

Kaunas University of Technology

PR00B251 Product Development Project

EcoSort

Intermediate Report

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EcoSort

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Introduction

In recent years, EU countries have faced many environmental challenges, which the organization hopes to manage better. Among these challenges is managing and sorting construction site waste in a manner that yields maximum benefit. Our team has been tasked with working with one of Europe's largest construction site companies (YIT) to develop smart and sustainable solutions for the sorting process on construction sites as the region aspires to reach the Green Continent goal within the next decade.

After many conversations between the team and a visit to the company's construction site, we came to an initial idea of the project that we will present to be the nucleus of principles for sustainable and smart solutions that combine the use of modern technology represented by a mobile application and an educational course that explains how to sort correctly, in addition to preparing a graphic model of information to facilitate the process and simplify it. We have studied the product in terms of market and business and analysed the economic factors (micro and macro) that affect the production process.

In the first part of the report, we have presented a detailed study of the market, customers, consumers, suppliers, competitors, and the micro and macro economy of the project, in addition to the project concept and its initial idea. In front of each of YIT's environment and sustainability specialists and our mentors' professors, we received encouraging feedback from each of them about the project idea as well as various notes on process improvement.

Then we started working together on correcting some mistakes and then analyzing the financial part of the project, which will be presented in detail in the coming pages. After completing the company's financial analysis, we started with the technological part by creating a prototype for the application by designing an interface for our software, in addition to starting to prepare course content and infographic models.

Aim and objectives.

Aim: Improving Sustainable Waste Management in Construction Using Smart Solutions.

Our waste management company aims to improve the sustainability of waste management practices in the construction industry by leveraging smart solutions. Our goal is to make the construction industry more environmentally friendly by reducing the mixed waste and increasing recycling.

Objectives:

1. **Develop a user-friendly waste management app:** We will create a smart waste management app that is intuitive, easy to use, and provides useful information for managers and workers in the construction industry. The app will enable workers to quickly identify the correct sorting method for waste disposal, increase recycling, and promote sustainable practices.
2. **Provide engaging sustainability courses:** We will develop engaging sustainability courses for construction workers that demonstrate the benefits of sustainable waste management practices. These courses will highlight the impact of waste on the environment and educate workers on how to reduce the mixed waste in the construction industry.
3. **Use clear and concise infographics:** We will create clear and concise infographics to help workers quickly identify the correct sorting method for waste disposal. The infographics will be user-friendly and easy to understand, making it easier for workers to implement sustainable waste management practices.

Team

Table 1. Members of Product development project K228 team

Name Surname	Academic group	Study programme
Ivan Ramirez Triana	SSA-0	Civil Engineering
Tatenda Mawango	IFU-0	Informatics
Simonas Steponavičius	SSA-0	Civil Engineering
Ahmed Elsayed Ibrahim Abouelmagd Ahmed	EELU-1	Electric and Electronics Engineering
Salem Munneer Naseem	SSA-0	Civil Engineering

1. Product idea and preparation

1.1. Product idea

With the situation exposed by the company, and after our visit to the construction site, we as a team identified the main issues of waste management during the construction process. We found specific points to improve and innovative ideas to perform. From this mentioned before, we decided to design and create EcoSort to get a significant change and improvement in this ambit.c



Fig. 1. Logo of our Product

EcoSort is a package that includes a mobile application that helps to find, locate, and manage the waste of a construction site in real time. It also comes with new signs, an info-graphics system, rules for waste management, and an educational program for the site workers about the app and its usage and sustainability in general.

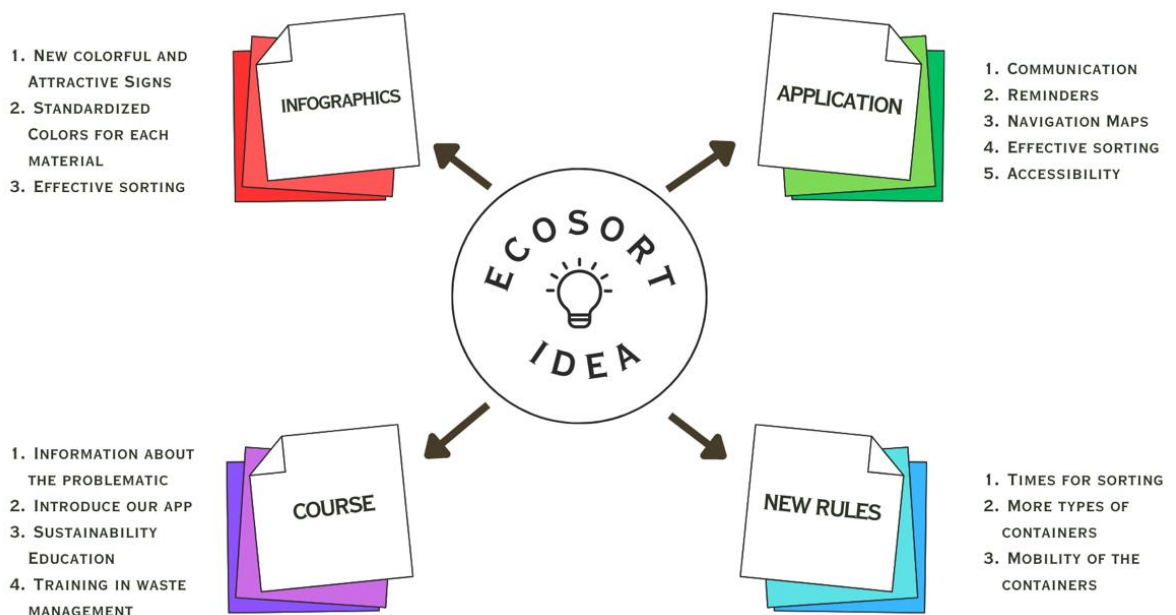


Fig. 2. Concept map of our Product Idea

1.2. Product development method

Our team is a cohesive group of individuals with different backgrounds who share a common goal of delivering successful projects. Ivan Ramirez is the team leader, and he provides guidance and support to ensure that we work effectively towards the objectives. Tatenda and Ahmed play a key role in supporting our team, bringing their own skills and knowledge to help us meet the goals.

Simonas is the Lithuanian expert and the only Lithuanian speaker on our team. His expertise and knowledge of the local culture and language are invaluable when communicating with companies in Lithuania, which is our target country. We use WhatsApp as our primary communication channel, which enables us to stay connected and exchange ideas throughout the day. When we need to hold online meetings, we use Microsoft Teams.

In addition to our communication channels, we follow the design thinking method in all our processes. This approach allows us to focus on the needs of our users and develop tailored solutions that meet their specific requirements. We also find it helpful to have face-to-face meetings in our university library, which provides a conducive environment for brainstorming and ideation.

2. Product development concept

In this section, we performed a micro and macro environment analysis to understand the market and identify internal and external factors that could impact our project. The analysis helped us identify our strengths, weaknesses, opportunities, and threats to develop strategies to overcome challenges and capitalize on opportunities.

