JUNIOR ASTITVA SAMMAN

GAME CHANGER

SUSTAINABILITY IN MOTION

REPORT BY
JAY VERMA
XI D
MODERN SCHOOL
VASANT VIHAR

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INTRODUCTION

From playing hide and seek as a toddler to competing in the Olympics, sports are essential to human life. Improving physical and mental health, strengthening community relations, and contributing to local and global economies are just a few of the benefits of the sports industry. Major sporting events, such as the Olympic Games or FIFA World Cup, attract millions of spectators and generate substantial revenue through ticket sales, tourism, and sponsorships. The sports industry also creates employment opportunities and drives innovation, technology advancements, and investment, stimulating economic growth and development.

Source: 1 https://www.chaseyoursport.com/Career-in-Sports/Sports-Industry-in-India-an-Overview/101

However, these benefits come at a significant cost to the environment. From excessive waste generation to resource depletion and pollution, the environmental impact of the sports industry has become a cause for concern. In an era that faces the threat of climate change and the growing urgency of environmental degradation, it is imperative to develop innovative solutions to the problems of waste generation across industries.

In this comprehensive project, I will delve into the background of the sports industry's environmental impact, the waste generated within the sector, and the various consequences it entails. I also explore sustainable solutions that can be adopted by sports organisations, teams, and venues to mitigate the industry's environmental footprint. Finally, I will propose a novel solution to these issues – UpBeat, a revolutionary Bluetooth speaker housed within upcycled cricket balls, footballs, and basketball. This product targets waste reduction while appealing to sports fans as consumers, making it a creative solution to an enduring problem. Additionally, I will share the action plan for the Game Changers campaign to support the communities of e-waste recyclers, electronic repair servicemen, sportsmen and academies that I work with towards the development of UpBeat.

Background on the Sports Industry and Its Environmental Impact

Following any major sporting event in New Delhi, be it T20 matches or the Hockey World Cup, it is not unusual to see piles of plastic waste littered outside stadiums. And that is merely the tip of the iceberg. The sports industry is a massive global enterprise encompassing various sectors, including professional leagues, amateur clubs, sports equipment manufacturers, apparel companies, and event organisers. The industry's popularity and growth have resulted in a considerable ecological footprint. From the construction and maintenance of stadiums and arenas to the production and distribution of sports merchandise, the sports sector impacts ecosystems, natural resources, and biodiversity.

Waste Generated by the Sports Industry

The sports industry generates substantial waste, encompassing various categories such as packaging, single-use plastics, and outdated equipment. The massive influx of spectators during events leads to a surge in single-use items, particularly food containers, beverage cups, and other disposable materials. Additionally, as any young athlete knows, damaged or outdated sports gear and equipment piles up, forming a massive part of sports waste.

Types of Waste Generated in Sports

- Packaging: Sports merchandise, equipment, and snacks are often sold in excessive and non-sustainable packaging, contributing to the accumulation of waste.

- Single-use Plastics: Bottled beverages, food containers, and plastic bags are extensively used during sports events, adding to the plastic pollution crisis.

- Equipment: Sports equipment, including old or damaged gear, contributes to the waste stream, as it often ends up discarded in landfills.

Environmental Consequences of Sports Waste

Landfills

Disposing of non-recyclable and non-biodegradable waste in landfills leads to environmental degradation and the release of harmful greenhouse gases. Fires are also common in landfills, such as the Ghazipur landfill in Delhi, which frequently erupts with spontaneous fires and creates toxic atmospheric conditions for the area's residents.

Pollution

Improper waste management in the sports industry results in air, water, and soil pollution, impacting nearby communities and ecosystems.

Resource Depletion

The production and consumption of sports equipment and apparel lead to the depletion of natural resources, such as water, minerals, and fossil fuels.

Impact area	Positive	Negative
Economic, Tourism, Commercial	Increased expenditure	Price inflation
	Economic benefits in form of tax revenues	Increase in local tax (to construct facilities needed for the event)
	Employment opportunities	Mismanagement of public funds
	Education and training	Real estate speculation
	Marketing of the host region as a tourism destination	Short-term contract work
	New opportunities for potential investors	
Infrastructure & Physical resources	New and improved infrastructure and local facilities	Infrastructural congestion
	Rejuvenation of urban areas	White elephants - Underused sports and associated facilities after the event
	Increased security	Limited access and redistribution of resources
Political	Propagation of political values and ideology	Suppression of human rights
Sport & Recreation	Introduction of programmes, services and facilities (e.g. "Football for Hope" in Kayelitsha)	Lack of sustainability of these programmes and services after the event
	Education and training	Access to needs-based accredited training to enhance employability
	Participation opportunities	Bias towards elite performance
Environmental	Attention to the natural environment	Loss of control over local environment
	Preservation of elements of physical landscape and local heritage	Pollution of nature in and around host region

Source: 2 https://www.researchgate.net/figure/Positive-and-negative-impacts-of-sporting-events-Compiled-from-Burnett-2008-Ohmann_tbl1_280932770

Relationship between Sports Waste and Climate Change

The relationship between the sports industry and climate change is complex and multifaceted. The popularity and commercialisation of sports have led to significant environmental consequences, contributing to the global climate crisis. The industry's massive infrastructure, including stadiums, arenas, and transportation for events, consumes vast amounts of energy and resources, resulting in greenhouse gas emissions. Moreover, the production and distribution of sports merchandise, particularly those made from non-renewable materials like plastics, contribute to pollution and further exacerbate climate change. Additionally, the disposal of waste generated during sporting events, such as single-use plastics and equipment, leads to emissions from landfills and incineration processes. However, with its vast reach and influence, the sports industry also holds the potential to become a powerful agent of change. By adopting sustainable practices, promoting eco-friendly products, and raising awareness about climate issues, the sports industry can play a pivotal role in mitigating climate change and inspiring millions of fans worldwide to become environmental advocates.

Sustainable Solutions to the Environmental Impact of Sports

Current Waste Reduction Initiatives Implemented by Sports Organizations, Teams, and Venues

In recent years, the sports industry has taken steps to address its environmental impact by implementing waste reduction initiatives. Some sports organisations and teams have adopted recycling programs, energy-efficient stadium designs, and sustainable sourcing of materials for merchandise.

THE MYTH OF RECYCLING

Despite the widespread belief that recycling is an effective and efficient solution for waste management, the reality is often quite different. While recycling is undoubtedly better than sending waste to landfills or incineration, it still faces several challenges that limit its overall effectiveness.

One significant issue is contamination in recycling streams, where non-recyclable materials inadvertently end up in recycling bins, reducing the quality of recycled materials and making them harder to process. Given our country's improper waste management and collection systems, most recyclables are not adequately cleaned before being segregated and are, therefore, unfit for recycling.

Moreover, like many plastics, certain materials are difficult or impossible to recycle economically due to complex sorting processes and a lack of markets for recycled material. As a result, a considerable portion of recyclables are downcycled, incinerated, or sent to landfills.

