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Every bin smart. Every step informed.

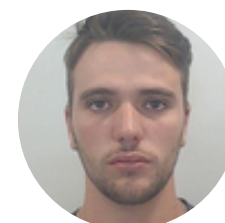
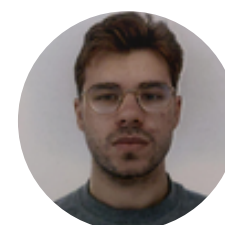
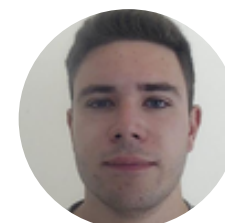
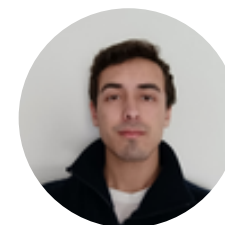
IOT SENSORS FOR REAL TIME WASTE MANAGEMENT OPTIMIZATION



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Team composition

Afonso Andrade	The peace maker The problem solver	Engineering Manager
Carlos Esteves	The executor The peace maker	Project Manager
João Venâncio	The balloon popper The problem finder	CFO
Lucas Afonso	Idea Guy The communicator	CTO
Pedro Gabriel	The executor The problem solver	Technical Lead
Pedro Duarte	The problem solver The communicator	Head of Product





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What do we propose?

Collecting data from dispersed sensors along a building in order to optimize waste collection.

The gathered information is analyzed to find the most efficient waste collection.





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Decision for one opportunity

	Market Potential	Competitive Advantage	Team Experience	Time To Market	Scalability	Score
Waste Management	High (1)	High (1)	Low (0)	High (1)	High (1)	4
Stock Management	High (1)	High (1)	Low (0)	High (1)	Low (0)	3
Agriculture	High (1)	High (1)	High (1)	Low (0)	Low (0)	3



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Key Stakeholders, Needs and Pains

Stakeholder	Operations Manager	Data Analyst	Building Manager	Employee
Type	User	Influencer	Payer	User
Needs	<ul style="list-style-type: none">-Reduce time and resources-More efficient management-Reduce costs	<ul style="list-style-type: none">-Ability to scale the system as the organization grows-Ability to use the information for better functioning of the mall	<ul style="list-style-type: none">-Optimization of waste collection- Bettering environmental impact-Cleaner environment	<ul style="list-style-type: none">-Fair Compensation and Benefits-Work-Life Balance
Pains	<ul style="list-style-type: none">Reliance on data collection and analysis- error-prone	<ul style="list-style-type: none">-Misleading data-External unforeseen events	<ul style="list-style-type: none">-Inical investment-Technical issues-Data management	<ul style="list-style-type: none">-Inadequate Resources or Tools-Lack of Communication



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Business Model Canvas

• Desirability Risk

CUSTOMER RELATIONSHIPS	CUSTOMER SEGMENTS	CHANNELS	VALUE PROPOSITIONS
<ul style="list-style-type: none">• Dedicated onboarding and training for staff;• Technical support and maintenance services;• Data reporting and performance reviews;• Subscription-based or managed service model with account reps	<ul style="list-style-type: none">• Shopping mall facility managers;• Mall property management companies;• Waste management service providers (contracted by malls)• Hospital logistic managers;	<ul style="list-style-type: none">• Direct sales to mall management companies• B2B marketing (trade shows, industry publications, LinkedIn outreach)• Partnerships with waste management firms• Online platform showcasing dashboard demo and ROI	<ul style="list-style-type: none">• Real-time monitoring of bin fullness to prevent overflow;• Optimized bin emptying schedules (save time and reduce labor costs);• Data-driven insights for cleaner, more efficient mall environments;• Environmental benefits via better waste handling



Business Model Canvas

- **Feasibility Risk**

KEY PARTNERSHIPS	KEY ACTIVITIES	KEY RESOURCES
<ul style="list-style-type: none">• IoT hardware manufacturers and resellers (e.g., Mauser, MicroWire, HNX DIY);• Cloud service providers (e.g., AWS, Azure);• Waste management companies;• Shopping mall operators for pilot programs• Installers/integrators (for hardware setup)• Professors at IST	<ul style="list-style-type: none">• Sensor development and deployment;• Algorithm design and updates (AI/ML for prediction);• Customer support and onboarding;• Software maintenance and updates;• Data collection and analysis/reporting	<ul style="list-style-type: none">• Sensor hardware (IoT devices) ;• Software platform (dashboard, analytics, algorithm);• Development and engineering team;• Sales and customer support staff ;• Data infrastructure (servers, cloud platform)