2.1. Macro environmental analysis

The aim is to identify macro-environmental factors that influence the demand for the product/service being analyzed, identify key competitors, their strengths, and weaknesses, and assess suppliers.

The task is carried out by answering the questions below in a sequential manner.

Questions for macro-environmental analysis:

1. What macro-environmental factors affect the market for the product being developed and make a direct impact on the product?
 - Changing construction technologies
 - Economic factors
 - Political factors
 - Eurocodes
1. How do the effects of those factors manifest themselves? To what extent can it affect the product being developed and its demand?

Identification of market drivers and assessment of their impact.

Economic environment.

- The economic change trends in the construction waste management market include an increasing focus on sustainability and circular economy principles, which are driving the development of new technologies and processes for waste sorting, recycling, and repurposing. As a result, there is a growing demand for recycled materials and sustainable waste management practices, which is leading to changes in consumption volumes and price levels.
- The increasing demand for recycled materials and sustainable waste management practices is affecting the activities of market participants in several ways. For example, construction companies and waste management firms are investing in new technologies and processes to improve their waste sorting and recycling capabilities, which is helping them meet the growing demand for sustainable waste management solutions. Additionally, there is a trend towards more collaboration and partnerships between market participants, as companies seek to develop more efficient and effective waste management solutions.
- Price levels in the construction waste management market are also being affected by these trends, as the cost of recycled materials and sustainable waste management practices can be higher than traditional waste management approaches. However, as the market continues to mature and demand for sustainable waste management solutions grows, it is expected that prices will become more competitive and cost-effective over time.

Socio-cultural environment

- Growing awareness and concern for environmental issues: As more people become aware of the impact of construction waste on the environment, there may be greater demand for products that help to reduce waste and promote recycling.
- Increasing urbanization and construction activity: As more people move to cities and construction activity increases, the demand for waste management solutions will also increase.
- Aging infrastructure: As infrastructure ages, there may be an increased need for demolition and renovation projects, which can generate significant amounts of waste.
- Changes in regulations and policies: Changes in rules and procedures related to waste management, such as increased recycling mandates, can create new opportunities for our product.
- Shifting demographics: Changes in the demographics of construction workers and contractors, such as an increase in younger, more environmentally conscious workers, may also influence the demand for waste sorting products.

Political-legal environment

The potential political effects on the various industries in the European Union are multiple, as political stability in general represents a basic pillar in supporting the stability of the economy and vital industries such as construction and waste management. The most important influencing factors at the present time may be the following:

- Russia's war on Ukraine: which negatively affected and still is the European Union's policies. Which represents a direct threat to the countries of the European Union, especially the neighboring countries of Ukraine in eastern Europe.
- Changing the political map and decision makers in some countries, which could lead to political imbalances and change the principles of joint action or the management of some important issues such as the energy crisis that affects all industries as well.
- The level of corruption in the country, the tax rate, working hours, and the minimum wage for construction site workers are also influencing factors in waste management.

Legal policies affecting waste management in the European Union:

- European Green Deal

(Striving to be the first climate-neutral continent)

Its aim is to transform the European economy for a sustainable future. The ambition of the European Union to become climate neutral is included in the 2030 and 2050 climate goals. One of our goals is to create and implement a clean circular economy. The Waste Ordinance therefore lays down the rules for waste management.

- EU TAXONOMY

A classification system, establishing a list of environmentally sustainable economic activities. At least 70% of non-hazardous construction and demolition waste generated through construction must be prepared for re-use, recycling, or other material recovery.

Scientific-technological environment

The role of scientific and technical development is very important with the integration of mobile apps and info graphics into construction sites. Integrating mobile apps with features such as worker notifications, real-time communications, navigation maps, and waste disposal assistance can significantly reduce waste. App notifications keep workers updated on waste reduction goals and progress, while the navigation map feature helps workers manage waste more efficiently. The app can also integrate new technologies such as the Internet of Things (IoT) to collect and analyze data from waste management systems. So, scientific and technological developments play an important role in waste reduction efforts in the construction industry, making it essential to stay up-to-date on technological developments for effective waste reduction.

Natural environment

The main resources required for managing construction waste are recognized as land and energy. Nevertheless, because these resources are limited, a future shortage is projected. Reducing the consumption of these resources through waste reuse and recycling and substituting sustainable energy sources for non-green energy are the solutions to this problem. Cheaper resources like recycled aggregates, timber, and plastics will be produced through these technologies. The cost of construction waste management will increase because of increased land and energy prices. The dangers of the market's effect on the environment are also underlined, along with any potential legal repercussions and penalties for breaking sustainability standards. One example of this is the EU Green Deal, this deal shows the trend of the market to sustainability.

2.2. Consumer voice survey

Questions for the design of the consumer voice:

1. What is/are research problem(s)?
2. What is a research objective for an identified research problem?
3. How would it be possible to receive the required information and use it to solve the research problem? Specify and reason methods required for research and data collection?
4. What questions will you ask respondents during the study?
5. How many (preliminary) respondents will be questioned during consumer voice research?
6. What will data analysis methods be used to summarize received data?

After doing the relevant research to identify our target market, we need to analyze our voice consumer, with the help of the questions provided.

1. Our main research problems where:
 - Data availability and quality: The availability and quality of data on the construction waste market may vary depending on the country or region being studied. Data on construction waste generation, recycling rates, and disposal practices may be incomplete or inconsistent, making it difficult to draw accurate conclusions.
 - Lack of standardization: There may be a lack of standardization in the way that construction waste is measured and reported, which can make it challenging to compare data between different sources or locations.
 - Complex supply chains: The construction waste market involves many different stakeholders, including contractors, waste haulers, recycling facilities, and government

regulators. Understanding the roles and interactions of these stakeholders can be complicated and require in-depth research.

- Economic factors: The construction waste market is influenced by economic factors such as construction activity levels, commodity prices, and government policies. These factors can be difficult to predict and may change rapidly, making it challenging to develop long-term projections for the market.
 - Environmental and social considerations: The construction waste market is subject to environmental and social considerations, such as sustainability, waste reduction, and worker safety. These factors may not always be captured in traditional market data, requiring additional research methods and data sources.
2. The main research aim and objective is to understand the market needs, the volumes of the market and the main players in the market so that we would know who to target and what we can offer that is necessary for them. Also one of the main objectives is to understand how the now existing system works and looks in action so that we can try to improve it.
 3. The main methods of collecting data are:
 - Eurostat and other data-collecting websites. These websites are beneficial since, with their information, we have access to volumes and other helpful statistics in our targeted market.
 - Our contact with YIT. The fact that we have a connection with one of the most prominent players in construction development is helpful. He can help us understand the insides of the whole system and show us how it all works, so we can try to improve it. Also, he can help us contact more people in the field for our survey.
 - Survey. The survey with other contacts that work around and in construction waste management will help us generate new ideas and test the existing ones on the real players in the industry.
 4. We prepared a questionnaire with a brief explanation of the products we offer and a list of essential and influential questions in their development to share with the environment specialist in different construction companies in Lithuania to find out the questions raised as follows :
 - 1) In your opinion, is it necessary to educate employees about sustainability? Why?
 - 2) How would you imagine the process of employee training? How much time per day or week could it take?
 - 3) What challenges could impede your company from taking a step forward in the implementation of new technologies in the waste sorting and management field?
 - 4) Do you think it would be difficult to adapt a new smart system as an application? Why?
 - 5) What could be the budget for the new smart application?
 - 6) What could be the benefits of sustainability?
 - 7) What could be the benefits of educating your workers?