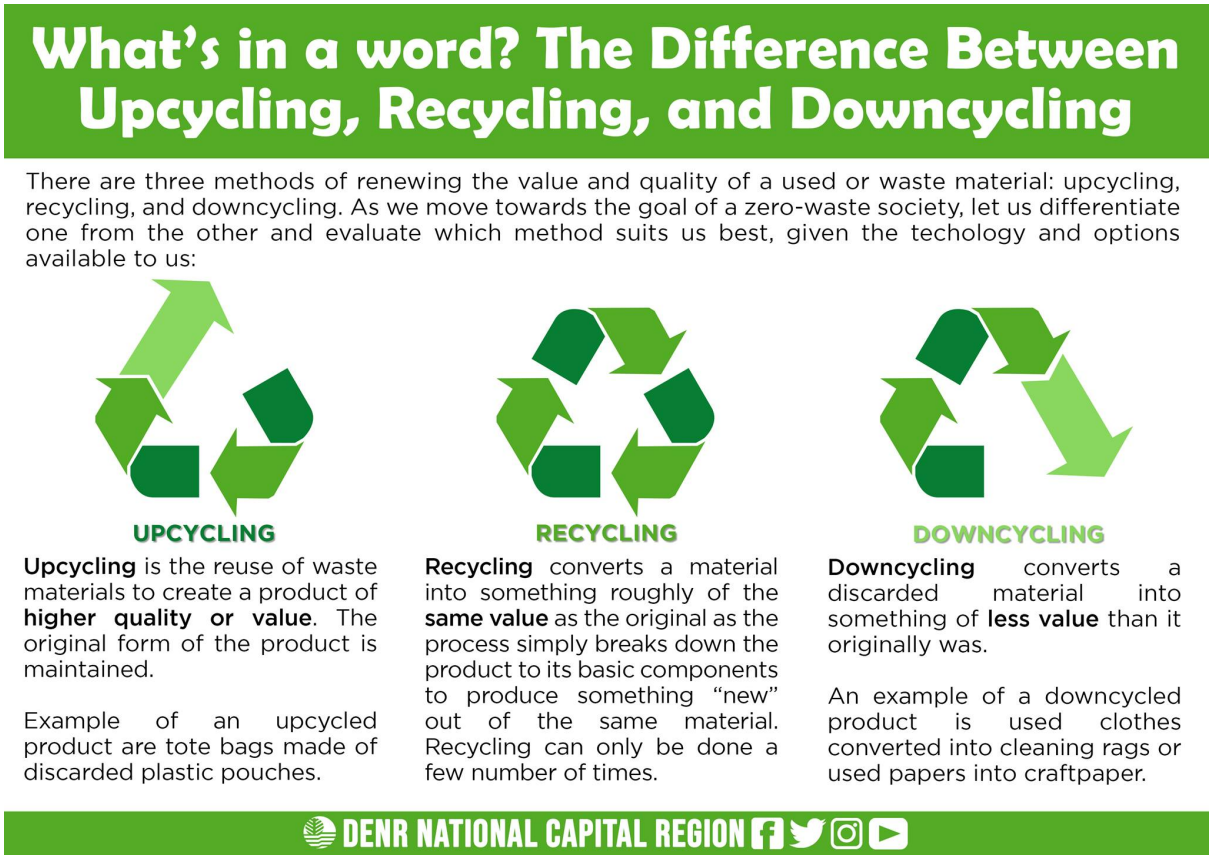
I conducted in-depth interactions with several prominent recycling companies, such as Recycle India Foundation and Swayambhu Innovative Solutions, and developed a comprehensive understanding of the challenges faced in recycling sports equipment specifically. My interactions revealed that a substantial portion of sports gear, including bats, balls, and other related items, are manufactured using a combination of materials, including plastic, cotton, rubber, and animal-derived products, making recycling difficult.

In a conversation with Mr. Ashutosh, a representative from Swayambhu Innovative Solutions, he noted that another hindrance faced by recycling facilities is the insufficient quantity of sports goods received for recycling purposes, making the recycling process economically non-viable.

To truly address the challenges of waste management, it is essential to focus on reducing waste at the source, promoting more sustainable products and packaging, and considering upcycling as a more effective solution to this problem.

WHAT IS UPCYCLING?

Upcycling is a creative and sustainable approach to waste management and product design that involves transforming discarded or unused materials and products into new items of higher value, quality, or usefulness. Unlike recycling, which breaks down materials to create new ones, upcycling retains the original material's integrity and enhances its purpose. The process involves reimagining and repurposing materials, often from items considered waste, into innovative and unique products. Upcycling not only reduces the amount of waste sent to landfills or incineration but also promotes resource conservation by giving new life to existing materials. Upcycled products showcase creativity and often carry a distinct and personalised touch, making them appealing to environmentally conscious consumers.



UPBEAT: A NOVEL SOLUTION

My proposal for a solution to the growing problem of sports waste is UpBeat - a revolutionary Bluetooth speaker that combines the passion of sports with the rhythm of music, all while making a positive impact on the environment. This innovative product transforms discarded sports balls into a premium sound experience.

Source: 3 concept image of UpBeat Speaker made from a discarded football

Crafted with utmost care and precision, each UpBeat Speaker is a unique masterpiece, showcasing the authentic wear and patina of the original sports ball. Upcycled with a touch of creativity and equipped with advanced audio technology, this speaker ensures that every beat and melody resonates with exceptional clarity and depth.

The durable construction of sports balls and a rugged outer casing make it perfect for indoor and outdoor use. It's designed to withstand the rigours of your active lifestyle, bringing the spirit of the game to any gathering or adventure.

Beyond its exceptional sound quality and durable build, the UpBeat Speaker takes pride in being an eco-conscious choice. Upcycling sports balls that would otherwise be discarded reduces waste and minimises our environmental impact. With this product, the user will not only get to experience music in a whole new way but also play a part in preserving our planet for future generations.

Source: 4 concept image of UpBear Speakers

Expert Advice and Interviews

Interview with the Director, Cosco

Source: 5 Images of various balls used in sports produced by Cosco

Before beginning to build a prototype of UpBeat, I interviewed Mr Manish Jain, Managing Director of COSCO, a renowned sporting goods company, to understand the industry's challenges so I could incorporate them into my plan for UpBeat.

The interview shed light on the critical waste management issue within the sports industry and explored COSCO's efforts to implement sustainable solutions. As a key player in the sector, Mr Jain shared valuable insights into the challenges faced by the sports industry and the innovative measures COSCO took to reduce its environmental impact. Through this interview, I gained a deeper understanding of how sporting goods companies can foster an eco-friendly approach to sports production and consumption, setting an example for others in the industry to follow. The transcript of the interview is given below:

Source: 6 Working with experts to understand the materials used in manufacturing sports equipment and gear and how they can be used to create UpBeat Speakers

Jay Verma: Good morning, Mr Jain. Thank you for taking the time to speak with me today. I am eager

to hear your insights on sustainability in sports as the Managing Director of COSCO. Can you share your perspective on the importance of sustainability within the sports industry?

Mr Jain: Sustainability is of utmost importance in the sports industry. As sports enthusiasts, we are responsible for protecting the environment and promoting a greener future. Like any other, the sports industry has a significant impact on the planet. Sustainability not only ensures the well-being of our environment, but customers are increasingly seeking eco-friendly options. At COSCO, we recognise the urgency of the matter.

JV: That's commendable. Can you provide some examples of the sustainability initiatives that can be taken to reduce the environmental impact of this industry?

MJ: Over the years, COSCO has taken concrete steps towards sustainability. Firstly, our supply chain prioritises eco-friendly materials and processes. We've also opted for biodegradable packaging options. Additionally, we actively encourage customers to return old sports equipment, promoting a circular economy approach. We're also investing in research and development to create innovative, sustainable products that meet the needs of athletes. Manufacturers, retailers, and even sports organisations need to prioritise sustainability in their operations. Additionally, raising awareness among athletes, fans, and consumers about the impact of their choices is essential in driving the demand for sustainable products and practices.

Source: 7 Discussion on sustainable sports and scope of upcycling for used, worn out sports gear with Mr Jain from Cosco

JV: What message would you like to convey to the sports community and your customers regarding

the importance of sustainability in their choices?

MJ: My message is simple -to athletes, fans, and customers, I urge you to consider the environmental impact of your sporting choices. By opting for sustainable products and supporting companies that prioritise eco-consciousness, you can contribute to a more sustainable sports industry.

JV: Thank you for sharing your valuable insights.

Interview with Recycling Coordinator, E-waster

I conducted a telephonic interview with Mr Anup Kumar from e-waster. As the lead recycling coordinator, he is responsible for managing e-waste from a number of sources. I approached him to try and understand the e-waste management process. One of the key highlights of our conversation was his organisation's approach towards creating a circular economy. He shared his insights on how widespread the mismanagement was and how his company was trying to reduce this waste by ensuring that no functional parts get discarded. Receptive to his ideology of a circular economy, I proposed collaborating with E-waster to source working speaker parts to develop my product line. He offered his support and invited me to visit the processing plant to see the various steps and to let me sort through working devices to see if I could find some things to work with. Here is a transcript of our conversation.

JV: Good afternoon, Mr. Kumar, and thank you for setting up this call with me. I am really keen on learning a little bit more about E-waster from you.

