BUS 101: Core Course in Business

Final Group Project

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R8T2

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Part A: Application of Tools and Concepts

1.1. Problem and Opportunity

Overflowing trash bins in residential areas have become a pressing issue in Kazakhstan's urban waste management. This problem is particularly problematic for three key reasons.

The first and most obvious reason is that overflowing bins detract from the appearance of streets and nearby buildings. When waste spills onto the pavement, it creates a mess that not only disrupts the area's organization but also contributes to an unpleasant environment, diminishing its overall aesthetic appeal.

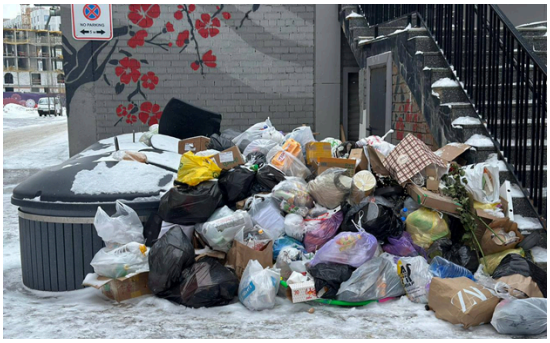


Figure 1. Overflowing trash bins in Astana. (KazTAG, 2024).

Moreover, overfilled trash bins also pose serious environmental risks. As waste spills into surrounding areas, it contaminates the soil and air. Decomposing organic waste releases harmful gases like methane and ammonia, while plastics and heavy metals can leach toxic chemicals into the soil, jeopardizing plant health and polluting the environment.

Finally, overflowing bins attract rodents by providing a food source, leading to infestations of rats and mice. These pests not only pose health risks by spreading diseases but can also damage property.

While intuitively, adding more trash bins may seem like a straightforward solution, it is not a sustainable one. Simply increasing the number of bins does not address the root cause of overflow and can lead to higher costs, inefficient resource use, and further strain on waste management systems.

1.2. Solution to the Problem

Recognizing the urgency of addressing this issue, we have chosen to focus our business venture on developing innovative solutions to improve waste management and create cleaner, more sustainable urban spaces.

Our *for-profit* solution combines smart trash bins with sensors to monitor waste levels and software to optimize collection routes. The bins send real-time data to the software, alerting trash collectors promptly. We also offer repair services to ensure functionality. By enhancing waste management efficiency, our product helps create cleaner streets, optimize resources, and promote sustainable urban living.

2.1. Analysis Prior to Business Strategy

To create a strategy aligned with the company's long-term profitability, we employed two foundational analytical frameworks: PESTEL and Porter's Five Forces (see Figures 2-3). The insights derived from these analyses were synthesized into a comprehensive SWOT analysis (see Figure 4). This preliminary evaluation enabled us to pinpoint key growth opportunities and address critical challenges.

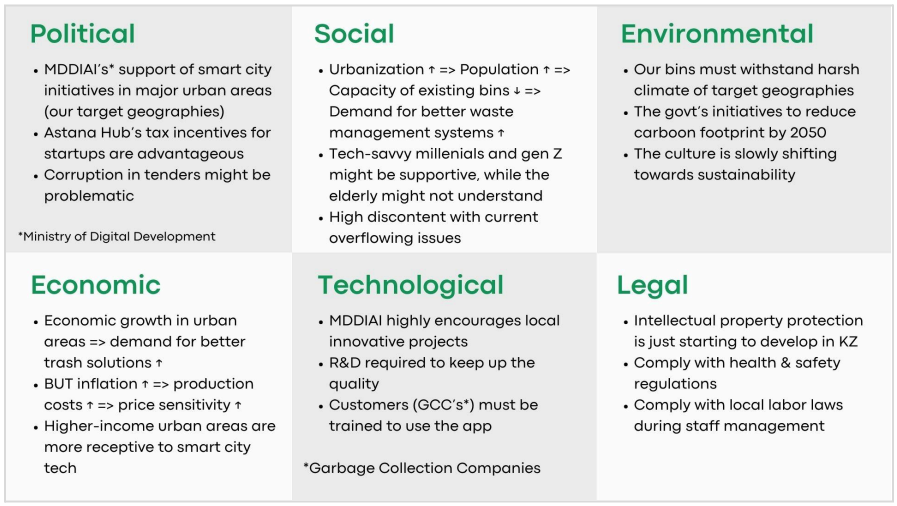


Figure 2. PESTEL analysis. (R8T2 SA3, 2024).