5. Our survey will target environmental specialists in construction companies in Lithuania as many as we can reach, since they are the most capable of providing clear answers that help develop our products, and we need the responses of at least three of them. In this way we present here the answers from Peikko and YIT specialist gave to us.

Peikko:

- 1) It is necessary to teach about sustainability. Firstly, for the workers to know how what it is and to know how they can add to it.
- 2) Courses could be done 1 time every 3 months. There should be set sustainability measurements that are being monitored.
- 3) Biggest problem is low motivation.
- 4) It wouldn't be hard to apply smart solutions since the workers already use them.
- 5) The budget is not clear.
- 6) The main benefit is the saving of resources, less polluted environment, investing the company's resources to projects that are necessary to the community.
- 7) The main aspect is to clearly introduce the measures used in sustainability.

YIT:

- 1) It is mandatory to teach about sustainability. This is an aspect in the employment procedure.
 - 2) The employees could be introduced with the rules. This could be a part of the production meetings (about 5 min.) Also there could be longer yearly sessions.
 - 3) If the solution applied is improving the process, there could only be financial restrictions.
 - 4) It depends on the app, if the workers don't have to use it to often, then it won't be a problem.
 - 5) If the app is beneficial, the budget could be about 5000 euro.
 - 6) The main benefit is less waste on site and lower waste removal prices.
 - 7) Lower waste removal prices saved time in the construction process since there is no need to recycle the waste on site.
6. Using primary data collection methods such as mail surveys and interviews, as we made a questionnaire, we got open answers, so we do not have charts or something in this way.

2.3. Consumer analysis

Questions for the target market segment identification:

1. What are the specific characteristics for product consumers?
2. What market segments can we identify?
3. Which identified market segments are the most attractive?
4. What is the potential target market segment?

With those question we performed the answers between the group members looking for the best for our product development

1. Our product consumers are the **construction companies in the European Area** that are looking for sustainability during the construction process. We must consider that the European Union's statistical agency, Eurostat, estimates there will be about 3.2 million businesses in the construction sector in the EU by 2020. It's important to note that this number covers all sizes of construction-related businesses, including small, medium, and large ones. With this information, we need to emphasize that these companies' needs are based on reducing and improving waste management to achieve the goals and the requirements established by the EU and their sustainability goals as companies around the world are looking for a better and more sustainable future where the responsibility and the actions taken are essential for the excellent development of the society.
2. As mentioned above, our product consumers are the construction companies in the European Area. These companies are the ones with more financial capacity that are able not just to get our product but also that can take the most advantage of it, as we are looking for significant construction volumes, where the workers and the managers need better access and more understandable processes to improve the waste sorting its management. With this, we have to segment the companies to which our product can be more valuable and reachable, and that can help them be sustainable and achieve the requirements given by the EU. For the targeted companies, the segmentation we determined is identifiable, substantial, actionable, and stable. Scaling down from the 3.2 million companies in the EU region, we can target 425 significant companies.



Fig. 3. Map of the most representative construction companies in the European Countries

3. Our market segment group is wide, and after this we must take into account that our product is useful for them as we are going to facilitate the process of the waste management and sorting, something that is fundamental for the sustainability of the construction process and to succeed

with the requirements of the EU. So with the EU green deal requirement by 2030, our product will impact.

- **Green building certifications:** Green building certifications, such as LEED or BREEAM, are becoming increasingly popular in the construction industry. These certifications require construction companies to meet specific sustainability standards, including waste reduction targets. Companies that specialize in waste reduction and recycling in construction can position themselves as experts in meeting these requirements.
 - **Public sector:** Governments at all levels are increasingly focusing on sustainability and waste reduction in construction. Sustainable construction companies can tap into this market by bidding on public sector projects, such as schools, hospitals, and government buildings, that prioritize sustainability.
 - **Building materials suppliers:** Sustainable construction companies can partner with building materials suppliers to develop sustainable products and materials that reduce waste in construction. By developing relationships with suppliers, sustainable construction companies can ensure a steady supply of sustainable materials for their projects.
 - **Commercial construction:** Many businesses are also interested in sustainability and reducing their environmental impact. Sustainable construction companies can target commercial clients that are committed to sustainability and want to reduce their waste.
4. The construction companies that need our product are those that are looking for smart solutions for the waste management system and its sorting as our product can be adapted to any kind of construction process it is useful and easy to adapt. Target market segments may include:
- **Large construction firms:** large construction firms are likely to have the resources and budget to invest in sustainable building practices and may be interested in a product or service that can help them reduce mixed waste material. These firms may also be more likely to work on large-scale projects where waste reduction targets are a priority.
 - **Public sector organizations:** Government bodies, municipalities, and public organizations that are committed to sustainability may be interested in a product or service that can help them meet their waste reduction targets. These organizations may be involved in building or renovating public facilities, schools, or hospitals, and may be more likely to prioritize sustainability in their procurement processes.
 - **Green building certifications:** Companies that provide green building certifications, such as LEED or BREEAM, may be interested in partnering with construction companies that offer waste reduction products or services. By working together, these companies can offer clients a comprehensive sustainability package that meets the requirements of the certification.

2.4. Analysis of competitors

Questions for competitor analysis:

1. What are the main competitors for your idea?

There are three main competitors, Sustain Academy, LŽVP and Sustainability.lt. We focused on finding competitors that make courses for companies and teach the workers in sustainability since there would be no other competitors for the other parts of our packet.

2. Which audiences do the identified competitors target?

The audiences that our competitors target are companies and their white-collar workers.

3. What are the competitors' strengths and weaknesses?

The main strength of our competitors are the specialists that work there, they have degrees and certifications in sustainability fields. The main weakness lies in the audience that they target - they target only the white-collar workers and say nothing about other members. Also a big weakness looking from our product standpoint - their courses are very broad and do not mention construction site waste management in any way.

Table 2. Table of Strengths and Weaknesses of our competitors.

	Sustain Academy	LŽVP	Sustainability.lt
Strengths	CPD Certification	Lots of specialists and courses	
Weaknesses	A course with a set date	Courses with set dates and no courses with construction waste management in mind	Smallest company

2.5. Supplier analysis

Questions for supplier analysis:

1. Which suppliers are needed for product development?

The main supplier is of course our university - KTU. They supply us with knowledge, guidance and even funding. Another supplier could be an advertisement company that would help us with making new signs for the site.

2. What are the characteristics of attractive suppliers?

The main characteristic of an attractive supplier would be experience in the construction field, may it be as a manufacturer of the tools that we would need, or a mentor that supplies us with necessary information.

Table 3. Table of our suppliers and their characteristics graded.

