

# **WaterWise**

Project Report by Team A

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# Contents

<b>Project Coordination and Analysis</b>	<b>3</b>
Introduction:	5
Market Analysis:	5
<b>Technical Lead</b>	<b>8</b>
Technical Specifications:	8
Resource Allocation:	10
Human Resources:	10
Budget Allocation:	10
Manufacturing cost per bottle:	10
Software development, testing, maintenance - outsourced:	11
Marketing and promotion:	11
Research and Development (R&D):	11
Projections and ROI:	11
<b>Marketing Distributing Strategist</b>	<b>12</b>
Market Concentration & Characteristics	13
Collaborating with Santa Clara University	15
Collaboration with well established company like Stanley cups	16
<b>Risk Manager and Quality Assurance Lead</b>	<b>17</b>
Risk Management	17
Project Risk Profile	18
Distribution Channel Insights	19
Key Companies & Market Share Insights	20
<b>Implementation Planner</b>	<b>22</b>
Implementation	22
Schedule	24

# Project Coordination and Analysis

## Executive Summary

The WaterWise project embodies a pioneering approach to address the critical issue of hydration maintenance through an innovative smart water bottle system. Recognizing the substantial impact of dehydration on cognitive function, physical health, and overall well-being, our team has developed a comprehensive solution to foster a culture of preventive healthcare and positive societal impact.

**Innovative Solution:** The WaterWise smart water bottle integrates advanced technology, including a precision weight sensor and LED reminders, to offer real-time tracking and management of water intake. This system is designed to automatically monitor hydration levels and encourage consistent water consumption through visual prompts and personalized hydration goals set via an accompanying mobile app.

**Health and Environmental Benefits:** Beyond promoting improved hydration and health, WaterWise emphasizes sustainability by reducing reliance on disposable water bottles, thereby contributing to environmental preservation. The project's benefits extend to enhanced physical health, mental well-being, and productivity through its seamless integration into daily routines.

**Market Potential:** Backed by extensive market research, the WaterWise bottle taps into the growing demand for innovative and sustainable hydration tools. The global market insights reveal a promising landscape for the adoption and commercialization of smart water bottles, further supported by strategic partnerships with educational institutions, online retailers, and fitness platforms.

**Technological Foundation:** Utilizing a blend of web and server technologies, including Apache, Django, and an ESP module, the WaterWise system ensures robust and efficient backend support for real-time data handling and user interaction. This adaptive and user-centric design is poised for ongoing enhancements based on feedback and testing.

**Strategic Partnerships and Marketing:** The project leverages strong relationships with third parties, including alliances with renowned brands and educational institutions, to drive early adoption and create a holistic health and well-being initiative. Our marketing strategy is meticulously crafted to connect, engage, and grow our community, fostering a widespread culture of hydration awareness.

**Financial Outlook and Sustainability:** The project presents a well-structured financial plan, accounting for manufacturing, development, and marketing costs, ensuring its economic viability and sustainability. With an estimated 220% return on investment, the WaterWise project is set to revolutionize the way individuals manage their hydration, marking a significant stride towards a healthier, more sustainable future.

**Conclusion:** WaterWise is more than just a smart water bottle; it's a comprehensive hydration management system with the power to make a tangible difference in people's lives and environmental health. Through innovation, strategic partnerships, and a focus on sustainability, WaterWise is poised to lead the shift towards a more water-wise world.

Let's Drive into the intricacies of the project, 'WaterWise' in this report in detail.

## **Introduction:**

The WaterWise project is a pioneering initiative designed to promote consistent hydration habits across all age groups, with a special focus on toddlers, the elderly, and those not technologically savvy. It aims to bridge the technological gap in hydration reminders, making it accessible to everyone, thereby improving overall well-being. The project is committed to developing a user-friendly solution that encourages people to meet their daily hydration needs, especially catering to individuals with specific medical requirements for water intake. Originating from a group of college students' real-life observation of frequently neglecting water consumption due to a lack of reminders, WaterWise was born out of the need to address the widespread issue of dehydration and its health risks. With objectives centered around creating an intuitive system that fosters regular water intake without heavy reliance on technology and adaptable to various needs, WaterWise strives to be a testament to innovative thinking and a dedication to enhancing societal health.

## **Market Analysis:**

This market analysis aims to provide insights into the opportunities and challenges surrounding the manufacturing of reusable smart water bottles. The analysis encompasses key market trends, consumer behavior, competitive landscape, technological advancements, and the increasing trend of using reusable water bottles.

## **Market Trends:**

- **Health Awareness:** Consumers are increasingly conscious of their health and wellness, leading to a greater emphasis on hydration. The demand for smart water bottles aligns with this trend, as they offer features that help users track and optimize their hydration levels.
- **Adoption of Smart Devices:** The market for smart devices is expanding rapidly, driven by advancements in IoT technology. Smart water bottles capitalize on this trend by integrating sensors, Bluetooth connectivity, and mobile app functionality.
- **Preference for Convenience:** Consumers seek products that offer convenience and ease of use. Smart water bottles with features such as hydration tracking, temperature control, and personalized reminders cater to this preference.