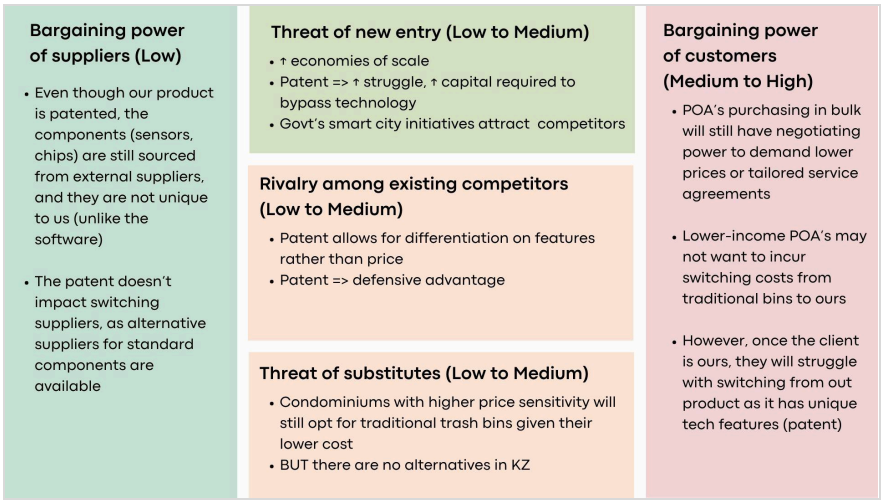


Figure 3. Porter's Five Forces analysis. (R8T2 SA3, 2024).

Figure 4. SWOT analysis. (R8T2 SA3, 2024).

2.2.1. Business Strategy Explanation

After thoroughly analyzing the various factors influencing our business environment, we developed a detailed Business Model Canvas to structure and refine our approach (see Figure 5). This framework allowed us to systematically outline the key components of our business, including value propositions, customer segments, revenue streams, cost structures, and strategic partnerships. By integrating insights from our earlier analysis, the Business Model Canvas served as a blueprint to align our operations, maximize profitability, and ensure long-term sustainability.

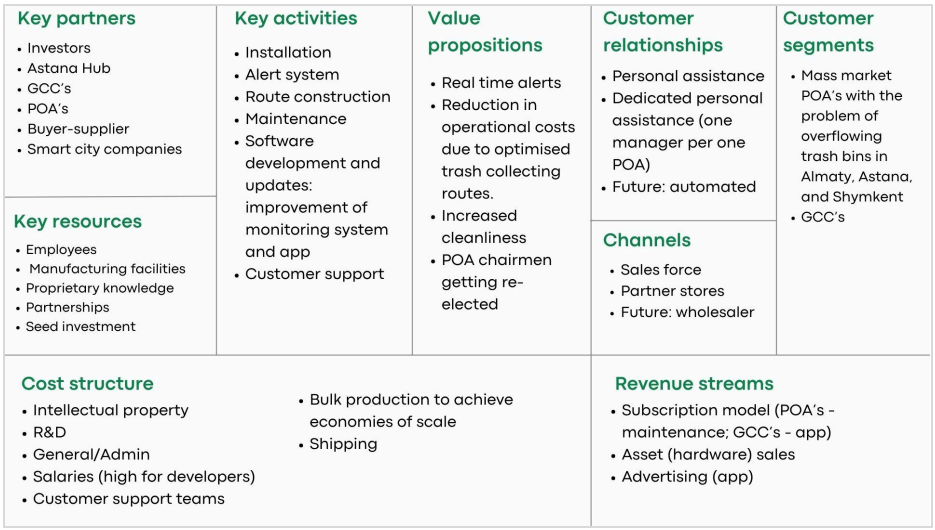


Figure 5. Business Model Canvas. (R8T2 SA3, 2024).

2.2.2. A critical component of our Business Model Canvas is the set of key *activities*, which include the production of innovative smart trash bins, designed with integrated sensors to monitor waste levels.

Following production, our team handles the installation of these bins to ensure proper setup and integration with the waste management system. We also focus on developing and maintaining a robust software alert system that notifies waste collectors in real time when bins are nearing capacity, optimizing collection routes and schedules. To sustain seamless operations, we offer ongoing maintenance services, ensuring that the bins and software remain fully operational.

Finally, our customer support team plays a vital role, addressing inquiries, resolving issues, and fostering strong relationships with clients to ensure satisfaction and trust in our solutions. Together, these activities form the foundation of our value proposition and operational excellence. (Created with assistance from ChatGPT).

2.2.3. To execute our key activities effectively, our business relies on a well-defined set of key *resources*.

A skilled team of employees is essential, encompassing engineers, software developers, maintenance specialists, and customer support professionals to ensure the seamless integration of

technology and service. Given the advanced technical requirements of our product, we may need to outsource talent by inviting experienced IT specialists from abroad to complement our local workforce and drive innovation.