KTU	Very bad	Bad	Acceptable	Good	Very good
	(1)	(2)	(3)	(4)	(5)
Price competitiveness					X
Product quality and reliability					X
Ability to provide post-purchase service and warranty					X
Timeliness of deliveries				X	
Quality of sales representative's work					X
Overall compliance with consumer requirements					X
Reputation					X
Average = 5					

Standout print	Very bad	Bad	Acceptable	Good	Very good
	(1)	(2)	(3)	(4)	(5)
Price competitiveness					X
Product quality and reliability					X
Ability to provide post-purchase service and warranty			X		
Timeliness of deliveries				X	
Quality of sales representative's work					X
Overall compliance with consumer requirements				X	
Reputation					X
Average = 5					

2.6. Financial and cost-benefit analysis

In this part of the report, we needed to calculate income, expenses and expected profits based on market, competitor, and consumer data analysis, and to define the funding sources.

Questions for financial prognoses:

1. What costs are required for product development, prototyping, testing?
2. What income and costs are forecasted for the first year of activities?
3. What are the expected start-up sources of financing?

2.6.1. Costs for product development, prototyping and testing.

List of resources necessary for the development of the product and predict their costs

Table 4. Table of the product development costs.

Type of costs	Value, euro
Standout print	14 euro per sign (variable) (YIT maybe 7)
Freelancer of mobile app	500 – 1000 euro
Worker for courses	250 – 300 euro (7 days of work)
Manufacturer of stands	Tbc (100 - 200) euro
Total costs:	Roughly 2000 euro

* Actual expenses only include standout print.

*When it comes to the application, we have decided to take matters into our own hands with the help of our university's tech team and resources. However, to ensure the highest quality, we plan to hire a professional app developer through various freelance websites. Our aim is to create a user-friendly app that is easy to navigate and meets the unique needs of our clients.

We have also done our homework and found several printing presses in Lithuania that can offer us exceptional printing quality at prices ranging from 7 to 14 euros per piece. This will help us create visually appealing training materials that captivate our trainees' attention and enhance their learning experience.

To ensure that our trainees receive top-notch instruction, we will be hiring highly qualified instructors daily. They will be responsible for delivering engaging and informative material to our trainees, helping them achieve their goals. Our prices for this service range from 250 to 300 euros per week, and we believe that this investment will be well worth it in the end.

2.6.2. Income and costs for the first year of activities

Questions for income and costs forecast:

1. What assets (long-term) are needed for the operation?
2. What is the forecasted income from the sale of the product? What resources are needed to carry out a product and activity? What are the forecasted costs of the product?
3. What is the forecasted result of the activity - profit (loss)?

Initial investments into long-term assets

Table 5. Table of the initial investments into long-term assets

Type of long-term asset	Value, euro
Computers, phones	4000
Equipment	1000
Transport (renting option)	(80*8).
Office/Storage rent	6000
Utilities	6000
Other	300
Total	17940

*As a new start-up company, we recognize the importance of investing in the appropriate equipment and resources for optimal operations. Thus, we allocated a budget of approximately 4000 euros for acquiring computers and smartphones, recognizing that digital communication and information sharing is integral to our business model. In addition, we have set aside 1000 euros for initial office and standing equipment, including furnishings necessary for a productive workspace.

Moreover, we have considered the expense of office and storage space for the first year, budgeting 6000 euros for rent and an additional 6000 euros for utilities. To ensure efficient and timely transportation, we have also allocated resources for a rented car, which can be obtained for approximately 80 euros per day based on our research utilizing CityBee. For environmentally friendly and cost-effective transportation, we are also exploring the option of investing in bicycles.

Finally, we recognize the possibility of unforeseen expenses and have allotted 300 euros for other miscellaneous costs. By investing wisely in these resources and anticipating potential expenses, we aim to position our company for success in the competitive market.

Estimated income and expenses

Income forecast.

As a sustainable start-up, we are excited to introduce our product to the construction industry. Our offering includes an initial course on sustainability with updates to keep up with the ever-evolving landscape, as well as recognizable infographics to facilitate the sorting of waste, and an innovative application that is the heart of our product. The application features a mapping section of the construction site, manager control assigned by the collaborating company, and other essential functions that contribute the waste management during the construction process.

Our subscription-based product is priced at 3000 euros per month, including all the features mentioned above. However, the price may increase based on the number of users required for the application. Since most construction companies work with subcontractors that may change regularly, we need to provide them access, which means more users than the initial subscription.

We take pride in the value our product brings to the industry, and we are confident that it will contribute significantly to sustainability efforts in construction.

Table 6. Table of the initial approximate income divided per quarters.

	I qtr., euro	II qtr, euro	III qtr, euro	IV qtr, euro	Total, euro
Income 3000 per month for a project	12000	24000	60000	84000	180000

Forecast of raw materials and/or goods to resell.

Table 7. Table of Cost of raw materials or goods to resell.

Material	Price, euro per unit	I qtr. unit	II qtr. unit	III qtr. unit	IV qtr. unit	Total amount, units	Material cost, euro
1	2	3	4	5	6	7	8
Stands	35	10	20	50	70	70	2450
Signs	15	15	30	75	105	105	1575
Paper work	0,5	95	170	425	595	1275	637.5
Total:	50.5	120	220	550	770	1450	4662.5

*Through extensive research and analysis of consumer trends, our company has projected an estimated acquisition of seven customers within our first year. We are excited to announce that we have already established a collaborative partnership with YIT, who we anticipate will be our first and primary customer during the initial quarter. As our business grows, we predict that our customer base will expand to two in the second quarter, five in the third quarter, and finally reach seven by the fourth quarter.

Our company provides a variety of services, including the sale of various items such as stands, signs, and course paperwork. Stands are sold in convenient packs of ten for a reasonable price of 35 euros per pack. Signs are also sold in packs, with fifteen signs in each pack and a cost of only 15 euros per pack. Course paperwork, an essential aspect of our services, will be sold in packs of ninety-five for a mere 0.5 euros per pack, providing a cost-effective solution for all our customers' needs.

Forecast of payroll costs

Table 8. Table of Payroll costs (employees directly involved in the production of the product/ provision of the service, sales, administration, management staff).

Position/ Profession	Number of employees	Average wage after taxes (net wage), euro per employee per month	Total workplace costs ¹ , euro	Quarterly wage fund, euro
1	2	3	4	5 (2*4*3)
CEO	1	1000	1571,63	4000
Developers	1	950	1473,69	3800
Product managers	3	950	1473,69	11400
Total:	5	2900	4519.01	19200

* As a small corporation, our team is composed of the CEO, Developer, and three product managers. As a startup, we have been strategic in our approach to reduce our expenses, particularly in regard to payroll costs. Our focus on fiscal responsibility has been paramount, and we have ensured that our payroll calculations align with the legal minimum monthly salary of 730 euros.

In order to facilitate these calculations, we have leveraged the powerful and reliable *sodra.lt* calculator, which has been instrumental in estimating our workplace expenditures. With this tool, we have been able to accurately predict salaries before taxes, streamline our payroll process, and maintain the financial health of our company. Through careful planning and judicious use of resources, we are confident that we can successfully navigate the early stages of our business and establish a strong foundation for future growth.