## **Consumer Behavior:**

- **Demand for Personalization:** Customizable features in smart water bottles, such as personalized hydration goals and reminders, resonate with consumers seeking products tailored to their individual preferences.
- **Focus on Sustainability:** The increasing awareness of environmental issues has led to a growing preference for reusable alternatives to single-use plastics. Reusable smart water bottles address this concern by offering a sustainable and eco-friendly hydration solution.

## **Competitive Landscape:**

- **Existing Players:** Established companies such as HidrateSpark, Thermos, and LARQ have already penetrated the smart water bottle market with a range of offerings. However, there is room for innovation and differentiation, particularly in the reusable segment.
- **Entry Barriers:** Competing in this market requires expertise in IoT technology, manufacturing capabilities, and effective distribution channels. Overcoming entry barriers and establishing a unique value proposition will be essential for success.

### **Technological Advancements:**

- **IoT Integration:** Advanced sensors, Bluetooth connectivity, and mobile app integration are integral to the functionality of smart water bottles, enhancing user experience and convenience.
- **Battery Life and Efficiency:** Improvements in battery technology are crucial for ensuring uninterrupted functionality and maximizing the usability of smart water bottles.
- **Data Security:** Protecting user data through robust security measures is paramount, given the collection of personal hydration data by smart water bottles.

### **Increasing Trend of Using Reusable Water Bottles:**

- **Environmental Concerns:** The rising awareness of plastic pollution and environmental degradation has spurred a shift towards reusable alternatives to single-use plastics.
- **Government and Corporate Initiatives:** Government regulations and corporate sustainability initiatives further promote the adoption of reusable water bottles, creating a conducive market environment.
- **Health, Fashion, and Cost Considerations:** Reusable water bottles are perceived as safer, fashionable, and cost effective alternatives to single-use plastics, driving their popularity among consumers.

### **Challenges:**

- **Cost Considerations:** Integrating advanced technology into reusable water bottles may increase production costs, potentially impacting pricing competitiveness. Striking a balance between innovative features and affordability will be crucial.
- **User Experience:** Ensuring a seamless and intuitive user experience is essential for widespread adoption. Challenges may arise in designing user-friendly interfaces, optimizing battery life, and maintaining reliable connectivity.
- **Data Security:** Collecting and storing user data for hydration tracking purposes raises concerns about data privacy and security. Implementing robust encryption and privacy measures will be necessary to address consumer apprehensions.

**Market Potential:**

- Growth Opportunities: Despite challenges, the market for reusable smart water bottles presents significant growth opportunities driven by increasing health awareness, environmental concerns, and technological advancements.
- Expanding Consumer Base: The appeal of reusable smart water bottles extends beyond health enthusiasts to include environmentally conscious consumers, tech-savvy individuals, and those seeking convenience.
- Market Penetration: Targeting specific demographics such as fitness enthusiasts, athletes, students, and professionals can aid in market penetration and brand positioning.
- Diversification Opportunities: Beyond individual consumers, there are opportunities to explore partnerships with corporate wellness programs, fitness centers, and healthcare providers to expand the reach of reusable smart water bottles.
- Global Reach: The market for reusable smart water bottles is not limited to specific geographical regions, offering opportunities for international expansion and market diversification.

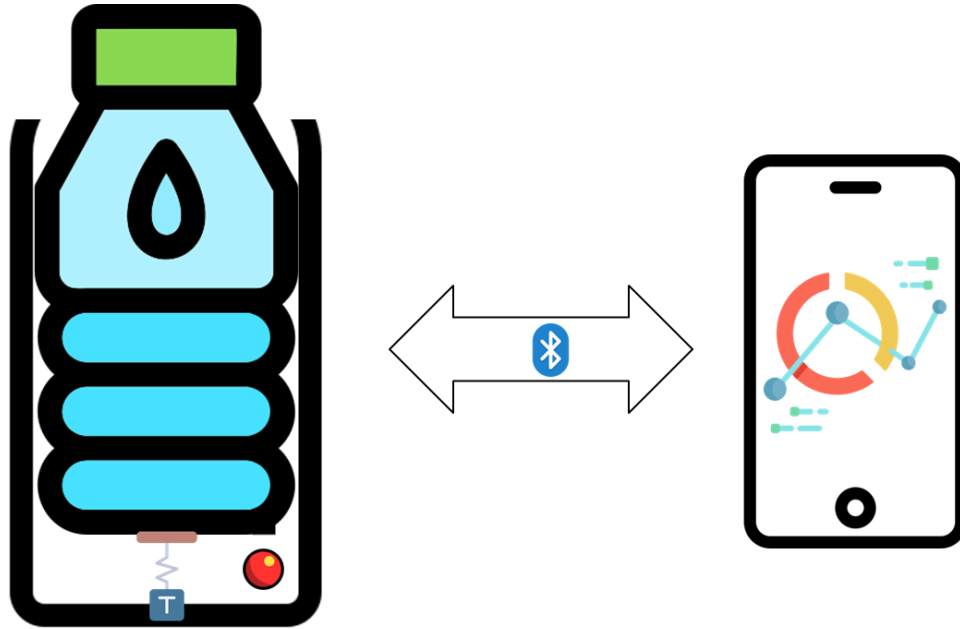
In conclusion, the market analysis reveals a promising landscape for reusable smart water bottles, driven by trends such as health consciousness, sustainability concerns, and technological advancements. Despite challenges like cost, user experience, and market saturation, significant growth opportunities exist. By leveraging innovation, addressing consumer preferences, and navigating challenges proactively, the project can position itself for success in this dynamic market, offering a compelling solution that combines convenience, sustainability, and functionality.