Access to manufacturing facilities is equally critical for producing our smart trash bins, and we are committed to boosting domestic production to support local industries and reduce reliance on imports.

Proprietary knowledge, particularly in sensor technology and software development, serves as a cornerstone of our innovation and competitive edge.

Finally, seed investment plays a foundational role, providing the financial resources needed to develop our product, establish infrastructure, and scale operations effectively. Together, these resources will enable us to deliver a high-quality, sustainable solution to urban waste management challenges.

2.2.4. Key *investors* are integral to our success, including entities such as Astana Hub, where we can apply for startup acceleration programs, gain mentorship, and access funding opportunities.

Private investors and venture capitalists will provide financial backing for scaling operations, while partnerships with garbage collection companies will help refine our route optimization system to meet industry needs.

Property owners' associations (POAs) are critical as potential clients, motivated by the promise of cleaner neighborhoods.

Collaborations with other smart city companies will enable us to share expertise, network, and attract specialized talent.

Lastly, government support is essential, aligning our project with clean city initiatives and potentially securing grants or policy support to promote sustainable urban development.

2.2.5. We divided our *customer segments* using business-to-business (B2B) segmentation based on organizational needs and roles in the waste management ecosystem.

Property owners' associations represent the demand side, seeking solutions for cleaner and more appealing neighborhoods, while garbage collection companies represent the operational side, looking for efficiency and cost savings in waste collection processes.

The former (POAs) manage residential and commercial neighborhoods. They prioritize maintaining clean and attractive environments for residents and visitors, making our smart trash bins an ideal solution to prevent overflow and reduce waste-related complaints. By adopting our system, they can improve the quality of life in their communities and enhance their reputation for effective management.

The latter (GCCs) benefit from our route optimization system. By using real-time data from our smart bins, these companies can plan more efficient collection routes, saving time, fuel, and operational costs. Additionally, our solution helps them address service gaps and improve customer satisfaction, making it a valuable tool in their operations. Both segments share a common goal of better waste management, positioning our solution as a practical and mutually beneficial choice.

If we look at geographic customer segmentation, it makes sense for us to target densely-populated urban areas of Kazakhstan where the identified problem is highly prevalent. We must also look at the purchasing power of residents. According to Zakon.kz (2023), the top three cities with the highest trash production are Astana, Almaty, and Shymkent. Thus, in our first 5 years of operation, we will target those cities instead of starting little in all cities at once. (Created with assistance from ChatGPT).

2.2.6. Our *customer relationships* with POAs and GCCs will initially be built on personalized assistance to ensure their specific needs are met.

For POAs, we will help determine the optimal number of smart trash bins required and provide tailored consultations to enhance waste management in their neighborhoods. Similarly, for GCCs, we will guide them in integrating our route optimization system into their operations. To maintain strong relationships, a dedicated manager will be assigned to oversee the accounts of several POAs or GCCs, ensuring consistent support and addressing any concerns promptly.

As our business grows, we will aim to transition to a more automated system to streamline interactions while maintaining a high level of service quality.

2.2.7. Our *channels* for delivering value to customers will evolve as our business grows. Initially, we will rely on a dedicated sales force to directly approach POAs and GCCs, offering personalized consultations and building strong relationships. Additionally, we will collaborate with partner stores to make our smart trash bins and related services accessible to a wider audience.

To build trust and demonstrate the value of the smart trash bins to our clients, we will focus on:

- Face-to-face meetings with decision-makers,
- Participation in smart city and startup events to increase brand recognition,
- Direct outreach campaigns for investors with tailored presentations and ROI analyses,
- Targeted case studies and testimonials to showcase our product's benefits.

In the future, as demand increases, we plan to expand our reach through wholesalers, enabling bulk distribution and further scaling our operations. This multi-channel approach ensures both personalized service and broader market penetration.

2.2.8. Our *value proposition* centers on delivering real-time alerts for overflowing bins, enabling faster response times and reducing waste-related complaints.

For GCCs, we offer significant cost savings through optimized collection routes (see Figure 7), while POAs benefit from cleaner neighborhoods and enhanced resident satisfaction (see Figure 6).