AK: Good afternoon; thank you for reaching out to E-waster. We always look forward to interacting with students making them more aware as consumers and buyers of e-waste. Our company is dedicated to responsibly managing electronic waste while promoting sustainable practices. We believe in the potential to reduce electronic waste by repurposing functional components.

JV: That sounds like a worthwhile endeavour. Does your organisation have a fixed collection network to bring electronic waste to the processing facility?

AN: We do have our collection centres and services, but we also collaborate with local e-waste recycling centres and partner with electronic manufacturers to access discarded devices. We also encourage individuals to donate old electronics to our cause.

JV: So, manufacturers can also send devices with defects from a fault in the production line? And then what happens to the devices once you collect them?

AN: Yes, of course. Depending on the terms of our contract, we may offer repair, replace a specific part that is faulty or collect the device as a whole that now needs to be discarded. After collecting the spare parts, we thoroughly inspect, clean, and test them. If any component is damaged beyond repair, we ensure responsible recycling. However, the functional elements are organised and catalogued in our inventory. These components are then made available to the public or other businesses interested in purchasing refurbished or what may also be called second-hand devices. We may sometimes decide on keeping a device dissembled depending on the market trends, having noticed that its spare parts are more in demand. We also tie up with vendors from local electronic repair outlets to supply parts to them.

JV: That's fantastic. But it also sounds like very laborious work. What would you say is your long-term goal in this industry?

AN: Our long-term goal is to reduce electronic waste and promote a circular economy by extending the lifespan of electronic components. We aim to:

- **Minimise E-Waste:** By salvaging and reusing parts, we hope to reduce the amount of electronic waste ending up in landfills.
- **Promote Sustainability:** Encouraging the use of repurposed parts and/or devices to contribute to sustainable consumption and production.

- **Education:** We aim to educate the public, students in particular, about the importance of responsible electronics disposal and recycling.

Ultimately, we hope to inspire others to adopt similar initiatives and contribute to a more environmentally conscious world.

JV: Great! On that note, I'd like to share a concept I have been working on. I want to make sports more sustainable, so I am working on UpBeat, a Bluetooth speaker that uses old, worn-out balls as an enclosure. I am seeking tie-ups with sports academies and clubs to source the enclosures and was hoping you could help me source the Bluetooth parts.

AN: We're always eager to support initiatives that promote recycling and environmental sustainability, and this is such a unique idea; I am sure we can identify areas to work together and make this a success for you. What parts are you looking for specifically?

JV: Yes, so I am looking for all the components that would go inside the enclosure. Mainly:

- **Speaker Drivers:** for good audio quality and output.
- **Bluetooth Modules:** receiver and circuit board to enable wireless connectivity and hassle-free use.
- **Wires:** surplus inventory for repairing and replacing the connective pathways between different circuit parts.

AN: I see. We do have a lot of these parts pass through our facility. So here is how E-waster can support your project:

- **Component Retrieval:** We can identify and set aside functional electronic components from discarded electronic devices, including Bluetooth modules and speaker drivers, charging ports, etc., specifically for your project.
- **Awareness:** We can run a social media series featuring your project and encourage everyone in our network to give their old speakers that they are no longer using.
- **Testing and Sorting:** Our team can test and sort the components to ensure they are in working condition. In fact, you can even visit the processing plant on a day when

you don't have to go to school and work with our engineers to take some electronics apart, learn how the testing is conducted and even oversee some repairs.

JV: That's incredibly helpful! Thank you so much, and yes, I would love to visit your facility and learn from your team. It will also help me discern the condition of the parts I collect from within my network. Since I am still working on my prototype, I would love to hear your thoughts on the concept. Do you envision it benefiting the recycling efforts and technological innovation?

AN: I think you have an excellent idea, and it has immense potential. It can accelerate our goal of responsible electronic waste recycling by repurposing components that would otherwise end up in landfills. And your idea contributes to technological innovation, showing that creativity can thrive even in the world of recycling.

JV: Thank you for your kind words and for accepting my request to work together. I am very excited to set up my visit and work with you to make a positive impact.

Interview with Chief Cricket Coach, Uday Gupte Cricket Academy

I interviewed Uday Gupte, the founder and owner of the Gupte Cricket Academy, to learn about his views on sustainability in sports. His academy is gradually shifting to be more sustainable by significantly reducing the waste generated at tournaments they organise. His team also hosts sports tournaments with as little environmental damage as possible. I also wanted to enquire about sports waste management campaigns that are running currently and what their approach is towards achieving this goal.

Speaking to another sportsman about making these games more environment-friendly gave me insight into how much work we have ahead of us. Most importantly, I began thinking about expanding my campaign to include a demonstration and DIY workshop for

sportsperson training at the academy. Furthermore, interactions with coaches and trainers highlighted their need to upgrade their sports gear so that their players can train and perform better.

Here is a transcript of our conversation:

JV: Good evening, Coach Gupte, and thank you for setting up this call today. I am eager to know how your sports academy contributes to a more sustainable future for sports, especially in cricket.

UG: Good evening, and you're welcome. It's great to see young athletes taking an interest in sustainability. So, let me start by briefly explaining what sustainability in sports means to me. I believe in minimising our environmental impact and fostering a responsible sports culture. It involves reducing waste, conserving resources, and promoting eco-friendly habits among our athletes and staff. It is a lifestyle, and as a coach and a business owner, I hope to instil my athletes and the team working at the company with these values.

JV: You are right; it is indeed a lifestyle change. And we need more mentors like you to educate, inform and make people aware so we can reduce our environmental damage. So, have you taken concrete steps at the academy to become more sustainable?

UG: Yes, we have. Some of the programs we have or are setting up include

- **Solar Power:** The academy roof is covered with solar panels to provide clean, emission-free electricity in the changing rooms and cloakrooms.
- **Rain Water Harvester** to reduce our water consumption while maintaining the health and quality of our field.
- **Equipment Repair and Refurbishing:** to reduce the waste of sports gear that can be repaired easily

JV: That's a holistic approach to sports and training! I was hoping to participate in similar efforts to reduce waste generated by sports, so I have a unique proposal for you. I am sure

you have several cricket balls that you eventually need to discard instead of disposing of them. I'd like to request that I use some worn-out balls to create enclosures for wireless Bluetooth speakers. I was thinking of starting with a small pilot project, maybe five to ten old balls cut them open and use them to case the circuit and module for a Bluetooth speaker inside. I am calling the device UpBeat.

AN: That's an intriguing! I appreciate your creative thinking.

Meeting with Mukesh Sir at Modern School, Vasant Vihar

JV: Thank you. Once I refine my prototype, I also thought we could have a tournament for your trainees and offer a speaker as a tournament reward. What are your thoughts on that?

AN: I love it! The players could use them in our outdoor training areas. Athletes could connect their devices and play motivating music during workouts. It would be a fun way to reuse old equipment to boost the training atmosphere, and it undoubtedly aligns with my idea of promoting sustainability during training. I also have balls with different materials so you can experiment and see what gives you the best results.

JV: That is so helpful in getting my prototype ready! Do you have any suggestions or advice for me?

AN: Well, more than a suggestion, I have a proposal. Once this is ready, you may come to the academy and host a workshop with the Under-13 sportspersons. It will encourage them to develop creative solutions like this, and we can look at having that tournament with them so they get the UpBeat Speaker if they win. And we can have a segment where they propose solutions for other sports consumables at the end of the match to make the academy more


Meeting with Mukesh Sir at Modern School, Vasant Vihar

eco-friendly. Some of them struggle to organise sports equipment and gear for themselves, so this will encourage them to be more resourceful and creative.

JV: Yes, absolutely! And I can help your trainees with resource management as well. I am conducting a drive to collect sports gear from my classmates, family and neighbourhood; I will bring my collection over to you so your trainees can take what they need.

AN: Lovely! This has been a delightful conversation! I am so happy that you reached out!

JV: Likewise, coach, thank you for your help and support.

