important insights into the effects of screen time. The study also highlights the significance of digital well-being tactics, such as behavioral treatments, screen usage rules, and time management tools. In the future, reducing the harmful consequences of excessive screen time will require increasing awareness and promoting safe digital usage. By investigating long-term effects and potential remedies fueled by developing technology, future research can build on this work. In the end, cultivating a more positive and conscientious connection with technology requires finding a balance between digital participation and personal wellbeing.

Reference

- **Cain, N., & Gradisar, M. (2010).** Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep Medicine, 11(8),* 735-742. https://doi.org/10.1016/j.sleep.2010.02.006

- **Christensen, M. A., Bettencourt, L., Kaye, L., Moturu, S. T., & Thewjitcharoen, Y. (2016).** Direct measurements of smartphone screen time: Relationships with demographics and sleep. *PLOS ONE, 11(11),* e0165331. https://doi.org/10.1371/journal.pone.0165331

- **Kardefelt-Winther, D. (2017).** How does the time children spend using digital technology impact their mental well-being, social relationships, and physical activity? *UNICEF Office of Research-Innocenti*. https://www.unicef-irc.org/publications/pdf/Children-digital-technology-wellbeing.pdf

- **Rosen, L. D., Carrier, L. M., & Cheever, N. A. (2013).** Facebook and texting made me do it: Media-induced task-switching while studying. *Computers in Human Behavior, 29(3),* 948-958. https://doi.org/10.1016/j.chb.2012.12.001

- **Twenge, J. M., & Campbell, W. K. (2018).** Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. *Preventive Medicine Reports, 12,* 271-283. https://doi.org/10.1016/j.pmedr.2018.10.003

- **World Health Organization. (2019).** Guidelines on physical activity, sedentary behavior, and sleep for children under 5 years of age. *WHO Reports*. https://www.who.int/publications/i/item/9789241550536

Appendix

SWOT Analysis

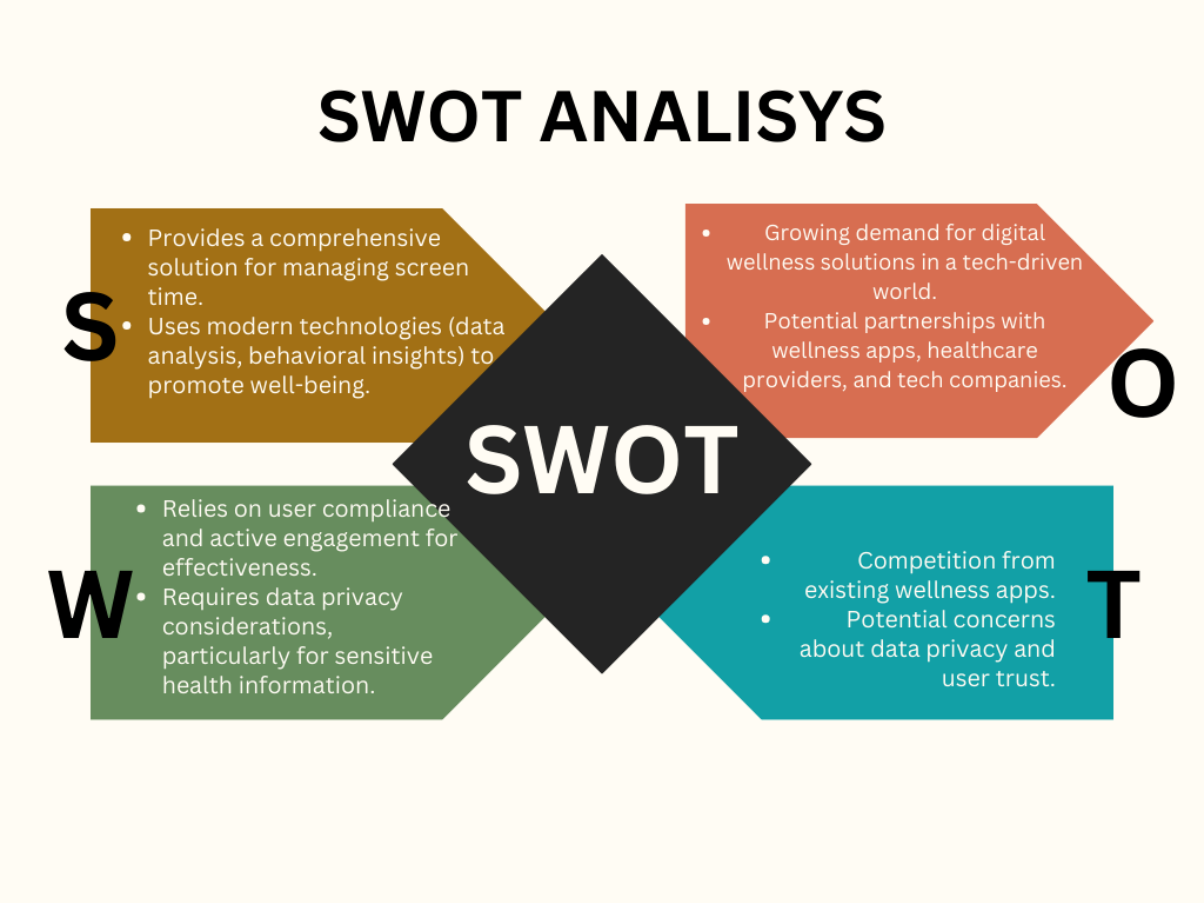

Figure 13: SWOT