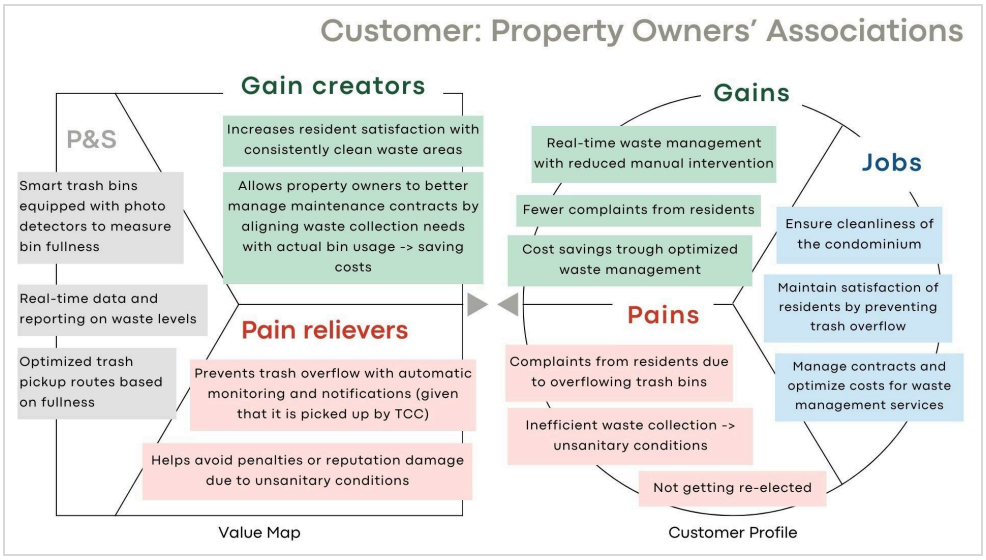


Figure 6. Value Proposition Canvas for POAs. (R8T2 SA2, 2024).

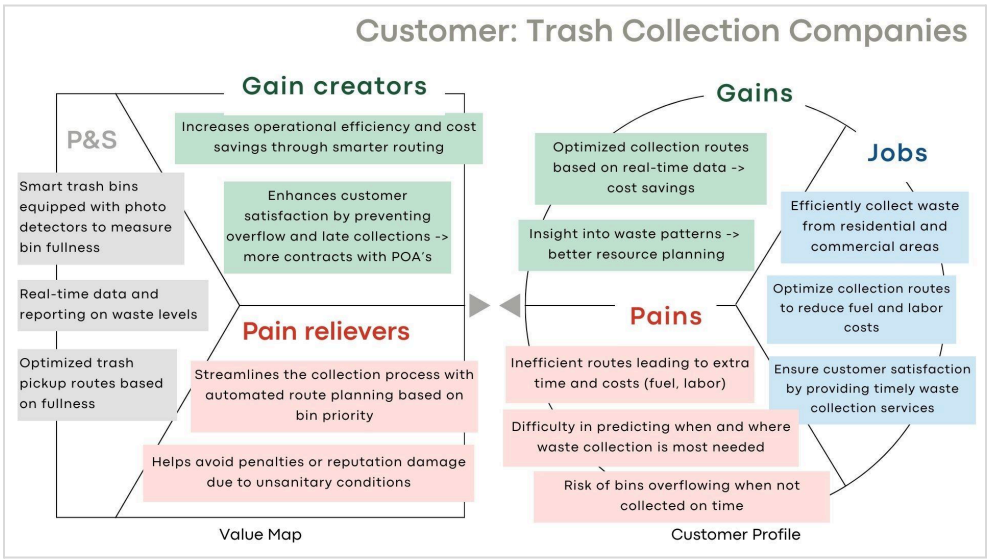


Figure 7. Value Proposition Canvas for GCCs. (R8T2 SA2, 2024).

Politically, our solution provides added value: POA chairmen can secure re-election by demonstrating effective waste management, and city officials gain public recognition for addressing a long-standing urban challenge.

2.2.9. We designed our *revenue structure* in a way to ensure a sustainable and diversified income stream.

The primary source will come from selling our smart trash bins as hardware to property owners' associations and garbage collection companies.

Additionally, we will implement a subscription-based model for access to our software, which powers real-time alerts and route optimization.

A smaller portion of our revenue will be generated through advertising opportunities, both within the app and on the physical bins themselves, providing value to local businesses and sponsors while enhancing our profitability.

2.2.10. Our *cost structure* encompasses several key components essential to our operations.

A significant expense is the development and maintenance of our intellectual property, particularly the software that powers our smart trash bins.

We also allocate substantial resources to R&D to enhance our technology and maintain a competitive edge.

Other major costs include general administrative expenses, competitive salaries to attract and retain top talent, and shipping costs to deliver our products to customers.

Looking ahead, as we scale up production, we anticipate achieving increasing returns to scale, reducing per-unit costs through bulk manufacturing and improved operational efficiency.