## Technical Lead

**Technical Specifications:**

The solution to build a subtle notifier to remind the consumer who are too busy and occupied to drink water on time to keep good hydration levels is to come up with a solution to remind the consumers in a subtle, yet effective way.

The solution proposed is subtle, efficient, and not an inconvenience.



The figure above depicts a setup of WaterWise and an interaction between the device and a user's smartphone. The device is a bottle with a false bottom which harbors a scale to measure the weight of the water in the container. The solution of weighting water to measure water consumption because water of 1 gram is 1 ml of water. The weight deficit tells us how much water is consumed in a session.

When the consumer fills up the water, the weight is noted and would start water reading of a new session. A timer is started to keep track of time since last consumption of water, when the interval is reached, the water bottle alerts the user to drink water by flashing a light. The light will continue to glow until the consumer drinks water. The consumer should drink a threshold limit of water in order to complete the session of water, this threshold is dynamic based on age, gender, mass, height of the consumer. If the threshold is not met, the light will continue to glow reminding that not an adequate amount of water was consumed, and the light stops as soon as the goal is met. The session data is sent to the user's smartphone and is recorded to keep track of the user's progress of water consumption. The user can login to the mobile application and check the daily, weekly and monthly consumption of water, to check against recommended consumption and help build the user's water habits.

*The key components of the entire WaterWise setup would be:*

1. Water bottle: A water bottle as per the design, which has a container with false bottom, to store the PCB with battery source and a load cell to weigh the water in the container.

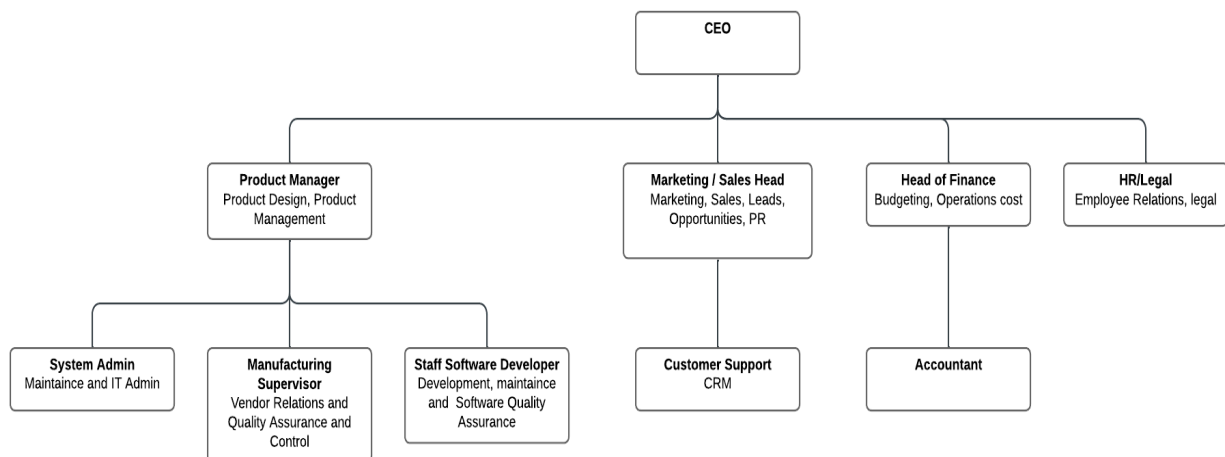


2. PCB with battery source: A PCB designed for the application to process water consumption, with a bluetooth module to interact with the Smartphone, connected to a rechargeable battery.
3. Load cell: An actuator to get the real time values of the current water measures to calculate the water consumption.
4. LED alert system: Alert system which flashes light when the water needs to be consumed by the user.
5. Smartphone for tracking and personalized alerts: The smart bottle is paired with the smartphone to provide data of the water consumption, which is stored in the user records to help the user track the hydration habits.
6. Server with database: The data, although stored on the smartphone, needs interaction with the server and data is pushed to the server database for more reliability and to provide analytics.

## Resource Allocation

### Human Resources:

The project requires cross functional teams, mostly working together, in a linear setup.



*Figure 1: Demonstrate the future project hierarchy*

The above picture is a draft of the organization structure, with only 3 levels. The CEO is the head of the table, followed by management heads, responsible for product, marketing/sales, finance, and HR/legal, followed by subordinates which help the department they work under. The last level is designed to be flexible, meaning that new resources can be added in the same level or a level below for support as the company scales up.