Calculation of depreciation

Table 9. Table of Depreciation of long-term assets.

Long-term assets	Cost of asset, euro	Residual value, euro	Estimated useful life, years ²	Quarterly charge for depreciation, euro ³
Computers	1400	800	4	37.5
Total:	1400	800	4	37.5

*We have conducted a comprehensive evaluation of the long-term assets related to the services we offer and have concluded that computers are the only item falling under this category. We plan to resell or rent out the other equipment as needed. Our diligent analysis has yielded an estimated value of approximately 1400 euros for each computer in our inventory. Moreover, we have projected the residual value of each computer at the end of its useful life to be 800 euros, with an expected lifespan of four years. To calculate the rate of depreciation for these computers, we have employed the straight-line method. This methodology has resulted in a yearly depreciation rate of 150 euros. Consequently, for the purpose of our income statement, the quarterly depreciation rate for the year will amount to 37.5 euros. Our meticulous planning ensures that we maintain our assets' value and optimize our profitability for years to come.

Forecast of operating expenses (overheads)

The operating costs, such as rent, cleaning, advertising, accounting, communications, utilities, server rental, business start-up services, etc are provided in the Table 10.

Estimated profit and profitability.

Table 10. Table of Estimated profit and profitability

	I qtr., euro	II qtr, euro	III qtr, euro	IV qtr, euro	Total, euro
Income	12000	24000	60000	84000	180000
3000 per month for a project					
Expenses, total	34710.19	34431.19	34431.19	34431.19	138003.76
Raw materials & goods to resell	1165.63	1165.63	1165.63	1165.63	4662.5
Payroll	29865.56	29865.56	29865.56	29865.56	119462.24
Operating expenses, total	3679	3400	3400	3400	13879
<i>Rent, cleaning</i>	<i>1500</i>	<i>1500</i>	<i>1500</i>	<i>1500</i>	<i>6000</i>
<i>Advertising</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Accounting</i>	<i>400</i>	<i>400</i>	<i>400</i>	<i>400</i>	<i>1600</i>
<i>Communication, utilities</i>	<i>1500</i>	<i>1500</i>	<i>1500</i>	<i>1500</i>	<i>6000</i>
<i>Start-up costs⁴</i>	<i>279</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>279</i>

Profit (loss) before interest, taxes, depreciation and amortization (EBITDA)	-22710.19	-10431.19	25568.81	49568.81	41996.24
Depreciation	37,5	37,5	37,5	37,5	150
Financial expenses (interest) (Luminor loan calculator with 13.95% interest)	1249	1823	25568.81 (re-financ e)	9922.19(re-financ e)	38563
Profit (loss) before taxes	-23996.69	-12291.69	0	39646.62	3433.24
Profit tax ⁵	0	0	0	0	0
Net profit (loss)	-23996.69	-12291.69	0	39646.62	3433.24
Net Profit Margin, % $NPM = \frac{\text{Net profit (loss)}}{\text{Income}} * 100$	-199.97	-51.22	0	47.20	1.91

* The table presented below provides a comprehensive overview of the projected profitability of a new start-up company. The estimated profits and revenue for four quarters (I to IV) and the total are outlined in detail.

The top row of the table highlights the revenue generated from a single project, which amounts to an impressive 3000 euros per month. Over the course of a year, this translates to a total revenue of 180,000 euros, with seven projects planned for the IVth quarter.

Moving onto expenses, the costs are divided into various categories such as raw materials, payroll, rent, advertising, and utilities, among others. The total expenses amount to 138,003.76 euros, encompassing all the categories. However, this is an estimation, and the expenses may fluctuate depending on various factors.

The third row of the table showcases the profit (loss) before interest, taxes, depreciation, and amortization (EBITDA), calculated by subtracting the total expenses from the revenue. Despite being negative in the first quarter, the EBITDA turns positive in the subsequent quarters, indicating the project's profitability. However, given the losses in the first quarter, the company may need to consider obtaining a loan, which could be refinanced by the IIIrd quarter. It is noteworthy that the company is exempt from paying profit tax in the first year, given its status as a new start-up company with limited employees.

The analysis shows that the company can only attain profitability by expanding its operations or undertaking at least three projects simultaneously. With the plan to scale up to seven projects in the IVth quarter, the net profit margin surges to 1,91%, signaling a slow growth opportunity for the company.

2.6.3. Sources of financing

As a startup, we recognize that securing funding is a critical aspect of our business model. To achieve our goals, we have identified various funding sources, with a primary focus on attracting companies interested in our project. Our approach has already yielded positive results, with YIT, a prominent player in the construction industry, offering to finance our application with a generous contribution of five thousand euros.

Furthermore, we understand the value of networking and establishing meaningful connections in the industry. With this in mind, we are planning to participate in Technorama Conference where our goal is to leverage this opportunity to connect with potential funders who share our vision for revolutionizing the construction waste management sector.

We are committed to utilizing all available resources and exploring every avenue to secure the necessary funding to bring our vision to life. We believe that our innovative approach to construction

waste management has the potential to transform the industry and make a significant impact on sustainability efforts worldwide.

Conclusions

1. The total costs for product development, prototyping, and testing are estimated to be around 2000 euros, with the bulk of the cost being attributed to standout print.
2. The long-term assets required for the operation of the business in the first year are estimated to cost 17,940 euros. These assets include computers, equipment, transport (renting option), office/storage rent, utilities, and other miscellaneous expenses.
3. The forecasted income from the sale of the product is estimated to be 180,000 euros for the first year, based on a subscription-based model priced at 3000 euros per month. This estimation considers possible discounts, prices for different types of buyers, and the quantities sold to them.
4. The business model only becomes profitable with growth or at least 3 concurrent projects. This is an estimation since we calculated the profits only considering the lowest subscription level.

2.7. Analysis of technologies

To develop our mobile application, we utilized a range of cutting-edge technologies, including Android Studio, with Kotlin serving as our preferred programming language. In order to ensure that our development process was as smooth and efficient as possible, we drew on a variety of helpful resources. These included the official Android development documentation website, as well as the Android Developer YouTube channel, where we were able to access valuable guidance and support from experts in the field.

In addition to these resources, we were also fortunate to have the support of Andrius Paulauskas, a smart devices lecturer, who provided us with advice and assistance throughout the development process. We also utilized the M2 and M3 design websites, which proved to be an excellent source of inspiration and guidance for our app's overall design and aesthetic. Through the combined use of these tools and resources.

3. Development of the project

3.1. Design Thinking description

We incorporate the design thinking methodology into all our workflows to ensure that our users' needs remain at the forefront of our development process. This approach enables us to create customized solutions that are tailor-made to meet their precise requirements.

The steps of the DT we have done are the following:

1st stage: **Understand.**

Our activities during the understanding phase were:

First, a meeting with the company (YIT) in the university library, where we got acquainted closely with the problem to be solved and the challenges surrounding it.

Then, we carried out a brainstorming process among the group members and discussed the topic in general.