Partnership with Cricket coach, Dahiya Cricket Academy, Modern School, Vasant Vihar

Starting from my 'home ground,' I reached out to my school's cricket coach for a partnership to use the old, worn-out cricket balls available there. Mukesh sir was very forthcoming and supportive of my campaign. He informed me that the school has a number of cricket balls with different internal structures and sizes, and with the team training diligently, they use up cricket balls at a high frequency. He escorted me to the room where their discarded sports gear and consumables were stored and told me to take the balls made with leather, PVC and plastic, whichever would be most beneficial for my project. Since I noticed some worn-out but repairable equipment also lying there, as a goodwill gesture, I will repair the equipment and return the refurbished equipment to him.

Partnership with C-Net Communications India Pvt. Ltd.

In a similar approach, I connected with C-Net Communications Pvt. Ltd., an organisation leading the Indian market in the sale and service of DVB set-top boxes (MPEG-2, MPEG-4, SD, HD, PVRs) and other digital broadcast products. I request their support in arranging for Bluetooth and audio circuit modules and speakers they extract from television sets they receive from customers in their buy-back schemes. With a family member working at the organisation's helm, I tapped into this resource I had available in my immediate environment for guidance on working with electronic parts and reliable sourcing channels to arrange for more.

Game Changers Campaign

Continued conversations with sports academies and training centres have made me aware of some of their struggles. I heard some accounts of sportspeople who no longer train with these academies because their families thought it was a waste of time, and some academies have had to let athletes go because their skill was above the institute's level. Still, the centre could no longer afford more advanced equipment to train with. Seeing this state of affairs, I am also initiating a community outreach program called Game Changers. To create awareness about my campaign and garner support from UpBeat customers, I will market my speaker as UpBeat by Game Changers. This will draw in anyone curious about how the world of sports needs to see a change and will encourage them to be the start of that change in their arena.

Game Changers: Sustainability in Motion

I am organising 3 community welfare campaigns that will educate people in and around my locality while providing resources for my collaborators

Electronic Waste (E-Waste) Management Initiative

I am initiating a movement for effective electronic waste (e-waste) management collection and management within my community to ensure that old and outdated devices can be disposed of using the designated channels and processes.

Direct Engagement with Residents

I engage directly with community members to encourage their participation in the e-waste collection drive. Given potential reluctance on their part, I guide them through evaluating their old electronic devices and making informed decisions regarding their continued use.

Device Assessment and Repair Referral

Should individuals express interest in assessing the viability of their electronic devices or repairing them, I facilitate a comprehensive device health assessment with HPL COMMUNICATION, based on which people can initiate the repair process.

Secure Disposal Coordination

For those individuals who determine that they no longer intend to use their devices, I connect them to the team at E-waster for further processing.

Education Through Personal Interaction

During these interactions, I seize the opportunity to educate individuals through one-on-one dialogues about the pressing environmental concerns of e-waste accumulation.

Promotion of Sustainable Practices

I aim to instil a lasting lifestyle change by guiding individuals through device health checks and disposal. As people in the community become more aware, they will begin taking the initiative to ensure e-waste management.

Target Audience

The initiative is most impactful for individuals who possess unused electronic devices and are unaware of how to dispose them off. Knowing the available facilities can motivate them to step up and participate.

Resource Reclamation

This movement enables me to harness valuable spare parts from devices sent to E-waster. Once dissembled and checked, their team shares the list of viable components I can purchase from them.

Working with the people in my community, I want to mobilise community engagement, raising a sense of awareness and responsibility to introduce sustainability into their lives with minimal effort.

Sports Equipment Provision Initiative

Under this campaign, I collect old, worn-out, and unused sports equipment from my locality and refurbish and redistribute it to sportspeople and academies faced with financial difficulties. It is similar to my approach in e-waste management, relying on getting the chance to speak to people directly and encouraging them to find ways to make the sport they play more sustainable. This segment of my campaign includes the following.

Engagement with Users

The most important part of the campaign is to connect with community members one-on-one to initiate a conversation about how they can make the sport they play more sustainable and how we can work together to change the way our games are played.

Collect, Assess and Repair

Sports equipment, consumables and gear I collect are thoroughly assessed to determine its repairability. Items that can be repaired are sorted out for refurbishment, and the rest is discarded.

Group Demonstrations

I segregate sports gear that the players themselves can easily repair. I take this to academies where they are needed and conduct group demonstrations to educate players on refurbishing techniques, thus enhancing self-sufficiency.

Redistribution to Needy Athletes

Refurbished equipment, restored to usable condition, is subsequently allocated to athletes who are financially unable to procure their own supplies, working in collaboration with academy and training centre coaches to identify players for distribution.

Engagement of Skilled Workers

To address equipment requiring specialised skills or machinery for repair, I collaborate with small-scale skilled workers, such as tailors and mattress creators, who get employed per unit.

Income Generation and Fair Compensation

Proceeds generated from the sales of the UpBeat Speaker are allocated toward compensating skilled workers for their efforts.

Through the Sports Equipment Provision Initiative, the Game Changers campaign promotes sustainability in sports, creates more resources for sportsmen and generates employment for small-scale skilled workers. The scope for creating an environment of inclusivity expands beyond sports with this segment.

Game Changer Fund Raiser Tournaments

Background

Game Changer Fundraiser tournaments are strategic collaborative events that I organise at partner sports academies with the help of corporate funds and CSR sponsorships.

Objective

The tournaments have a two-fold advantage of providing young and aspiring athletes with a platform for honing their skills by facilitating more frequent training and competition opportunities and reinforcing sustainability in sports during tournaments through routine implementation of sustainability strategies.

Prize Structure

As part of this initiative, it is envisaged that the winners of these tournaments will be rewarded not only with accolades but also with valuable prizes. Notably, each tournament champion shall be presented with an UpBeat speaker alongside other commensurate rewards and benefits.

Financial Model

Corporate sponsorships fund the tournaments. Attendees are sent invites for the matches, accompanied by a nominal entry fee; the proceeds are channelled towards financing the academy's operations, encompassing maintenance, procurement of necessary supplies, and the continual enhancement of facilities.

Game Changer Fundraiser Tournaments represent an approach to support young athletes' development, promote sustainable tournament hosting, and make sports more inclusive.

UPBEAT: PRODUCT DEVELOPMENT

Collaboration with On My Own Technology

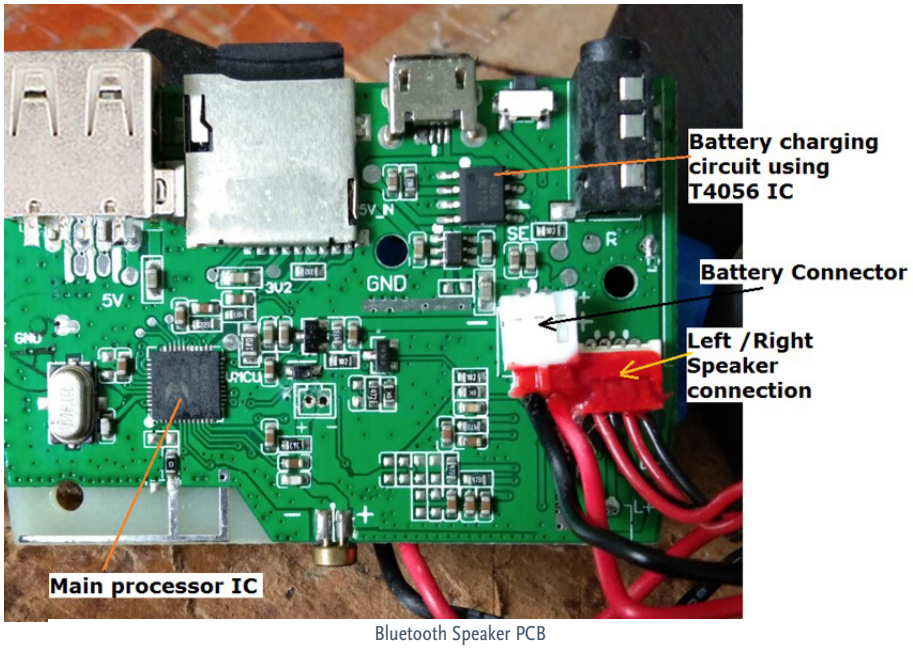
I contacted On My Own Technology (OMOTEC), an organisation specialising in teaching STEAM using innovation and research. They offer programs for young scientists of all ages. With no experience in handling circuit boards and electronic modules, I hoped to get their guidance, mentorship and support to create my prototype. My first few meetings were spent learning about the components of a Bluetooth speaker.