## **Budget Allocation:**

### **Manufacturing cost per bottle:**

- Cost of manufacturing bottle in bulk in China per bottle - \$4
- Cost of the PCB manufacturing in bulk in China per bottle - \$6
- Integration and Quality Control per bottle - \$3
- Shipping and logistics per bottle - \$3
- Other costs: facility maintenance, insurance \$2

Cost to manufacture 1 bottle : **\$18**

### **Software development, testing, maintenance - outsourced:**

- Mobile Application Development
- Integration with Hardware
- Testing and Quality Assurance
- Software maintenance and bug fixes

Cost of the process for year one: **\$30,000**

### **Marketing and promotion:**

- Market Research
- Branding and Positioning
- Website Development
- Content Creation
- Social Media Marketing
- Paid Advertising
- Email Marketing
- Events and Sponsorships
- Analytics and Measurement

Cost of marketing and promotion for year one: **\$50,000**

### **Research and Development (R&D):**

- Initial R&D costs for designing the smart features, such as sensors, connectivity, and app development.
- Cost for prototyping and testing.
- Innovations

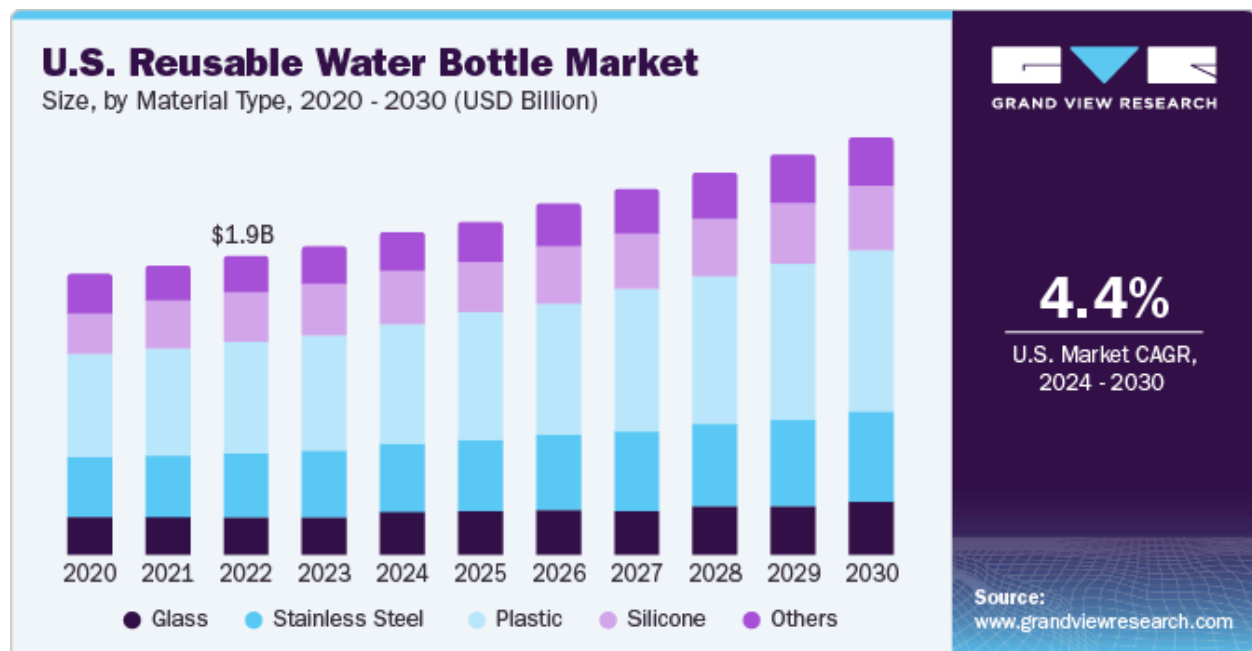
Cost of R&D for year one: **\$20,000**

## **Projections and ROI:**

Metric	Value
Initial Investment	\$200K
Self funding	\$50K
Investment we are seeking	\$200K
Estimated Annual Sales	20K
Estimated Annual Revenue	\$800K
Selling Price per Bottle	\$40
Revenue for 20K Sales	\$800K
Estimated Annual Expenses	\$260K
Cost per Bottle	\$18
Cost of Manufacturing Bottles	\$160K
Annual Net Profit	\$440K
ROI	220%

# Marketing Distributing Strategist

The global reusable water bottle market was valued at USD 9.28 billion in 2023 and is expected to grow at a compound annual growth rate (CAGR) of 4.4% from 2024 to 2030. Growing awareness regarding environmental hazards has motivated people to take on the responsibility of reducing their contribution to the plastic problem. As a result, a large number of consumers across the globe have been ditching single-use plastic bottles for good and replacing them with reusable water bottles. Moreover, the COVID-19 home isolation guidelines have, nevertheless, spurred the demand for various kitchen products, including reusable bottles.



*Figure 2: Showcase the market trend for Reusable Water Bottle*

Reusable water bottles are becoming more and more popular across target markets worldwide, especially in homes, offices, and schools. These reusable bottles lessen the amount of plastic that ends up in landfills, which is what mostly contaminates groundwater. Also, the usage of reusable water bottles is being encouraged by rising awareness of the negative environmental effects of non-disposable and single-use plastic bottles as well as a major rise in the amount of plastic garbage in seas and landfills.