After that, we distributed the roles among the members of the group so that they are complementary.

The main obstacles we faced at that stage were:

Lack of information about the problem through the simple research sources available to us at the time, in addition to the lack of sufficient motivation for some members of the group.

2nd stage: **Observe.**

At that stage, we visited the construction site ourselves, examined the sorting places and the workplace, and then we had a discussion with the environmental specialist in the company about some of the proposed solutions and future assumptions for the project. In addition, we have collected extra information about workers, customers, consumer needs the market and suppliers.

The obstacles were trying to reach a specific offer in which we can provide real and effective solutions to the problem.

3rd stage: **Synthesis.**

At this stage, we designed the concept of the project and then we conducted a survey with environmental specialists in different companies.

The main obstacle was reaching enough specialists in companies because many of them did not answer us.

4th stage: **Ideation.**

At this stage, we have turned the project into a real solution Which is an application that includes a map of the construction site and sorting locations, in addition to an educational course for workers on how to sort in an appropriate manner, and finally an infographic of the different sorting boxes.

5th stage: **Prototyping.**

After we presented the project idea to the company's representatives and the mentors, we then proceeded to modify some notes based on their feedback, and after that we prepared a prototype for the application by preparing the interface design, in addition to starting to prepare the content of the educational course.

6th stage: **Testing.**

During the final stage, we conducted tests on the application with environmental specialists at YIT. And he shared some observations regarding their work and the following aspects of the application:

For Worker Application:

All menu sections are found to be useful.

Home: he mentioned that It would be beneficial to have a memory aid for waste sorting (color codes) displayed when the application is launched. Additionally, it should provide up-to-date information, such as changes in the location of waste containers or new types of waste being sorted due to construction phase updates.

Map: When clicking on a container, there should be an enlarged explanation of the color code indicating the type of waste. It would be helpful to have the container icons with the sign icons that were previously shared.

Reminders: The option to upload photos should be available when creating a task. This feature would serve as evidence both when assigning a task and when responding to a task created by an employee.

Reward system: Implementing a system of rewards and penalties for subcontractors and workers upon task completion would be beneficial. Generating a code for this system might not be seamless, so it would be ideal for the manager to be able to select employees and subcontractors from a list and evaluate them accordingly.

For Manager Application:

Map: Same thoughts as the ones mentioned for workers.

Reminders: The ability to add photos when creating a task should be included.

Reward system: Like the worker application, the manager application should have the same reward system.

Info screen: he mentioned that it would be valuable to have a section where not only prepared informational screens are available, but also educational materials, statistics, or any other relevant information that the manager could utilize during weekly meetings or training sessions.

3.2. Design thinking stage

With all these steps described before, we must consider that the design thinking method is a cycle where at any time we can go some steps back to change or improve some aspects that were done. Currently, we have passed the entire six stages of Design Thinking, from starting a meeting with the company at the beginning of the project until testing the final product with the company itself and receiving feedback and notes about the product.

3.3. Product Development

In this section we want to present the developments we have made in improving our product. Our first part has been to enhance the course content, and we are going to share that we have created a wide variety of topics and subjects that will be provided to our customers' workers. We are confident that this will result in an outstanding learning experience that will not only benefit the workers but also improve the overall operations of our customers' businesses in sustainability aspects.

Course Content

1. Introduction to Sustainability in Construction waste management: The importance of sustainability in the construction industry, current sustainability practices, and the role of on-site construction companies in promoting sustainability.

1. Introduction

- Title: Introduction to Sustainability in Construction Waste Management
- Subtitle: The importance of sustainability in the construction industry, current sustainability practices, and the role of on-site construction companies in promoting sustainability.

Slide 2: What is sustainability in construction?

- Definition of sustainability in construction (i.e. meeting the needs of the present without compromising the ability of future generations to meet their own needs)
- Importance of sustainability in the construction industry

Slide 3: Why is sustainable waste management important?

- The impact of construction waste on the environment
- Benefits of sustainable waste management practices (e.g. cost savings, reduced environmental impact)

Slide 4: Current sustainability practices in construction waste management

- Overview of current sustainable waste management practices (e.g. waste reduction, recycling, disposal)
- Examples of sustainable waste management practices on construction sites

Slide 5: Best practices for sustainable waste management

- Reduce waste generation (e.g. through material optimization, prefabrication, and reusing materials)
- Separate and recycle waste (e.g. by using separate containers for different waste streams, such as metal, plastic, and paper)
- Dispose of hazardous waste properly (e.g. by using licensed waste carriers for transportation and disposal)

Slide 6: The role of on-site construction companies in promoting sustainability

- Importance of on-site workers' role in sustainable waste management
- Collaboration between construction companies, workers, and waste management companies
- Importance of training and education for on-site workers in sustainable waste management practices

Slide 7: Case studies of successful sustainable waste management practices

- Examples of construction projects with successful sustainable waste management practices
- Benefits of sustainable waste management practices in these projects

Slide 8: Conclusion

- Recap of the importance of sustainability in construction waste management
- Importance of on-site workers' role in promoting sustainable waste management practices
- Call to action for implementing sustainable waste management practices on construction sites.

2. Sustainable Waste Management: The basics of waste management, including waste reduction, recycling, and disposal. Focus will be placed on ways to reduce waste, recycle more effectively, and minimize environmental impact.

Slide 1: Introduction

- Title: Sustainable Waste Management for On-Site Construction Workers
- Subtitle: The basics of waste management, including waste reduction, recycling, and disposal. Focus will be placed on ways to reduce waste, recycle more effectively, and minimize environmental impact.

Slide 2: What is waste management?

- Definition of waste management
- The three main components: waste reduction, recycling, and disposal
- Importance of proper waste management for environmental sustainability

Slide 3: Why should we recycle?

- Benefits of recycling (e.g. conserving natural resources, reducing energy consumption, reducing greenhouse gas emissions)
- The impact of recycling on the environment and society
- Importance of encouraging recycling in households and businesses

Slide 4: Goals of sustainable waste management

- Reduce the amount of waste produced
- Increase the amount of waste recycled
- Minimize the environmental impact of waste disposal

Slide 5: Waste reduction strategies for on-site construction workers

- Reduce, reuse, and recycle

Slide 6: Effective recycling strategies for on-site construction workers

- The importance of proper sorting and separation of recyclables
- Recycling programs and initiatives for construction waste
- The role of on-site workers in promoting effective recycling practices

Slide 7: Minimizing environmental impact of waste disposal for on-site construction workers

- The impact of landfill and incineration on the environment

- Alternative waste disposal methods (e.g. composting, waste-to-energy facilities)
- Importance of reducing the amount of waste sent to landfills and incinerators

Slide 8: On-site waste management practices

- Importance of on-site waste management practices
- Strategies for reducing waste on construction sites
- The role of on-site workers in managing waste effectively

3. Sustainable Material Sourcing: An overview of sustainable material sourcing practices, including selecting environmentally friendly materials, responsible supply chain management, and using recycled materials.