Retrofitting a Bluetooth receiver and sound driver to create the UpBeat Speaker using a cricket ball

Bluetooth Speaker Components

Bluetooth Module

The Bluetooth module is the heart and brain of a Bluetooth speaker. It manages all speaker operations by serving as an antenna to receive inputs from a user, process the signal and implement the



Bluetooth Speaker PCB

corresponding action. Such signals include users putting the speaker in pairing mode and controlling audio playback with commands like play/pause, volume up/down, etc. It also responds to external inputs it receives when the power button is pressed, or the speaker is put on charge. It consists of a printed circuit board (PCB) with integrated circuits (IC) on both sides and acts as a relay between the user's input and the speaker's output. It detects when the speaker has not had any exchange activity with a paired device. It enables the speaker to go into idle/standby mode to save power and extend battery operation on a single charge. Its in-built voltage regulator also manages the amount of energy it draws from the battery and continues optimising the same for maximum utility.

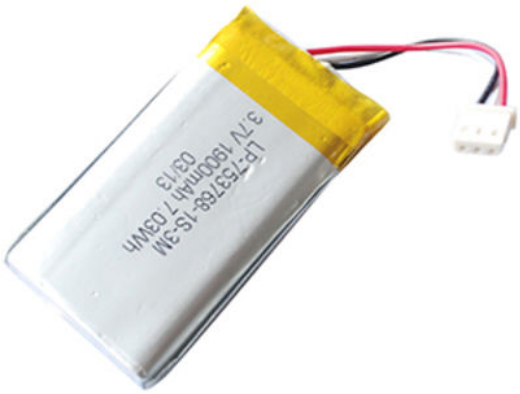
Speaker Drivers (Woofers and Tweeters)

The speaker can produce a full range of audio output by combining woofers that produce low-frequency sounds and tweeters that produce high-frequency sounds. The speaker driver receives the electronic impulse from the PCB. This impulse activates an internal electromagnet wrapped around the base of the speaker called the voice coil that vibrates the speaker's diaphragm and creates the desired sound. The size and shape of the speaker driver, in combination with the modulator placed inside the speaker, dictate the volume, pitch and quality of the sound.

Full Range Active Speaker Driver

Power Supply

This is the source of electric current used by the Bluetooth module and sound output mechanism to operate the speaker. This current is supplied by a rechargeable lithium polymer battery installed inside the speaker and controlled by the PCB to regulate the flow of current to each component. The batter needs 60 minutes of charging to go from 0 to 100% battery.



3.7 volts Lithium Polymer Battery

Control Button(s)

The control button(s) located on the external surface of the speal triggers the PCB to begin operating, activating the Bluetooth module the signal. This is also the user interface section of the device.

Power Button

Charging Port

The charging input port has a plug-in socket on the outside of the speaker; it connects to the battery to recharge it when connected via a micro USB port. As the speaker is used, the lithium polymer battery discharges and must eventually be connected to an external power source to charge again to continue supplying power to the speaker components.

Charging Port on PCB

1 PVC and 1 Cricket Ball

The PVC ball holds the components of the speaker, and the cricket ball is used as the final outer casing.

PCV Ball and Cricket Ball

Methodology: UpBeat Speaker Assembly

The UpBeat Speaker involves a step-by-step assembly process that upcycles old sports balls into sustainable audio devices. This methodology successfully assembles parts collected as waste from sports centres and electronic waste processing plants to create while maintaining its aesthetic and functional integrity.

Tools and Materials Required

- Bluetooth speaker components (PCV ball, cricket ball, speaker drivers, Bluetooth module, battery, wires, and connectors)
- Screwdriver
- Soldering iron and solder
- Wire stripper and cutter
- Multimeter (for testing)
- One used cricket ball with a leather exterior
- One used PVC plastic ball
- Cutting tools
- Adhesive tape
- Spray paint/acrylic paint and brushes
- Sound hole-making tool (or other similar tool to create air holes)
- Final secure belt

Assembly Steps

1. Step 1: Preparation

1.1. Gather all the necessary tools and materials.

1.2. Clean all the components to ensure that there is no dust

1.3. Remove protective films from the parts (if any)

1.4. Ensure a clean and well-ventilated workspace.

2. Step 2: Cut the PCV and Cricket Ball

2.1. Using the cutting tools, carefully cut the plastic ball into two equal halves.

2.2. Carefully cut the cricket ball into two equal halves using the cutting tools.

2.3. Dust both the balls off for residue and set aside.

3. Step 3: Power Supply

3.1. Check the voltage of the Bluetooth module.

3.2. Verify the module voltage to be 3.3V.

3.3. Check the voltage of the battery.

3.4. Verify the battery voltage to be 3.7V.

3.5. If your Bluetooth module does not have a voltage regulator, use an LDO or DC/DC Buck regulator to balance the voltage difference.

3.6. Connect the positive (red) and negative (black) leads of the battery to the Bluetooth module or voltage regulator.

4. Step 4: Bluetooth Module

4.1. Connect the VCC (power) and GND (ground) pins of the Bluetooth module to the corresponding voltage and ground connections.

5. Audio Output

5.1. Connect the audio output pins of the Bluetooth module to the input pins of your audio output device.

5.2. Use an active speaker for a small ball like a cricket ball and a passive speaker with an amplifier circuit board for a large ball like a football.

5.3. Ensure you have the correct impedance matching and signal levels between the Bluetooth module and the audio device. You may need to add resistors or capacitors for this.

6. Pairing and Configuration

6.1. Power up your circuit by connecting the battery.

6.2. Put your Bluetooth module into pairing mode.

6.3. On your smartphone or other Bluetooth source device, search for and pair with your Bluetooth module.

7. Testing

7.1. Play audio from your source device, which should be transmitted wirelessly to your audio output device via Bluetooth.

7.2. Test the range and ensure the signal is clear within the desired operating distance.

8. Assembly

8.1. Place the Bluetooth circuit board and rechargeable battery inside one of the plastic ball halves

8.2. Position the speaker inside the plastic ball half with the air holes.

8.3. Ensure that it is securely placed and aligned for optimal sound output.

9. Creating Air Holes

9.1. Use the sound hole-making tool to create evenly spaced air holes on the plastic ball half that contains the circuit board and battery.

9.2. These holes will allow sound to escape from the speaker.

10. Taping the Ball Halves

10.1. Join the two plastic ball halves together by taping them along the seam.

10.2. Ensure a tight and secure fit to prevent any components from shifting.

11. Painting the Outer Shell

11.1. Remove the outer shell of the cricket ball.

11.2. Apply paint to the outer shell to make it look fresh and attractive.

11.3. Allow the paint to dry completely.

12. Covering the Speaker

12.1. Place the painted outer shell of the cricket ball over the plastic ball assembly.

12.2. Ensure the speaker is fully covered and the assembly looks like a complete sports ball.

13. Sealing the Center

13.1. Securely fasten the centre of the sphere by using the final secure belt.

13.2. This belt should hold the entire assembly together and prevent any movement of the components inside.

14. Quality Control

14.1. Test each completed UpBeat Speaker to ensure proper sound output and Bluetooth functionality.

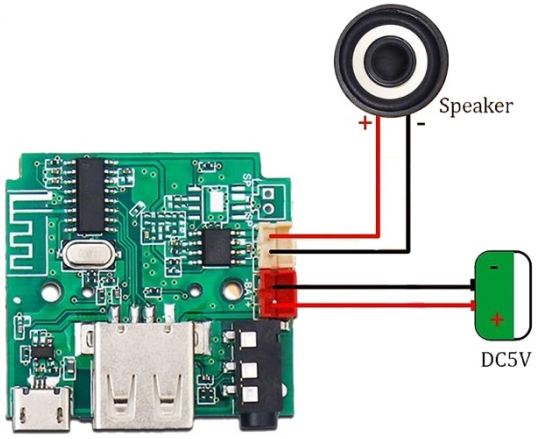
14.2. Inspect the paint finish for quality and uniformity.