3. Estimated Market Size in Year 1

City	# of GCCs		# of POAs		Average # of trash bins in condominiums	
	Total	Our share	Total	Our share	Total	Our share
Astana	7	10%	5263	10%	14400	10% = 1440
Almaty	5	10%	27546	10%	19000	10% = 1900

Shymkent	4	10%	4875	10%	20000	10%= 2000
Total	3,240,000 tenge		144,000,000 tenge			

4. Market Share Goals

Year	Expected Market Share (%)			Reasoning
	Astana	Almaty	Shymkent	
1	10	0	0	Since we are a startup, and all the members are located in Astana, we will start from this city. However, of course, the main reason is that Astana is one of the top 3 most densely-populated cities, which allows us to capture enough market share. 10% - because we are a new company and not all POAs will be willing to increase spending on our product.
2	11	10	0	Astana - with an assumed 10% CAGR, it will reach 11% in the next year. Almaty - 10% because we are just entering the market, and given our history from Astana, this amount will be willing to switch to us.
3	12.1	11.1	10	Astana - 10% CAGR gives 12.1%. Almaty - 11% CAGR, more rapid growth because of accumulating product recognition given Astana's context and increasing returns to scale. Shymkent - just entered the market.
4	13.3	12.3	11.2	Astana - 10% CAGR. Almaty - 11% CAGR continues. Shymkent - 12% CAGR, more rapid than Almaty because there is a stronger accumulated reputation effect (not only from Astana but also Almaty).
5	14.6	13.7	12.5	Approaching 5 years, we have already established ourselves in two major cities - Astana and Almaty, and we are growing at the same CAGR in Shymkent.

5. Priorities for Action

# (From most important to least)	Priority	Description	Duration (months)	Responsible parties	Expected outcome
1	Product development	Working on a sustainable and innovative design of the smart bins and app infrastrcture (R&D, testing)	3 (Seibel, 2023)	Product Development department	Minimum Viable Product (MVP)
2	Funding	Reaching out to private investors, government officials, Astana Hub, NURIS, and other potential sources of funding	5	CEO	Venture capital and grants enough to cover operating expenses
3	Distribution channels	Establishing partnerships with logistics companies for the distribution of bins	1	Operations	Signed contracts with local delivery companies
4	Subscription Management System	Developing an IoT solution that manages subscriptions for the smart bins, including payments, renewals, and customer support	3	IT	Subscription service
5	Advertisement partnerships	Finding clients that would like to publish their ads in our app and on the bins	2	Sales	Signed short-term/long-term contracts and subsequent increase in leads of clients

6. Key Assumptions Underpinning the Strategy

6.1. Market Assumptions

- **Demand Stability:** The number of POAs and GCCs in targeted cities will remain stable over time.
- **Solution Effectiveness:** Smart trash bins will effectively address waste overflow and inefficiencies, making them appealing to POAs and GCCs in urban areas.
- **Advertising Potential:** In more densely-populated areas of the city, advertisements on smart bins will attract enough leads for the clients to be satisfied.
- **Adopter Readiness:** There will be sufficient demand for smart trash bins among POAs, GCC to drive sustainable profit.

6.2. Financial Assumptions

- **Pricing Acceptance:** Customers will be willing to adopt the pricing model, which includes:
    - An upfront cost of 100,000 tenge per bin.
    - Monthly subscription fees starting at 9,000 tenge, increasing gradually over five years.
        - They are willing to pay because without intervention, the problem of overflowing bins is going to become more acute. Especially considering the steady population growth and migrants inflow in the selected 3 cities.
- **Cost Efficiency:** Production, logistics, and maintenance costs will remain within budgeted projections, ensuring profitability and scalability.

6.3. Operational Assumptions

- **Efficient Supply Chain:** The supply chain will function smoothly, enabling timely production, distribution, and installation of smart bins across targeted cities.
- **Technology Reliability:** Smart bin sensors and software for waste monitoring and route optimization will operate with minimal maintenance requirements.
- **Effective Partnerships:** Collaboration with local logistics providers will ensure efficient delivery and installation processes in all target areas.

6.4. Regulatory Assumptions

- **Compliance and Permissions:** There will be no issues with regulatory barriers to the installation of smart bins or the use of bins for advertising in public spaces.
- **Flexibility to Adapt:** Changes in local regulations will not impose significant operational or financial constraints on the business.

6.5. Customer Behavior Assumptions

- **Preference for Smart Solutions:** POAs and GCCs will prefer smart bins over traditional bins due to their advanced features and operational efficiencies and thus, will be willing to incur switching costs.
- **Advertiser Interest:** Advertisers that target lower and mid-end audience will perceive smart bins as an effective way to promote their product, especially in high-traffic areas. Mid-end customers will be more inclined to publish ads in the app, as such campaigns usually require more finance, which lower-end clients will not be able to afford. Advertisers that target higher-end audience will not be interested in our ads services since trash cans are typically not associated with luxury goods.

Part B: Summary Financial Projections and Expected Returns to Investors

1. **Price**

To determine the final price of our product, we carefully analyzed multiple factors, including the cost of manufacturing smart bins,the monetary value needed to support the development and sustainability of our enterprise and cost of existing traditional trash bins .