Slide 1: Introduction

- Title: Sustainable Material Sourcing for On-Site Construction Workers
- Subtitle: An overview of sustainable material sourcing practices, including selecting environmentally friendly materials, responsible supply chain management, and using recycled materials.

Slide 2: Why is sustainable material sourcing important?

- The impact of construction on the environment
- Importance of selecting sustainable materials and reducing waste
- Benefits of sustainable material sourcing practices

Slide 3: Selecting environmentally friendly materials

- Importance of selecting materials with low environmental impact
- Materials with environmentally friendly attributes (e.g. sustainably sourced wood, recycled content materials)
- Consideration of embodied carbon and life cycle assessments

Slide 4: Responsible supply chain management

- Importance of understanding the environmental impact of materials throughout the supply chain
- Strategies for selecting suppliers with environmentally friendly practices
- Consideration of ethical and social responsibility in supply chain management

Slide 5: Using recycled materials

- Importance of incorporating recycled materials into construction projects
- Benefits of using recycled materials (e.g. reducing waste, conserving natural resources)
- Examples of commonly recycled materials in construction (e.g. concrete, asphalt)

Slide 6: How can we source sustainable materials?

- Sourcing sustainable materials from reputable suppliers

- Certification schemes for sustainable materials (e.g. FSC for sustainably sourced wood)
- Green building rating systems (e.g. LEED) and their requirements for sustainable materials

Slide 7: Prioritizing reducing mixed waste

- Importance of reducing mixed waste in construction
- Strategies for reducing mixed waste (e.g. proper sorting and disposal of materials on-site)
- Benefits of reducing mixed waste (e.g. reducing waste disposal costs, conserving natural resources)

Slide 8: Sustainable material sourcing in action

- Examples of successful sustainable material sourcing practices in construction
- Benefits of sustainable material sourcing practices in these projects

Slide 9: Conclusion

- Recap of sustainable material sourcing practices
- Importance of on-site workers' role in sustainable material sourcing
- Call to action for implementing sustainable material sourcing practices on construction sites.

- 4. Smart Sustainable Waste Management App Usage:** An overview of how a smart waste management app can be used to track waste generation and disposal, monitor recycling efforts, and reduce waste overall. Hands-on training with a specific app will be provided.

Slide 1: Introduction

- Title: Smart Sustainable Waste Management App Usage for On-Site Construction Workers
- Subtitle: An overview of how a smart waste management app can be used to track waste generation and disposal, monitor recycling efforts, and reduce waste overall. Hands-on training with a specific app will be provided.

Slide 2: Why use a smart waste management app?

- The impact of construction on the environment
- Importance of reducing waste and increasing recycling efforts
- Benefits of using a smart waste management app to monitor and reduce waste

Slide 3: Workers app

- Overview of the workers' app
- How to use the app to track waste containers
- Features of the app

Slide 4: Managers app

- Overview of the managers' app
- How to use the app to monitor recycling efforts, workers needs and rewards

- Features of the app

Slide 5: App training

- Hands-on training with the specific app used on the construction site
- Step-by-step instructions for using the app
- Practice exercises to reinforce app usage

Slide 6: Reward system

- Importance of incentivizing sustainable waste management practices
- Types of rewards
- Examples of successful reward systems in construction waste management

Slide 7: App implementation and usage

- Importance of consistent app usage throughout the construction project
- App usage guidelines and expectations for on-site workers and managers
- Regular app usage evaluations and updates to improve effectiveness

Slide 8: Smart sustainable waste management in action

- Examples of successful sustainable waste management practices using a smart waste management app
- Benefits of using a smart waste management app in these projects

Slide 9: Conclusion

- Recap of smart sustainable waste management app usage
 - Importance of on-site workers' role in using the app and reducing waste
 - Call to action for implementing a smart sustainable waste management app on construction sites.
5. **Best Practices for Sustainable Waste Management:** Practical tips and techniques for on-site construction companies to promote sustainability in their projects by managing waste.

Slide 1: Introduction

- Title: Best Practices for Sustainable Waste Management for On-Site Construction Companies
- Subtitle: Practical tips and techniques for promoting sustainability in construction projects by managing waste

Slide 2: Why manage waste sustainably?

- The impact of construction waste on the environment
- Benefits of sustainable waste management practices (e.g. cost savings, reduced environmental impact)

Slide 3: General tips for sustainable waste management

- Reduce waste generation (e.g. through material optimization, prefabrication, and reusing materials)
- Separate and recycle waste (e.g. by using separate containers for different waste streams, such as metal, plastic, and paper)
- Dispose of hazardous waste properly (e.g. by using licensed waste carriers for transportation and disposal)

Slide 4: Rules and regulations for waste management

- Overview of waste management rules and regulations (e.g. environmental legislation, building codes, health, and safety regulations)
- Importance of compliance with rules and regulations for sustainable waste management practices
- Penalties for non-compliance

Slide 5: Checks and monitoring of waste management practices

- Importance of regular checks and monitoring of waste management practices
- Types of checks and monitoring (e.g. visual inspections, waste audits, waste tracking)
- How to report and address non-compliant waste management practices

Slide 6: Implementation of sustainable waste management practices

- Importance of including sustainable waste management practices in project planning and design
- Role of on-site workers in implementing sustainable waste management practices
- Importance of training and education for on-site workers in sustainable waste management practices

Slide 7: Case studies of successful sustainable waste management practices

- Examples of construction projects with successful sustainable waste management practices
- Benefits of sustainable waste management practices in these projects

Slide 8: Conclusion

- Recap of best practices for sustainable waste management in construction projects
- Importance of on-site workers' role in sustainable waste management
- Call to action for implementing sustainable waste management practices on construction sites.

6. Updates and news (if necessary)

- If there are updates, we will provide a short course on them.
- If there is any news on recycling, we will provide a course overlooking them.
- If we have reached our goal or there is anything to celebrate, we will provide a short meeting thanking the workers for their work to motivate them.

We have also established a distinctive identity for our course, meticulously crafting the visual appearance of the slides while considering their adaptability to evolving needs.