15. Packaging and Distribution

15.1. Once the UpBeat Speakers pass quality control, package them and add a branding sticker with the Game Changers logo.

15.2. Use eco-friendly packaging materials.

Connection Port Guide and Diagram



PCB Side 1 with Connection Guide

PCB Side 2 with Button Connection Pins

Cutting the ball in 2 equal halves

Placing the PCB inside the ball

Making sound holes on the surface

Inspecting sound hole pattern and spacing

Placing the speaker driver in the ball

Securely taping the two halves of the PVC Ball together

Painting the shell of the cricket ball

Place the PVC ball inside the cricket ball and seal the two halves

UPBEAT BUSINESS MODEL

Summary

UpBeat by Game Changers is a sustainable audio device that upcycles old sports balls into portable speakers. This innovative product caters to the young, environmentally conscious market segment. The business operates on a non-profit model with all earnings directed towards campaigns to facilitate e-waste management and the development of athletes and academies training in various sports.

Raw Material Procurement Strategy

UpBeat relies on a robust supply chain network established through collaborations and partnerships. The speaker body repurposes waste generated by old consumables discarded by sports academies. It encases electronic components sourced from e-waste processing plants and manufacturing discarded parts from repair stores and manufacturing units, and some parts procured from wholesale vendors. All the components are tested and passed as safe for use and in good condition before being upcycled into UpBeat speakers.

Academies and Sports Training Institutes Partners

1. Cricket Uday Gupte Academy, RK Puram
2. Dahiya Cricket Academy at Modern School VV

E-waste, Electronic Repair and Manufacturing Partners

1. E-waster
2. C-Net Communications India Pvt. Ltd. (TV manufacturers)

Online Vendors

The only component that is purchased new is the battery. Having received mixed feedback about the safety and viability of repaired batteries, UpBeat speakers are installed with new batteries only. All batteries recovered from collected e-waste, regardless of their condition, are handed to e-waste and electronic repair partners for further processing. Since lithium polymer batteries are readily available with online wholesale vendors, I purchase the battery from them, complete with warranty paperwork and approved safety testing.

Development Cost and Market Price

UpBeat pricing is set based on several considerations to ensure that it remains an affordable and sustainable device while also supporting the ongoing campaign activities for Game Changers.

Target Market

My primary target audience is young students, so the device is priced to match the purchasing power of this demographic.

Sustainability Icon

UpBeat aims to shift the perception of sustainability, emphasising that sustainable products need not come at exorbitant prices. Hence, the pricing, too, sets an example of sustainability that can spark creativity and enjoyment and does not come with a high price.

Fund Raising

Profits from UpBeat support the Game Changers campaign and give back to the communities that are an integral part of its supply chain network.

Sourcing

The pricing structure covers the cost of development, considering both zero-cost sourcing opportunities and per-unit payments to vendors.

Unit Pricing

Our cost breakdown per unit is as follows:

₹150 for a 3.7-volt Lithium Polymer rechargeable battery unit

₹120 for a 3-watt magnet speaker

₹100 for a printed circuit board (PCB) with integrated circuits (IC) for Bluetooth connectivity, audio output, battery management, and voltage regulation

₹15 for the cost of running and maintaining the soldering iron

₹9 for the cost of applying a final finished coat with spray or acrylic paint

₹3 for the adhesive used to reseal the ball

₹3 for an adhesive print of our branding (UpBeat) and campaign name (Game Changes: Sustainability in Motion)

₹10 miscellaneous costs

Total cost of development for each unit: ₹410

Retail price of 1 unit of UpBeat speaker: ₹699

Profit per unit sold: ₹289

Marketing Model

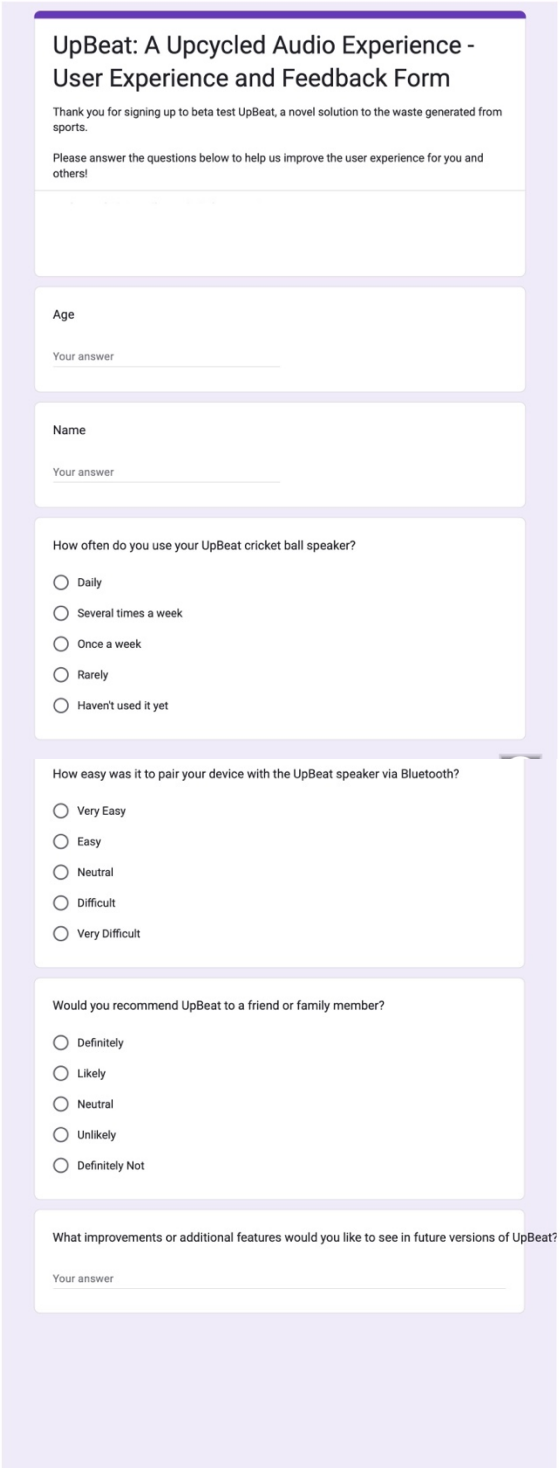
To reach a diverse audience, I am working on 2-3 versions of the UpBeat Speaker targeting various demographics. My marketing strategy includes:

- Online sales on our dedicated website

- Tournament prize sponsorships at sporting events with awareness campaigns about sustainability in sports through product promotion
- Collaborations with tech and electronic companies such as Reliance Digital and Croma to leverage their large audience base

UpBeat speaker is an opportunity to merge sustainability with affordable technology in the sports industry. Strengthened by a carefully considered pricing strategy and diverse marketing approach, it aims to captivate the target audience and positively impact the environment and local communities.

UPBEAT: AN UPCYCLED AUDIO EXPERIENCE – USER EXPERIENCE AND FEEDBACK FORM



UpBeat: A Upcycled Audio Experience - User Experience and Feedback Form

Thank you for signing up to beta test UpBeat, a novel solution to the waste generated from sports.

Please answer the questions below to help us improve the user experience for you and others!

Age

Your answer

Name

Your answer

How often do you use your UpBeat cricket ball speaker?

- Daily
- Several times a week
- Once a week
- Rarely
- Haven't used it yet

How easy was it to pair your device with the UpBeat speaker via Bluetooth?