Type of expenses	Expenses in tenge
Materials	30000
Logistics	15000
Technical expenses	104
Packaging	2000

Manufacturing overhead	500
Software maintenance	8000
Materials for banners	7000
Total cost	62604

We found that the cost of traditional trash bin is 50 000 tenge in Kazakhstan, so we decided that the initial price of our smart trash bin will be 100 000 tenge + 10 000 tenge for annual subscription because it is affordable for our target market and such price will contribute to sustainable development of our company and big potential revenues.

2. **Sales**

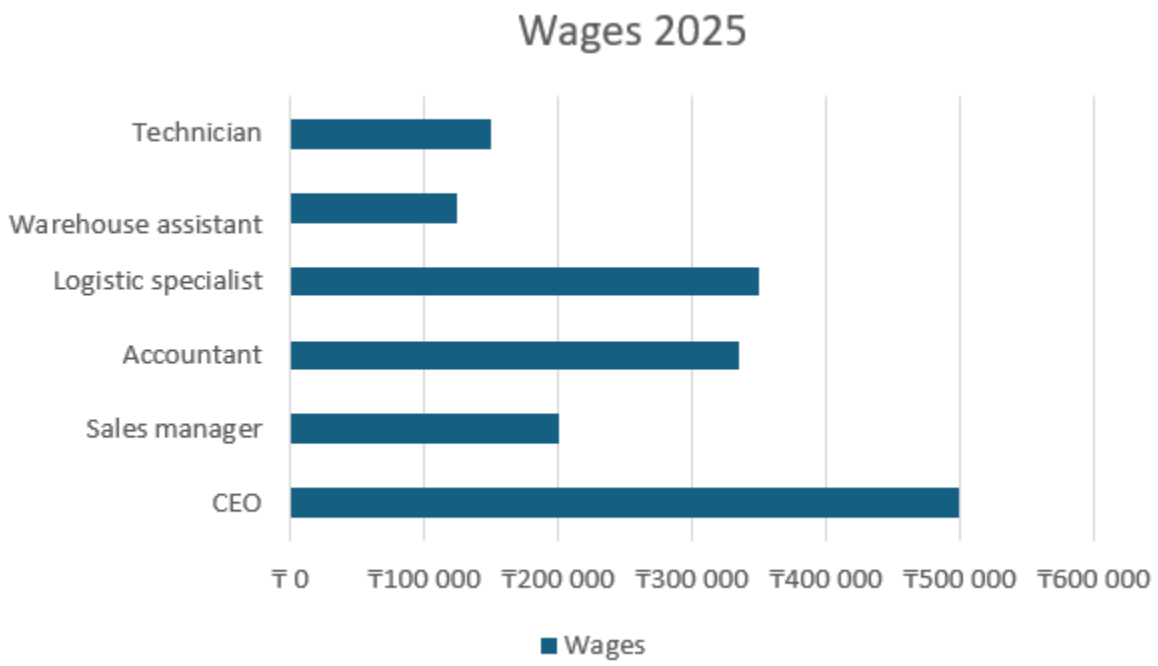
We assumed that the total number of sales of smart trash bins every year will exceed 1400 units because there is an existing problem of overflowing trash bins in Almaty,Astana and Shymkent. However, we assume that the number of subscriptions sold will be significantly lower than the number of trash bins sold because people in Kazakhstan are not accustomed to pay for subscription for trash bins and we assume that not many businesses will be eager to place their advertisement on our trash bins because such advertisement methods are not developed in Kazakhstan. Despite this, we predict that the total number of smart trash bins , subscriptions and advertising sold will grow annually because of the factors of population growth in Astana, Almaty and Shymkent and rapid urbanization.

3. **Initial investment**

We assume to have initial investment of 138 mln tenge partly as a grant from government and partly as a credit loan from a bank. We assume that we need 138 mln tenge to start a business because our strategy is based on rapid growth and development of our enterprise

4. **Expenses**

We assume that operating expenses will grow annually due to the fact that our company is going to expand swiftly, hence as a company grows we assume to have more employees ,higher renting expenditures, etc. We suppose that there will be an inflation rate of 10% in Kazakhstan for the next 5 years and that is why we assume that the cost of the production will increase by 10 percent annually,similarly due to inflation we will increase salaries of our employees by 25% annually so they do not suffer from inflation.