Also, governments around the world are taking steps to discourage the use of single-use plastic water bottles and encourage the use of reusable bottles made of glass, metal, and other environmentally benign and secure materials.

## Market Concentration & Characteristics

The global reusable water bottle market is highly fragmented and is characterized by the presence of a few established players, including Tupperware Brands Corporation, SIGG Switzerland AG, and CamelBak Products, LLC, in addition to several small and medium companies such as S'well, Hydro Flask, Nalgene, Klean Kanteen, Contigo, Aquasana Inc., and Hydaway. This change from plastic water bottles to reusable water bottles happened mainly because of three main reasons, there was a degree of innovation, governments and regulatory organizations made strict rules to ban plastic water bottles, and there were product substitutes, where companies proposed better alternatives taking advantage of this environmental change.



A majority of the new companies in the market are focusing on establishing a portfolio of stainless-steel bottles as they are naturally BPA-free and an excellent alternative to single-use plastics, to remain compliant with the stringent regulatory frameworks in the market.

## Collaborating with Santa Clara University



We propose a healthcare initiative where we would distribute the smart water bottles to SCU students, faculty and staff to create a positive societal impact right here from Santa Clara University. With the right finances and stakeholders, we could start distribution with the Santa Clara Athletes and to create content for our marketing team. Later we could spread distribution to SCU on-campus stay and library as well.

## Collaboration with well established company like Stanley cups



We propose an alliance with Stanley cups, which is the most popular water bottle in the US. The survey found that residents of 19 states (38%) searched for Stanley Tumblers more than other brands. Stanley has benefited from garnering the attention of influencers on Instagram and TikTok, many of whom are Gen Z and Millennial moms, who praise the tumblers for their durability, many color options, and tapered design that allows them to fit into cupholders. If that weren't enough, the tumbler also went viral for surviving a car fire and keeping the contents cold. According to Stackline, its mugs and tumblers category saw a 926% increase in sales in 2022 and 2023 alone, with market share on Amazon skyrocketing to 15.89% from 2.13%, just shy of market leader Yeti's 16%. Therefore we propose an alliance as big established companies like Stanley cups lack innovation and we have a low market cap established smart water bottle. Therefore an alliance would benefit both the organizations as they would get exposure to innovation and we would get access to their customer database, public relations and marketing landscape. Collaborating with a well established company is our primary aim to Target Marketing out of the many marketing strategies.

# Risk Manager and Quality Assurance Lead

## A. Identification of Risks

### **Technical Risks:**

- a. Possible issues arising from the compatibility of hardware components and software modules may lead to integration complexities and system malfunctions.
- b. Firmware glitches or inconsistencies could impact sensor accuracy, potentially compromising the reliability of water level measurements.
- c. Challenges in integrating the system with the middleware RESTful API server may result in communication errors or data transmission issues.

### **Operational Risks:**

- a. Delays in procuring hardware components may disrupt the project timeline, causing schedule overruns.
- b. Insufficient testing might overlook flaws or vulnerabilities in the system, affecting its performance and reliability.
- c. Unclear project requirements could lead to misunderstandings among team members, resulting in delays and rework.

### **External Risks:**

- a. Unanticipated changes in regulations or standards may necessitate modifications to the project, incurring additional costs and delays.
- b. Reliance on third-party services for database storage or web hosting exposes the project to risks such as service disruptions or data breaches.
- c. External factors like natural disasters or supply chain disruptions may affect resource availability, impacting project delivery.



## **B. Assessment and Analysis**

### **Prioritization:**

- Risks are prioritized based on their likelihood and potential impact on critical project objectives.

### **Risk Exposure:**

- Evaluate the potential consequences of each risk on project outcomes and stakeholders' interests.

### **Risk Dependencies:**

- Analyze how risks interact with each other to mitigate their combined effect effectively.

## **C. Mitigation Strategies**

### **Technical Risks:**

- a. Rigorous compatibility testing should be conducted to identify and resolve conflicts between hardware components and software modules.
- b. Establish stringent firmware validation processes to detect and rectify bugs affecting sensor accuracy.
- c. Maintain effective communication with middleware server developers to promptly address integration challenges.

### **Operational Risks:**

- a. Proactive supply chain management helps mitigate delays by engaging with reliable suppliers.
- b. Strengthen testing protocols to ensure thorough validation and identification of potential flaws.
- c. Foster continuous refinement of project requirements to address ambiguities or changes promptly.

### **External Risks:**

- a. Stay informed about regulatory changes to proactively adapt project plans and ensure compliance.
- b. Identify alternative service providers or contingency plans to mitigate disruptions associated with third-party dependencies.

c. Develop contingency plans to mitigate the impact of external disruptions by identifying alternative resources or work arrangements.

#### D. **Monitoring and Control**

##### **Establish Key Risk Indicators (KRIs):**

- Define measurable parameters to monitor the status and severity of identified risks throughout the project lifecycle.