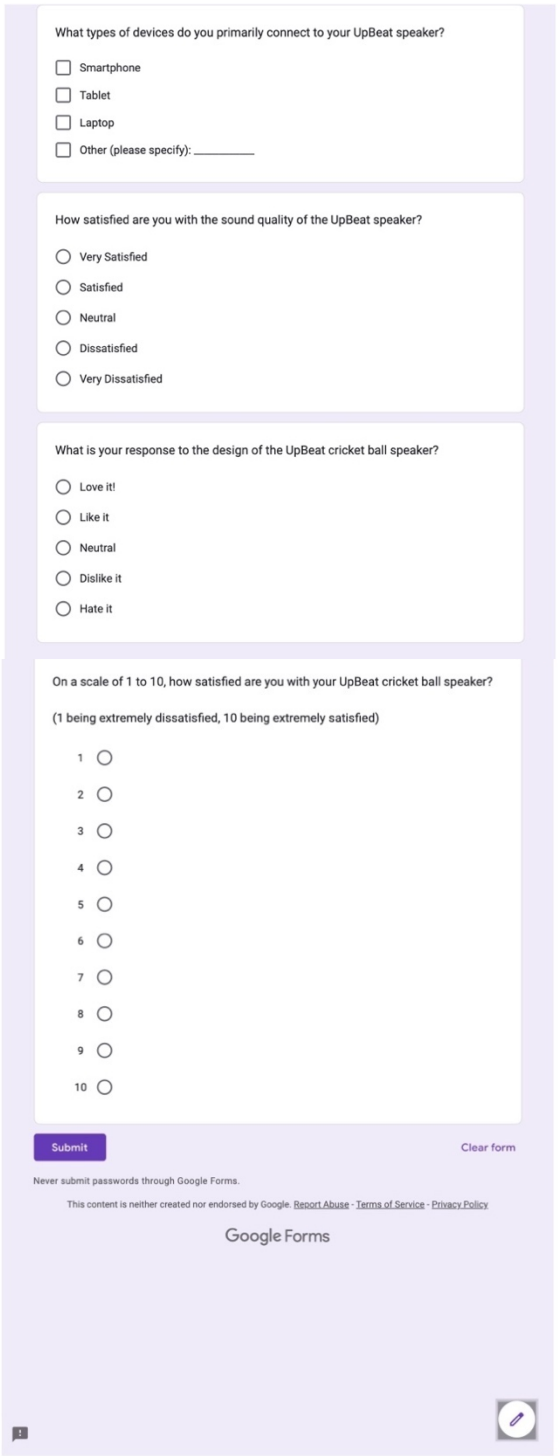
- Very Easy
- Easy
- Neutral
- Difficult
- Very Difficult

Would you recommend UpBeat to a friend or family member?

- Definitely
- Likely
- Neutral
- Unlikely
- Definitely Not

What improvements or additional features would you like to see in future versions of UpBeat?

Your answer



What types of devices do you primarily connect to your UpBeat speaker?

- Smartphone
- Tablet
- Laptop
- Other (please specify): _____

How satisfied are you with the sound quality of the UpBeat speaker?

- Very Satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very Dissatisfied

What is your response to the design of the UpBeat cricket ball speaker?

- Love it!
- Like it
- Neutral
- Dislike it
- Hate it

On a scale of 1 to 10, how satisfied are you with your UpBeat cricket ball speaker?

(1 being extremely dissatisfied, 10 being extremely satisfied)

1 2 3 4 5 6 7 8 9 10

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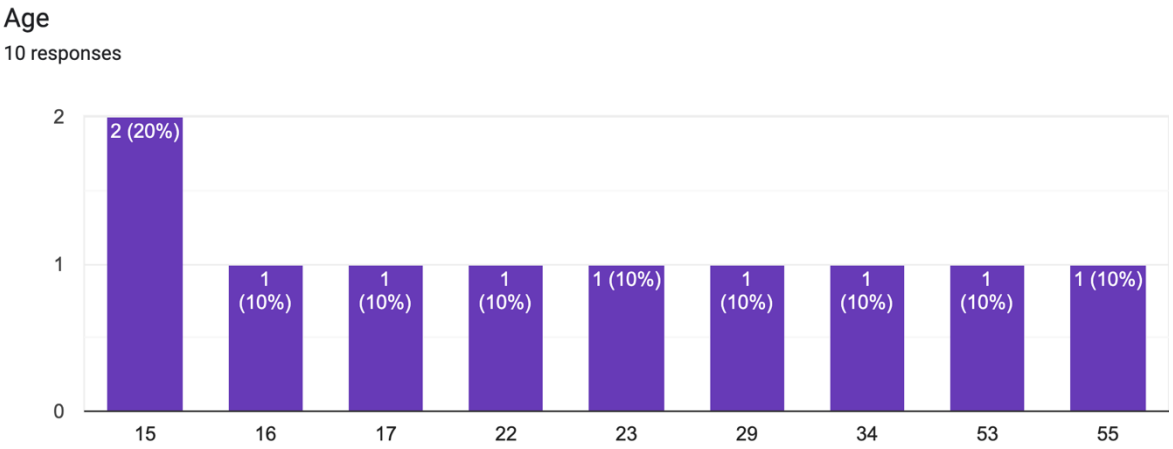
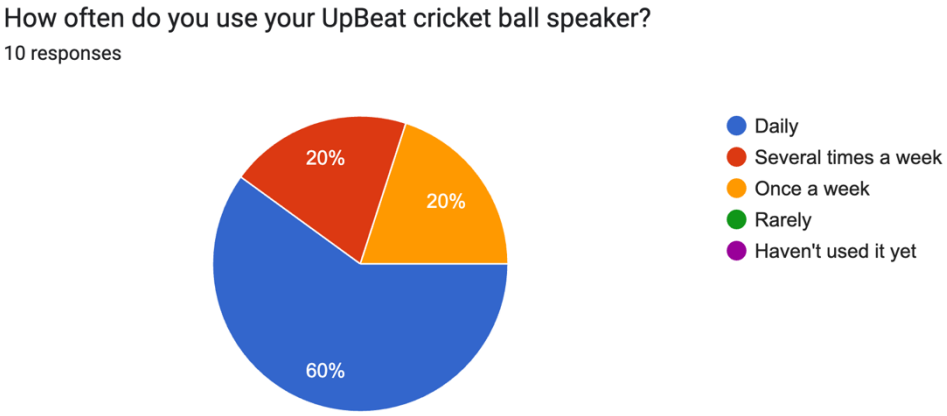
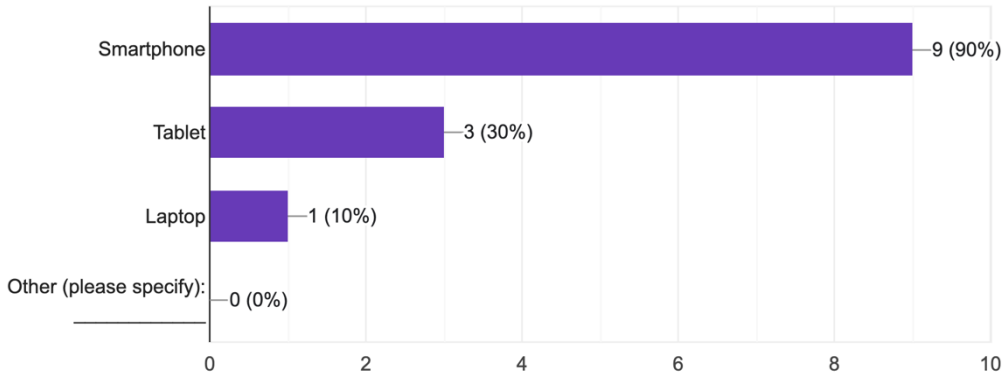
UPBEAT: USER EXPERIENCE AND FEEDBACK ANALYSIS





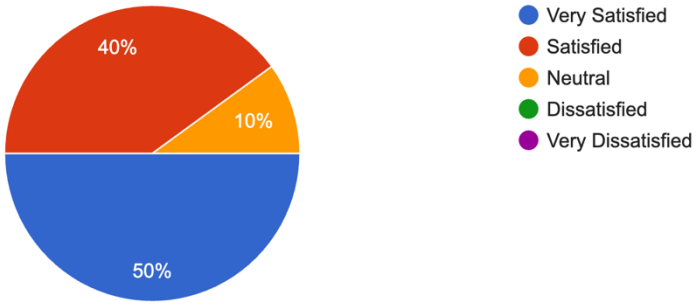
What types of devices do you primarily connect to your UpBeat speaker?