5.Revenues

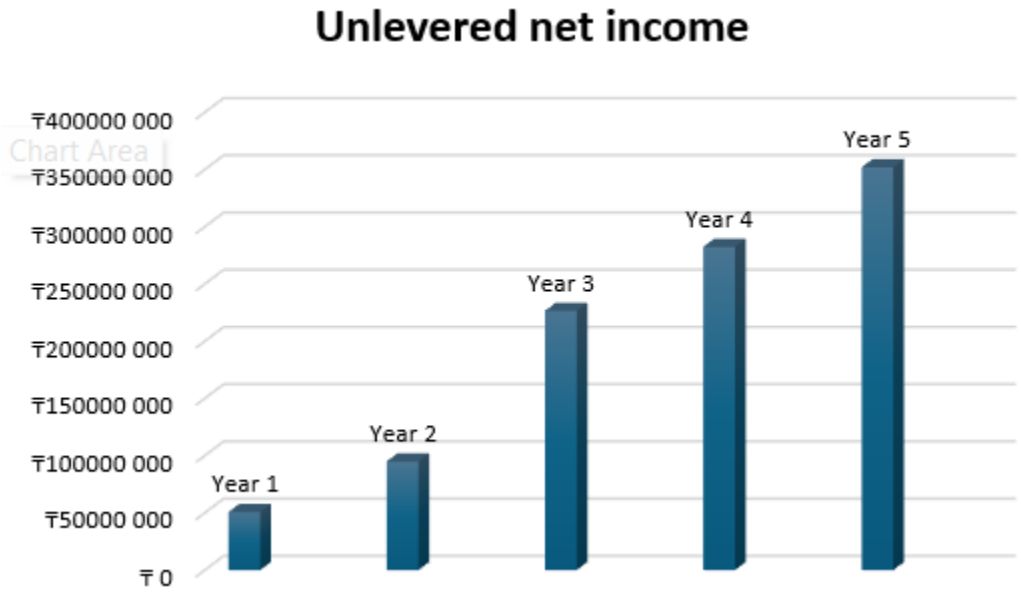
We assume the initial price of smart trash bins,annual subscription and advertising banners to be 100 000 tenge, 9000 tenge and 25000 tenge respectively and we suppose that we will increase the price of these goods by 10 percent annually because of inflation. Because the number of goods sold increases every year,revenues increase as well.

6.Interest rate

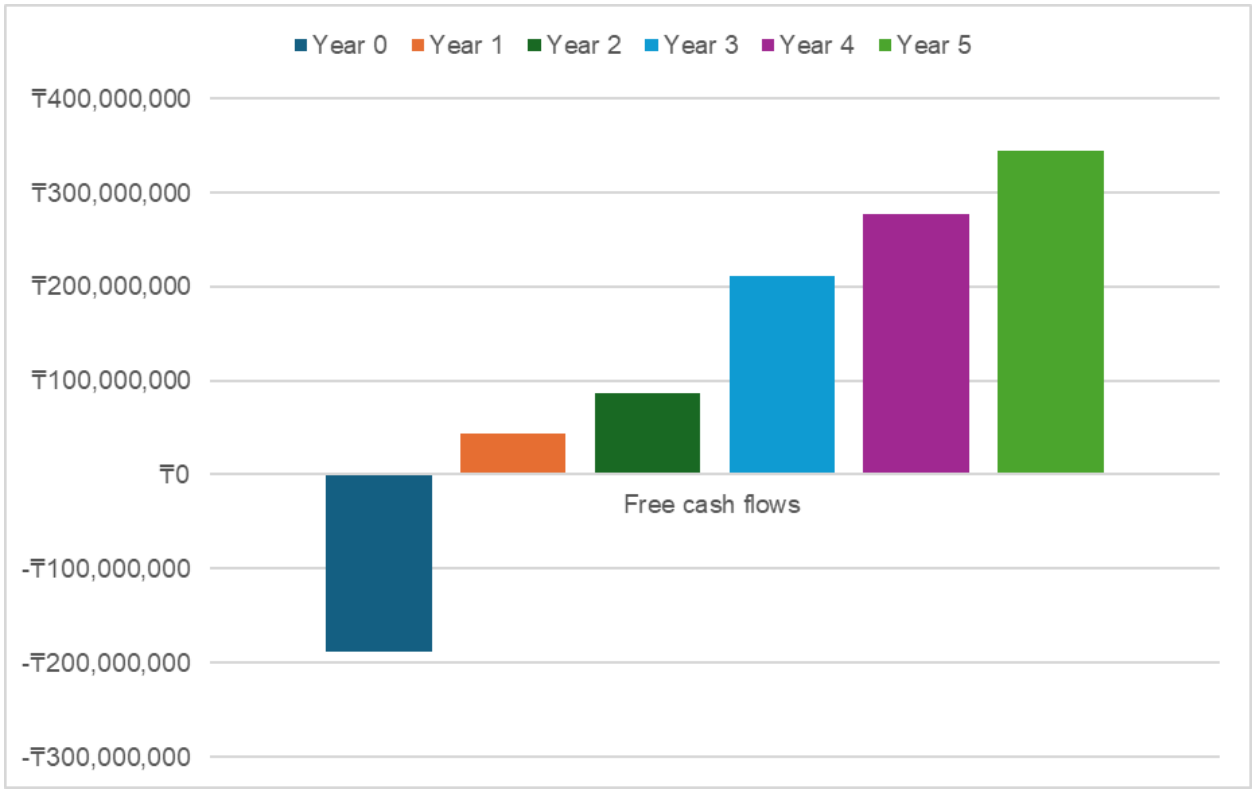
Interest rate decreases annually because we assume that we will pay our debts properly