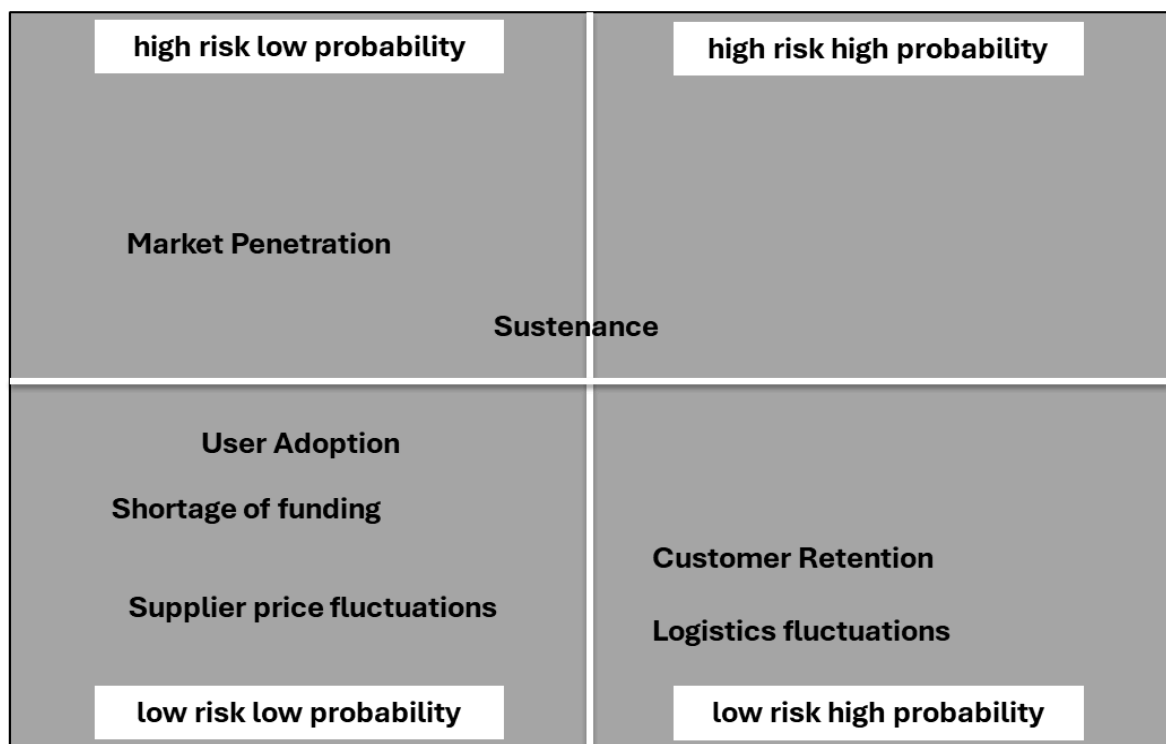
##### **Conduct regular risk reviews:**

- Periodic reviews reassess identified risks, evaluate mitigation strategies, and update risk registers accordingly.

##### **Implement proactive risk management measures:**

- Identify emerging risks and implement preventive or corrective actions to address them before they escalate into significant issues.