10 responses



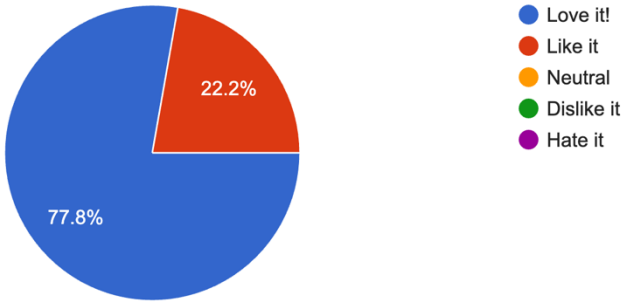
How satisfied are you with the sound quality of the UpBeat speaker?

10 responses



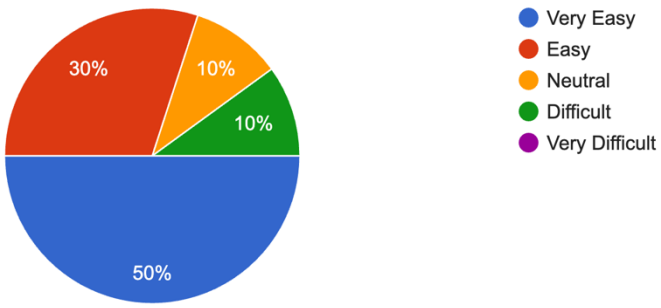
What is your response to the design of the UpBeat cricket ball speaker?

9 responses



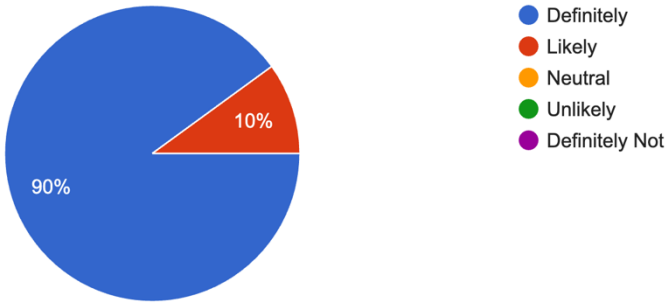
How easy was it to pair your device with the UpBeat speaker via Bluetooth?

10 responses



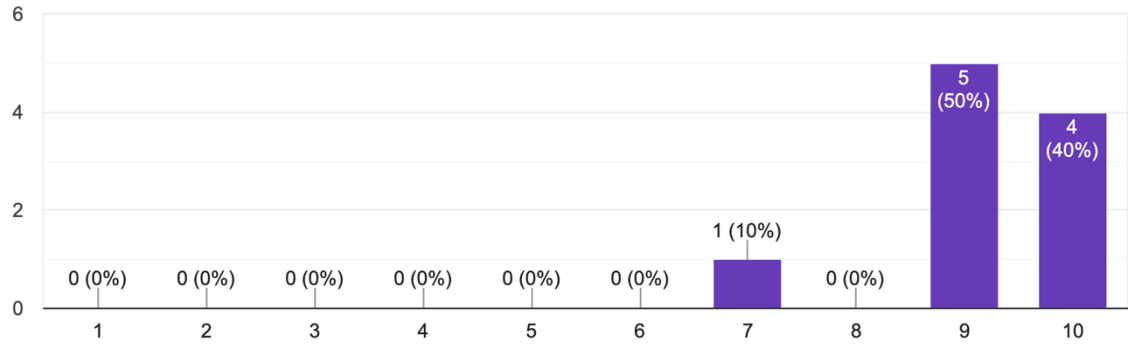
Would you recommend UpBeat to a friend or family member?

10 responses



On a scale of 1 to 10, how satisfied are you with your UpBeat cricket ball speaker? (1 being extremely dissatisfied, 10 being extremely satisfied)

10 responses



What improvements or additional features would you like to see in future versions of UpBeat?

10 responses

It's nice, I would buy it to gift to a sports fan.
product is cool but since it is quite small, the volume is not very loud. it's ok for few people but it would be nice to have a louder one for party
very unique product and I never would have thought it is actually a speaker. nice to keep on my desk but i would like to see more options, different sports balls
the bluetooth pairing took a little time with my ipad
nothing, love it!!!!!!!
bluetooth does not connect sometimes
i love this product. as an audiophile i feel the sound quality is good but could be even better
nothing, i love it!
i am a tennis player so i would love to get a tennis ball version
hard to pair multiple devices, otherwise its great

In order to test my prototype and get real-time, genuine user feedback, I selected 10 users from a range of age groups to test the speaker for a period of two weeks each. I then asked them to record their experience and feedback in the following form. I aim to use their feedback to improve my prototype.

Introduction

In this analysis, I will examine the results of the feedback form, examining the positive aspects, areas that need improvement, and future plans based on user input.

Positive Aspects

Design Appreciation

The feedback received was overwhelmingly positive in terms of the product's design. Users unanimously loved the cricket ball housing, highlighting its appeal to sports enthusiasts. Additionally, one user mentioned the intention to purchase it as a gift for fellow sports fans. This feedback indicates that the design of Upbeat is a significant success and resonates well with the target audience.

Bluetooth Pairing Reliability

While the majority of users reported a seamless Bluetooth pairing process, some faced difficulties. Interestingly, it was noted that these issues were more prevalent among the older generation. This insight suggests a potential generation gap in understanding or comfort with Bluetooth technology. In the next prototype, improving the Bluetooth pairing experience and making it more user-friendly is essential. This may include more precise instructions, simplified pairing procedures, or additional support for users who may not be as familiar with Bluetooth devices.

Audio Quality

Most users found the audio quality suitable, but a minority desired louder or clearer sound. To address this, I will conduct a cost analysis to determine the feasibility of using a more advanced speaker component in the next prototype. This may enhance the audio experience and cater to users with more demanding audio preferences.

Future Plans and Variants

Variety of Sports Balls: The feedback suggests that users are eager to see the product offered in different sports ball variants. This aligns with my plan to expand the range of upcycled sports waste products. Not only does this resonate with users, but it also aligns with sustainability goals by reducing sports equipment waste. Offering a variety of sports ball options will provide users with more choices and cater to a broader audience.

The feedback and user experiences regarding the upcycled cricket ball Bluetooth speaker are largely positive, with design appreciation being a standout feature. However, some areas need improvement, such as Bluetooth pairing reliability and potential enhancements in audio quality. The insights gathered from user feedback will be invaluable for refining future prototypes. Additionally, the enthusiasm for adding more sports ball variants aligns with the company's sustainable and user-centric approach, making it a promising avenue for growth.

CONCLUSION

The International Olympics Committee mentions in their Sustainability Essentials guidebook about the UN General Assembly speaking about the important role that sport plays in supporting the SDGs. Paragraph 37 of the UN 2030 Agenda states: "Sport is also an important enabler of sustainable development. We recognise the growing contribution of sport to the realisation of development and peace in its promotion of tolerance and respect and the contributions it makes to the empowerment of women and of young people, individuals and communities, as well as to health, education and social inclusion objectives".

Such lofty goals can be met only when we begin moving towards sustainability. Using sports as a community welfare activity will remain incomplete if every tournament continues to strain the environment and practice runs continue to create more waste that collects at landfills.

The environmental impact of the sports industry extends far beyond the boundaries of stadiums and arenas. It affects ecosystems, wildlife, and human communities worldwide. Therefore, addressing waste in the sports industry is an environmental concern and a social responsibility. While current initiatives such as the ones spearheaded by the Olympic Committee and companies like COSCO are essential, there is a dire need for innovation in this industry, to not only develop new sustainably-manufactured equipment but also develop

innovative solutions for the upcycling of old and damaged equipment. This promotes a circular economy and ensures that we are able to foster sustainable growth in the sports industry.

Taking on the task of developing an innovative solution to the problem of sports waste, the UpBeat Speakers are my creative solution that not only reduces landfill waste but also captures the interest of sports fans, drawing their awareness and influencing them to promote sustainability, reduce waste production, and reuse waste that doesn't need to be in a landfill. In this way, the UpBeat speaker not only reduces waste one cricket ball at a time but creates a cascading chain of sustainable practices that can truly transform our future.

It is only through collective action and unwavering commitment that the sports industry can become a beacon of sustainability and a champion for the planet.

SOURCES

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