

Bella Amezcua  
Mia Joseph  
Nick Calvo

## **DMI Capstone Research Project**

### **Problem Statement**

Students and staff face inconveniences due to overflowing trash cans and unhygienic conditions on campus. Our goal is to provide a convenient and cleaner alternative for waste management by implementing a mobile waste robot.

### **Market Analysis**

Our target market includes the diverse population of Texas State University. As of 2023, the campus population is estimated at 38,000 students and around 5,000 faculty and staff. The student body represents varying environmental awareness levels. An assessment of waste on campus reveals that an exponential amount of recyclables and general waste is produced each month. Current waste disposal involves traditional waste bins throughout campus, but there is room for improvement. Due to inconvenience and limited availability of recycling bins, a significant amount of recyclable materials ends up in general waste bins. Students and faculty will appreciate the demand for a more efficient and user-friendly waste management system.

Texas State University has a tech-savvy population, in the age of smartphones, nearly all students and staff own a device that uses mobile apps. The readiness to engage with technology favors the adoption of our trash and recycling robots. The campus administration's support will be secured due to interest in a sustainable solution that is cost effective. User's will appreciate the convenience and opportunities our solution provides, as well as offer a new way for Texas

State's population to protect the environment. This market analysis establishes the potential of our project and caters to the specific needs of Texas State University's campus community.

## **Financial Projections**

Our project will be initially funded through a combination of grants and an investment obtained from an environmentally-focused venture capital firm. This initial capital will be allocated primarily towards the production and deployment of the first set of robots. Ongoing capital for maintenance and repairs will be sourced from the revenue generated by these initial operations. Sponsorships and advertising will also be another source of income.

Environmentally-conscious brands and local businesses can collaborate with us. Our financial projections are a reflection of the in-depth analysis we conducted on the campus community of Texas State University. By the end of the first year of obtaining Texas State, we aim to provide our robots as a service for a minimum of 50 campus events, generating an estimated revenue of \$300,000. As well, we would introduce data and analytic services to the university. The robots would have multiple sensors and cameras collecting various information such as waste product, peak times, travel distance, time to arrive, etc. We estimate that by the end of year 2, we will have generated \$200,00 in revenue for the data and analytics. To ensure the continuous operation of our robots, we will charge the university for regular maintenance, servicing, and repairs. In the first year, we aim to secure maintenance contracts worth \$150,000, which will grow as the fleet of robots does. We have identified key risks associated with our financial plan, such as failing to find a robotics manufacturer with flexible production terms and Texas State University not wanting to use the robots at events. One crucial part to the plan is our commitment to diversifying our revenue streams. We plan to maintain open lines of communication with the

university partners to ensure their satisfaction with our services, reducing the risk of contract termination.

## **Diversity and Global Implications**

Our project and research acknowledges and includes the diverse nature of Texas State University. With a student population that is composed of individuals from various cultural, socioeconomic, and environmental backgrounds, we recognize the importance of tailoring our app and waste management services to meet needs of the diverse population. For instance, our mobile waste robots will be designed to be localized to a student's native language, full user-friendly controls for ease, and inclusive features for accessibility purposes. After a few months (3-5) of the robots being on campus, we plan to conduct research campaigns and surveys from the students and faculty, regardless if they use our services, to gather feedback and insights from different demographics. We want our product to be innovative and have an impact, but not at the cost of annoyance or usefulness. By having a data group that consists of non-customers, we can see what they want and think about us and our services. This proactive approach will enable us to continually adapt our services to the evolving needs and preferences of the diverse campus population. Furthermore, we view this project as a model of sustainability that goes above and beyond. Waste management is a global concern, and our approach to addressing this at Texas State University is just the start. As we look to the future, we envision the potential to expand our project beyond Texas State University and offer our services to a broader global audience. In addressing the global implications of waste management, we recognize that our approach must adapt to local regulations, recycling practices, and environmental concerns.

## **Competition**

While no direct competitors currently offer trash and recycling robots on college campuses, there are existing waste management services implemented by the college. The traditional services lack the automation and convenience our robots provide. The current waste management service has a long-established presence on campus and a well-defined process, but it limits innovation and computerization in waste collection. Campus community acknowledges the waste bins provided on campus, but our waste robots will attract attention and attain excitement to use our product. The waste robot is flexible in adapting to campus needs and offers an advanced solution with the click of a button. It is crucial to position our solution as innovative and a fresh approach to address the weaknesses of our existing competitor and be prepared for future competition in the market.

## **Market Strategies**

We must first comprehend the needs, preferences, and pain points of our target audience, which includes students, teachers, and staff, in order to effectively manage trash on campus. While also researching trash management strategies already in place on campus and in the neighborhood. locating areas of weakness and potential for development. Our research will help us improve the app-based waste robot so that it will better suit the demands and tastes of our target market. In terms of branding and positioning, we create a powerful brand identity that places an emphasis on convenience, cleanliness, and sustainability. Allowing our branding to communicate dependability and effectiveness.

First, we'd develop and keep active profiles on well-known social media sites to interact with our audience and share educational content. This is what we mean by our marketing channels. In order to spread awareness of our solution among a larger audience, we would then

work together with student government, clubs, and organizations on campus. Thirdly, we can correspond with users on a regular basis about new features, special offers, and sustainability accomplishments by using email marketing and online advertising. We can also use targeted online advertisements to connect with prospective customers on websites like Google Ads and social media. Last but not least, we may show off our software and interact with the college community in person at events, fairs, and expos held on campus.

With regard to content marketing, we can start by producing blog entries, infographics, and videos that inform our audience about the issues brought on by overflowing trash cans and the advantages of our app-based waste robot. Second, we'd create interesting videos that showed viewers how to use the app and highlighted its benefits. In order to build trust, we'd also publish user success stories and recommendations.

## **Potential Solutions**

Two solutions have been proposed; the first is the app-based waste robot. which would create and put into use an app-based garbage robot that would automatically gather and get rid of rubbish in busy areas on campus. The robot's design and construction would require engineering and programming knowledge as resources. funding for the project's hardware and software components as well as disposal relationships with regional trash management firms. We would advertise the software as a cutting-edge, practical, and effective tool for students and staff in order to make the target audience connection. Emphasize the time that the software can save students and staff, making their lives easier. Finally, stress the advantages for the environment, which are consistent with the campus community's values of sustainability.

Waste Management Education Campaign would be our second proposal. We would start a comprehensive effort to educate workers and students about waste management. Workshops,

seminars, and instructional materials are all part of this program. For workshops and seminars, we would have expert speakers or trainers. Resources for printing and designing educational materials. Then there would be places to hold events.

### Works Cited

Texas State University. (2023, February 16). *Texas State Profile*. Institutional Effectiveness : Texas State University.

<https://www.avpie.txst.edu/texas-state-profile.html>

Texas State University. (n.d.). *Waste management and recycling*.

<https://www.facilities.txst.edu/grounds/recycling.html>