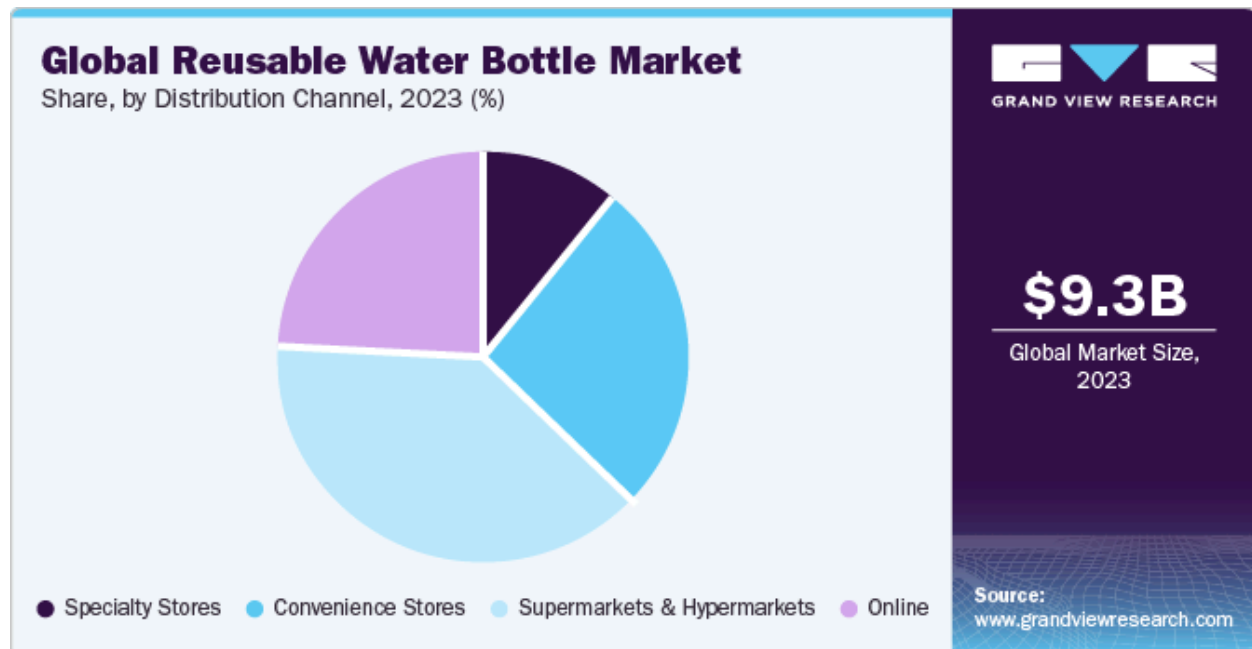
#### **The Project Risk Profile:**



*Figure 3: Quadrant analysis of Risk for Water Wise proposal*

## Distribution Channel Insights

The supermarkets and hypermarkets dominated the market with a revenue share of 38.5% in 2023. The rising popularity of this channel for shopping among consumers owing to a large variety of product availability under one roof and influential layout motivates consumers to purchase products from these stores.



*Figure 4: Describes the Global Reusable Water Bottle Market*

The online distribution channel of the reusable water bottle market is estimated to expand with a CAGR of 5.1% over the forecast period of 2023 - 2030. Increased e-commerce and smart device adoption, together with simple payment methods and promotional offers, are driving this market's expansion. Several producers use this route of distribution due to the simplicity of selling reusable bottles through custom logo printing. Manufacturers are offering their products through online channels due to consumers' growing demand for online purchasing in order to access a larger consumer base. We propose to start distribution in supermarkets such as Walmart, Costco and online marketplaces such as Amazon as they are the dominating distribution channels right now.

## Key Companies & Market Share Insights

The market is characterized by the presence of a few established players and new entrants. Many big players are increasing their focus on the growing trend of reusable water bottles. Players in the market are diversifying their service offerings in order to maintain market share.

- In February 2021, Hydaway launched a new version of its collapsible bottle that fits in the pocket. It is available in two sizes, 25 ounces and 17 ounces, and features a standard cap lid and a useful spout lid. The bottle is made from BPA-free plastic and silicone.
- In August 2020, Nalgene launched a new line of reusable water bottles under the brand name Nalgene Sustain. The water bottles are made of 50% recycled content and waste plastic.

Some of the prominent players in the global reusable water bottle market include:

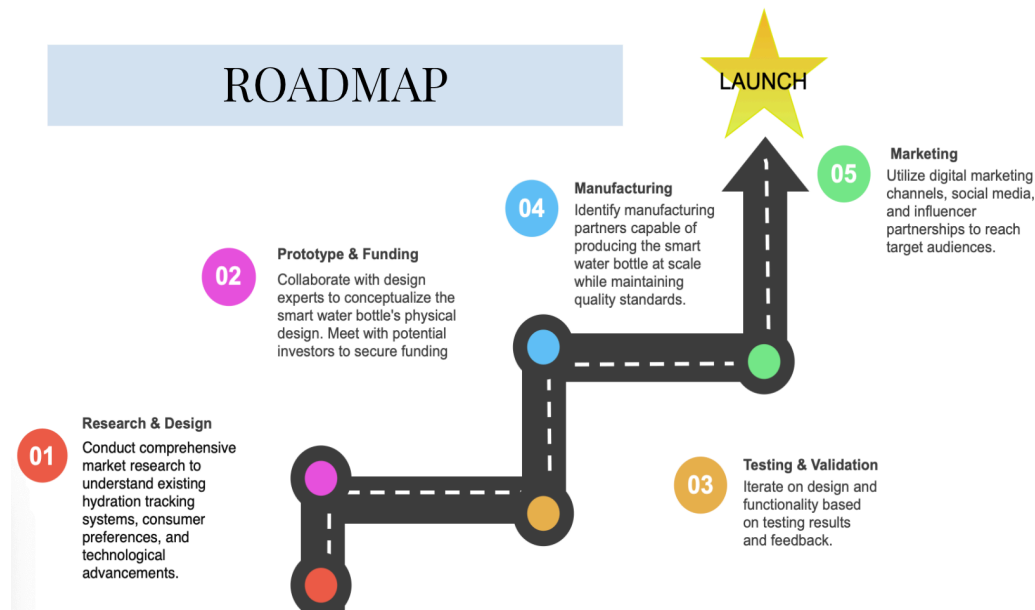
- Tupperware Brands Corporation
- SIGG Switzerland AG, GmbH
- CamelBak Products, LLC
- Klean Kanteen
- Contigo
- Aquasana Inc.
- Hydaway
- Nalgene
- S'well