7.Tax rate

Amount of tax paid annually increases because our revenues increase annually

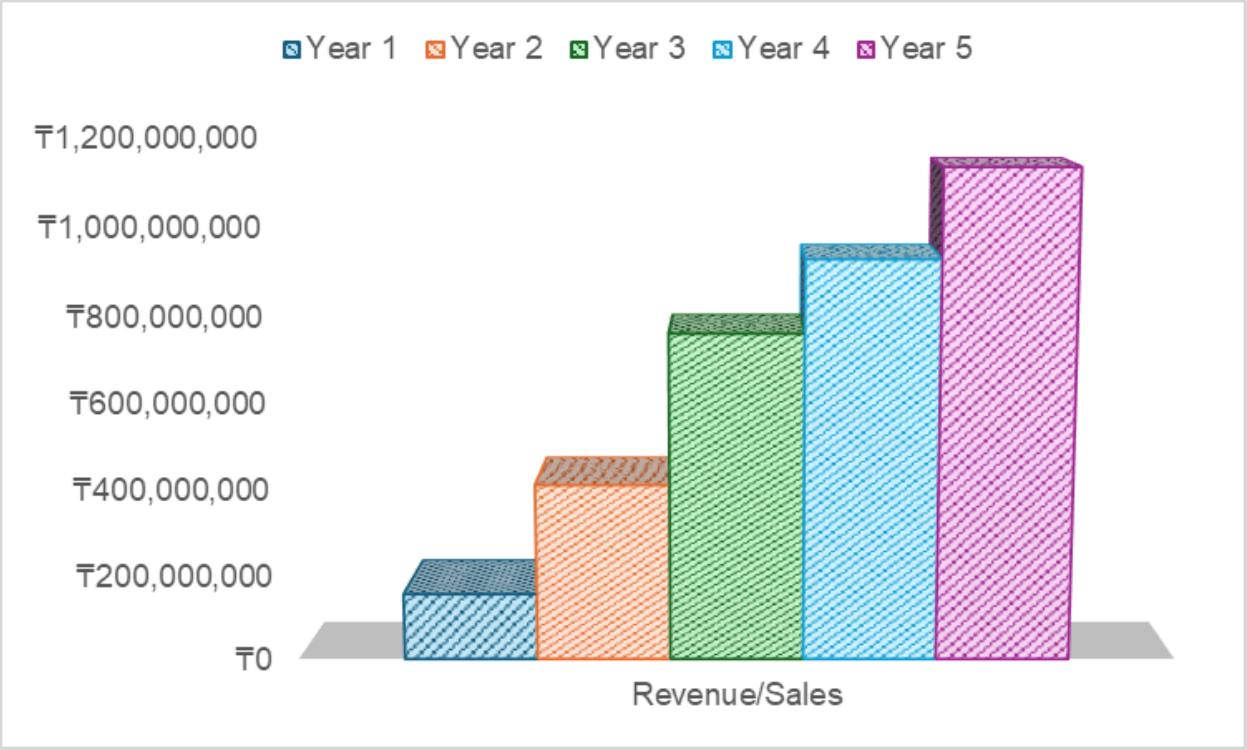


NPV



Graph 1. Free cash flow for the first 5 years

Our company is expected to have increasing cash flows due to the fact that our company will sell a greater number of smart trash bins. This upward trend ensures high profitability of our enterprise.



Graph 2. Revenue and sales

- Our annual revenue is expected to grow annually as we are going to expand to different cities of Kazakhstan. We assume to expand to 3 major cities of Kazakhstan: Astana first, then Almaty, and finally, Shymkent.

The calculated value of NPV over 3 billion tenge and the calculated value of IRR is 248%. An IRR of 248% indicates that the projected cash flows are far exceeding the initial investment, which is a strong sign of profitability. Such IRR is highly attractive to investors. However, we do have to take it with a grain of salt and understand that it is not really realistic. And our payback period is 2.18 years which makes our project especially valuable.

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