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Hardware used in each bin



Ultrasonic Sensor
3,9€ From MicroWire



ESP32 ESP32C3 w/ Wi-Fi
and battery charging
6,9€ From Mauser



Lithium Battery Shield 5V
3A Micro USB Power
1,87€ From HNX DIY



Estimation of costs (Shopping Mall)

	BEFORE	AFTER
Number of bins	<ul style="list-style-type: none">• 200 WC bins• 100 normal bins• 50 Restaurant bins	<ul style="list-style-type: none">• 100 WC bins• 50 normal bins• 50 Restaurant bins
Minutes per round	$200 * 5 \text{ min} + 150 * 1.5 \text{ min} = 1225 \text{ min}$	$100 * 5 \text{ Min} + 100 * 1.5 = 650 \text{ min}$
Workload	<ul style="list-style-type: none">• $1225/60\text{min} = 21$ employees for high movement days• $1225/120\text{min} = 11$ employees for low movement days	<ul style="list-style-type: none">• 11 workers on busy days• 6 workers on less busy days
Cost	$8.3\text{€}/\text{hour} * 21 \text{ employees} * 13 \text{ hours} * 10 \text{ days (more movement)} + 8.3\text{€}/\text{hour} * 11 \text{ employees} * 13 \text{ hours} * 20 \text{ days (less movement)} = 46397 \text{ €}$	$8.3\text{€}/\text{hour} * 11 \text{ employees} * 13 \text{ hours} * 10 \text{ days (more movement)} + 8.3\text{€}/\text{hour} * 6 \text{ employees} * 13 \text{ hours} * 20 \text{ days (less movement)} = 24817 \text{ €}$ Total cost = $24817 + 5000 = 29817 \text{ €}$



Business Model Canvas

- **Viability Risk**

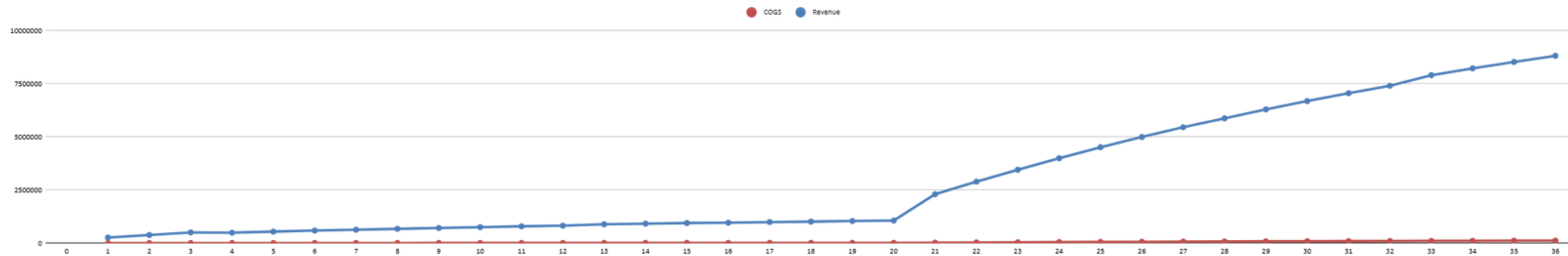
REVENUE STREAMS	COST STRUCTURE
<ul style="list-style-type: none">• Hardware sales (sensors and IoT devices) - 10360 €• Monthly or yearly subscription - 5000€/Month, 55000€/year (first month off)• Maintenance/service contracts (covered by the monthly/annual subscription)	<ul style="list-style-type: none">• R&D for hardware and software - 0€ in the beginning• Salaries (engineering, sales, support) - Only for the current team• Manufacturing and logistics for sensors - 5180 € (sensors + ESP32 + Batteries)• Cloud hosting and infrastructure - 9.07/Month €• Marketing and customer acquisition - 3000€ for the Marketing Team



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MileStones Prediction

M	Milestone	Staff	Mkt/m	Add. Serv.	Add. Capex	Invest
0	Start	1	2000	0	0	50000
3	MVP Ready	1	1000	0	0	0
5	Private Beta Launch	1	1000	0	0	40000
8	Public Beta Launch	1	1000	0	0	0
9	V1.0 Launch	2	1000	0	0	60000
11	1K revenue/month	2	1000	0	0	0
14	100% growth rate/month	3	1000	0	0	0
17	Hire VP marketing	4	1000	0	0	160000
20	10K revenue/month	4	10000	0	0	0
30	50K revenue/month	5	10000	0	0	0
36	3-Year checkpoint	6	10000	0	0	0





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Thank you for your attention!
Any questions? Suggestions?