# TITLE PAGE

- **Problem Statement ID –** 1539
- **Problem Statement Title-** STUDENT INNOVATION
- **Theme-** FITNESS & SPORTS
- **PS Category-** Hardware
- **Team ID-** 28199
- **Team Name-** T-SWEAT

# IDEA TITLE


## IDEA / SOLUTION :

**By wearing the t-shirt, users essentially serve as mobile advertisements for brands, while simultaneously benefiting from the financial incentives tied to their fitness activities.**

**Brand Advertising: Display of brand** names for **promotional** purposes.

- **IoT-Enabled Fitness Tracking:** Tracks workout data, including **steps** and **time**.
- **Mobile App Connectivity:** Sends activity data to a companion app via **Bluetooth**.
- **Monetization Model**: **Users earn money** based on workout duration and crowd exposure.

## Problem Resolution:

- The IoT-powered smart t-shirt integrates **fitness tracking** with **brand advertising**, offering a **unique** platform that **rewards users** based **on workout duration and crowd exposure.**

- Overcoming traditional fitness tracking limitations, the t-shirt ensures seamless data transfer and **monetization** in both high and low network environments.

## Unique Value Propositions (UVP):

- **Brand Exposure with Every Workout:** Displays advertisements while tracking workout activity, offering brands high visibility.

- **Monetized Fitness Tracking:** Users **earn money** based on workout time and crowd exposure, creating a unique incentive.

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# TECHNICAL APPROACH

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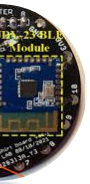
## Development:

- **IoT Hardware:**
  ESP32 for collecting and transmitting fitness data.
- **Mobile Application Development:**
  Flutter - Framework used for building the mobile application, ensuring **cross-platform** compatibility(IOS/ANDROID).
- **Cloud Services:**
  Google cloud for **real-time** data storage and synching .
- **Sensors**:
  **accelometers** : step-count tracking ,
  **IR sensor**: detects if the t-shirt is covered by external clothing



## PROCESS FLOW ARCHITECTURE



Functionality of Smart T-Shirt with Brand Advertisements and IoT-Based Workout Tracking

- Smart T-Shirt Features
  - Accelerometer for Step Tracking
  - IR Sensor for Jacket Detection
- Data Transmission via Bluetooth to Mobile App
  - Workout Data (Steps, Time)
  - Display Brand Advertisements on T-shirt
- Mobile Application Functions
  - Track Workout Data (Steps, Time)
  - Process Data
    - Authentication
    - Reward Calculation
- Secure Connection between App and Server with Clear Data Flow
  - Smart T-shirt with brand advertisements offers integrated IoT-based workout tracking.
  - The secure connection between the app and server ensures data privacy and security.
  - Clear data flow allows for efficient transfer of workout tracking information from the smart T-shirt to the app and server.

**Product Status:** 30% product built completed and further build is on progress. Testing and validation process are next to be undergone

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# FEASIBILITY AND VIABILITY

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## Technical Feasibility:

**User Experience**:
- Sensor Placement
- Real-time Data Feedback

**Data Privacy**:
- Health Data Security
- Secure App Integration

## Market Feasibility:

- **User Testing:** Conduct surveys or focus groups to validate interest and willingness to use a product with advertising.
- **Competitive Analysis:** Research competitors thoroughly to identify their strengths and gaps you can exploit.

## Operational Feasibility:

**Regulatory Compliance:** Ensure the product **meets health** and **safety** regulations in all target markets.

## Potential challenges and risks

- **Technical**: Battery life, sensor accuracy, integration complexity, and waterproofing are key risks.
- **Market**: Competition, consumer acceptance, and shifting trends may impact market success.
- **Operational**: Manufacturing coordination, distribution logistics, regulatory compliance, and customer support are critical operational risks.

## Strategies for overcoming these challenges

**Technical**:

Efficient sensors

Battery Durability

Waterproof coatings

**Market & Operational:**

Differentiate your product in **unique**, **innovative**, **user-friendly**.

establish reliable **manufacturing partnerships**

# IMPACT AND BENEFITS

## Positive Impacts:

**Better Fitness Habits:**

The t-shirt can encourage users to **stay active by rewarding** them with **money** for their workout hours, leading to **healthier lifestyles**.

**Financial Benefits:**

Users can **earn money** just by wearing The t-shirt and tracking their workouts, **making fitness more appealing.**

**Social Connection:**

Earning rewards and being part of a **fitness community** can promote **health and social** engagement.

## Negative Impacts:

**Maintenance Issues:**

Frequent washing, sweating, or exposure to tough conditions might **damage** the technology.

## Benefits of the Solution:

**Social**:

**Improved Access**:

Encourages more people to engage in fitness.

**Empowerment**:

Users control their fitness and earnings.

**Cost Efficiency:**

Potential savings compared to other fitness options

**Productivity**:

Boosts health and productivity.

**Environmental:**

**Waste Reduction**:

Reduces electronic waste by consolidating features.

**Energy Efficiency:**

Uses low-energy technology.

# RESEARCH AND REFERENCES

**Smart T-Shirt for Fitness & Advertising Integration**

**Research & Reference Links:**

- **IoT in Wearable Tech:**
  - IoT-Based Wearable Devices on Xplore(https://ieeexplore.ieee.org/document/9963553)
  - Smart Wearable Systems in Healthcare: IEEE Access] https://ieeexplore.ieee.org/search/searchresult.jsp?queryText=healthcare&highlight=true&returnType=SEARCH&matchPubs=true&refinements=ContentType:Journals&refinements=ContentType:Magazines&returnFacets=ALL&ranges=2021_2024_Year)
- **Sensor Technology (Accelerometers, IR Sensors):**
  - Flexible Sensors for Wearable Devices on ScienceDirect(https://www.sciencedirect.com/topics/engineering/wearable-sensor)
  - Low-Power Sensor Integration in Wearables on Springer Link(https://link.springer.com/protocol/10.1007/978-1-0716-3195-9_12)
  - Wearable Sensors for Activity Recognition: MDPI(https://www.mdpi.com/1424-8220/15/12/29858)
- **Fitness Tracking & User Engagement:**
  - Impact of Fitness Trackers on Health: MDPI Sensors](https://www.mdpi.com/2227-9709/4/1/5)
  - Consumer Engagement in Wearable Fitness Devices on Google Scholar](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6958644/)
  - Wearable Health Monitoring Systems: IEEE](https://ieeexplore.ieee.org/document/10593176)
- **Ad Revenue Models in Wearable Devices:**
  - Consumer Acceptance of Advertising in Wearable Devices: International Journal of Mobile Marketing] (https://www.researchgate.net/publication/334863088_Consumer_acceptance_of_sports_wearable_technology_the_role_of_technology_readiness)
  - Advertising in Wearables: Statista Industry Insights(https://www.statista.com/topics/1556/wearable-technology/#editorsPicks )
  - Monetization of Wearable Technologies on IBISWorld(https://www.ibisworld.com/united-states/market-research-reports/wearable-device-manufacturing-industry/)
- **Product Feasibility & Manufacturing:**
  - Challenges in Mass Manufacturing of Smart Textiles: Wiley Online Library(https://onlinelibrary.wiley.com/doi/abs/10.1002/int.21866)
  - Scaling Smart Wearable Tech: Harvard Business Review(https://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition)
  - [Manufacturing Smart Textiles: IEEE Spectrum](https://ieeexplore.ieee.org/document/7145236/similar#similar)

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