### Reusable Water Bottle Market Report Scope

Report Attribute	Details
Market size value in 2023	USD 9.28 billion
Revenue forecast in 2030	USD 12.60 billion
Growth Rate	CAGR of 4.4% from 2024 to 2030
Base year for estimation	2023
Histoirical data	2018 - 2022
Forecast period	2024 - 2030
Report updated	January 2024
Quantitative units	Revenue in USD billion and CAGR from 2024 to 2030
Report coverage	Revenue forecast, company ranking, competitive landscape, growth factors, and trends
Segments covered	Material type, distribution channel, region
Regional scope	North America, Europe, Asia Pacific, Central & South America, Middle East & Africa
Country scope	U.S., Canada, Mexico, Germany, U.K., France, Italy, Spain, Benelux, China, India, Japan, South Korea, Australia & New Zealand, Southeast Asia, Brazil, Argentina, Saudi Arabia, South Africa, UAE
Key companies profiled	Tupperware Brands Corporation; SIGG Switzerland AG, GmbH; CamelBak Products, LLC; Klean Kanteen; Contigo; Aquasana Inc.; Hydaway ; Nalgene; S'well

*Figure 5: Budget allocation and break down*

# Implementation Planner



*Figure 6: Roadmap to our Product proposal*

The roadmap depicted in the image outlines a strategic plan for bringing a smart water bottle to market. It details a sequence of key phases, each essential for the successful development, production, and launch of the product. Below is an elaboration of each phase:

- **Research & Design (Phase 1)**

- **Objective:** Establish a solid foundation of knowledge about the market and technology.
- **Activities:** This involves conducting extensive research on existing hydration tracking systems to identify gaps and opportunities. The design phase will focus on aligning the product with consumer preferences, considering both functionality and aesthetics, while also incorporating the latest advancements in technology to ensure the product is innovative and competitive.

- **Prototype & Funding (Phase 2)**

- **Objective:** Create a tangible representation of the product and secure financial backing.
- **Activities:** Collaboration with design experts will result in a prototype that embodies the vision for the smart water bottle. This prototype will serve as a

crucial tool for demonstrations to potential investors. The goal is to illustrate the viability and potential of the product in order to secure the necessary funding for further development and scaling.

- **Testing & Validation (Phase 3)**

- **Objective:** Refine the product through iterative development and user feedback.
- **Activities:** This phase is about continuous improvement. The smart water bottle will undergo rigorous testing to ensure it meets both functional expectations and quality standards. Feedback from these tests, which may include user trials, will inform adjustments to the design and features, leading to a well-validated product that is ready for mass production.

- **Manufacturing (Phase 4)**

- **Objective:** Establish the means for large-scale production while upholding quality.
- **Activities:** Identifying and partnering with manufacturing companies that have the capability to produce the smart water bottle efficiently and to the high-quality standards set during the design and testing phases. This step is critical for scaling up production without compromising on the quality that has been promised to potential customers and stakeholders.

- **Marketing (Phase 5)**

- **Objective:** Build brand awareness and market anticipation for the product.
- **Activities:** This phase involves the strategic use of digital marketing channels to create buzz around the product. Social media campaigns, influencer partnerships, and perhaps targeted advertising will be used to reach the identified target audience, build interest, and drive demand.

- **Launch (Final Step)**

- **Objective:** Successfully introduce the product to the market.
- **Outcome:** This is the culmination of all prior efforts, where the smart water bottle is officially made available for purchase. The launch is a critical moment that capitalizes on the marketing efforts and aims to convert interest into sales. Success at this stage is measured by market reception, initial sales figures, and the ability to meet the demand created by the marketing efforts.

# Schedule

The project schedule table represents a strategic plan for the development, production, and introduction of the smart water bottle into the market. The schedule is divided into key phases, each with designated tasks that align with specific time frames. The purpose of this image is to provide a formal overview of the project's timeline from conception to market deployment.

	Week 1 - 2	Week 3 - 4	Week 5-6
<b>March 11 - April 10:</b> Research and Development Phase	Market research and user needs analysis.	Define project requirements and objectives.	Finalize smart water bottle design and features.
<b>April 11 - May 15:</b> Prototype Development	Develop and test weight detection tool.	Create mock-ups and prototypes for user feedback.	Integrate weight detection tool with smart water bottle design.
<b>May 16 - June 20:</b> Technology Integration	Develop and test accompanying web application.	Integrate smart water bottle with web application.	Implement personalized hydration features.
<b>June 21 - July 25:</b> Testing and Validation	Conduct rigorous testing of smart water bottle and web application.	Gather feedback from beta testers and potential users.	Iterate on design and functionality based on feedback.
<b>July 26 - September 5:</b> Manufacturing and Production	Finalize manufacturing processes and production planning.	Select and onboard suppliers for raw materials.	Commence mass production and assembly.
<b>September 6 - October 10:</b> Launch and Marketing	Develop marketing strategy and materials.	Execute marketing campaigns to generate awareness.	Host launch event to unveil the product.
<b>October 11 - November 14:</b> Deployment and Distribution	Rollout smart water bottle and web application to market.	Distribute product through retail partners and online channels.	Provide user training and support resources.
<b>November 15 Onwards</b> Customer Adoption and Growth AM	Acquire initial customers and user base.	Monitor key performance indicators (KPIs) and user feedback.	Optimize marketing and product strategies.

*Figure 7: Schedule for Project Ideation to launch*