Fig. 4. Main Title Page



Fig. 5. Content Title Page



Fig. 6. Introduction Page

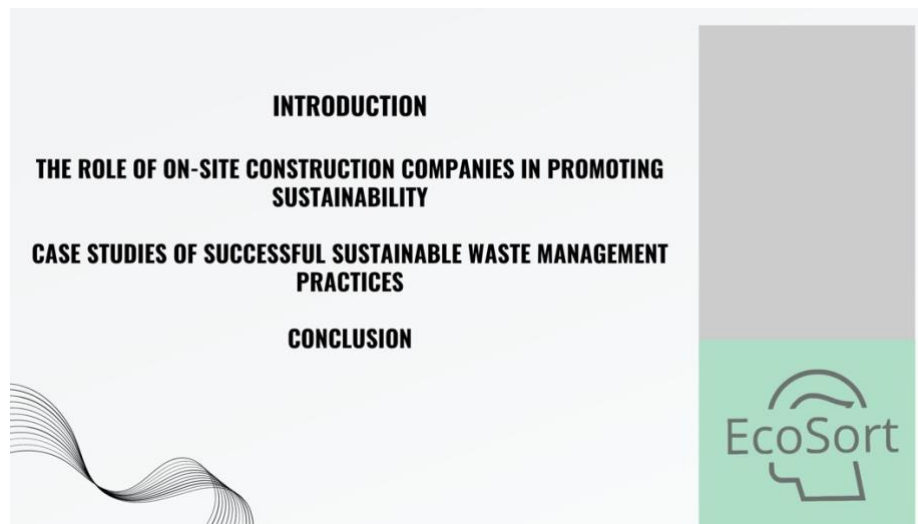


Fig. 7. Introduction Page 2

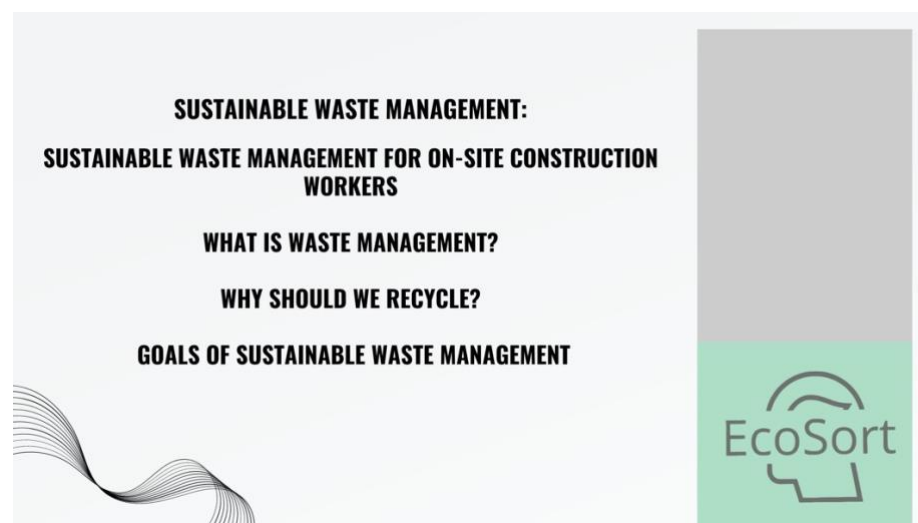


Fig. 8. First Topic Page

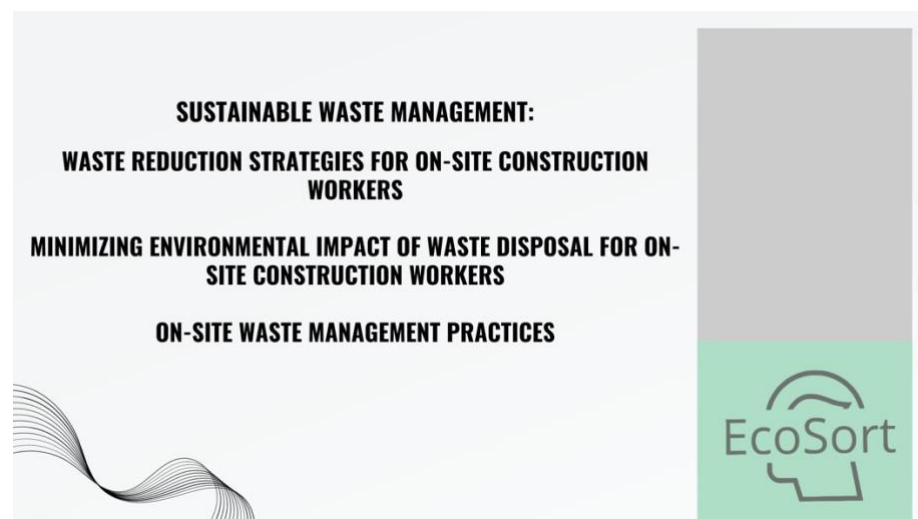


Fig. 9. First Topic Page 2

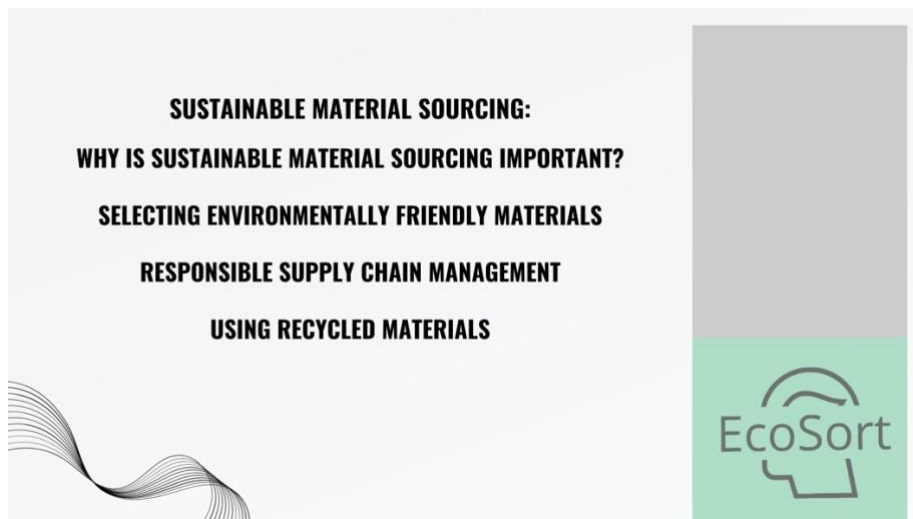


Fig. 10. Second Topic Page

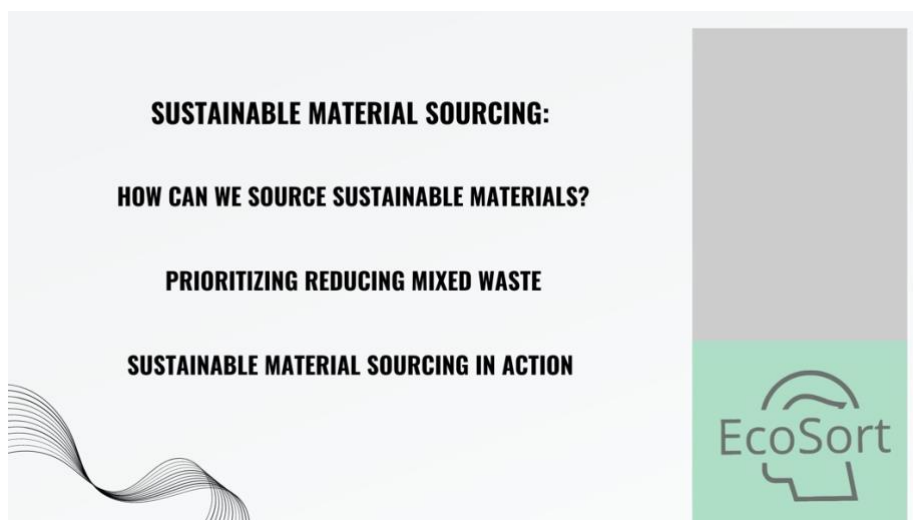


Fig. 11. Second Topic Page 2

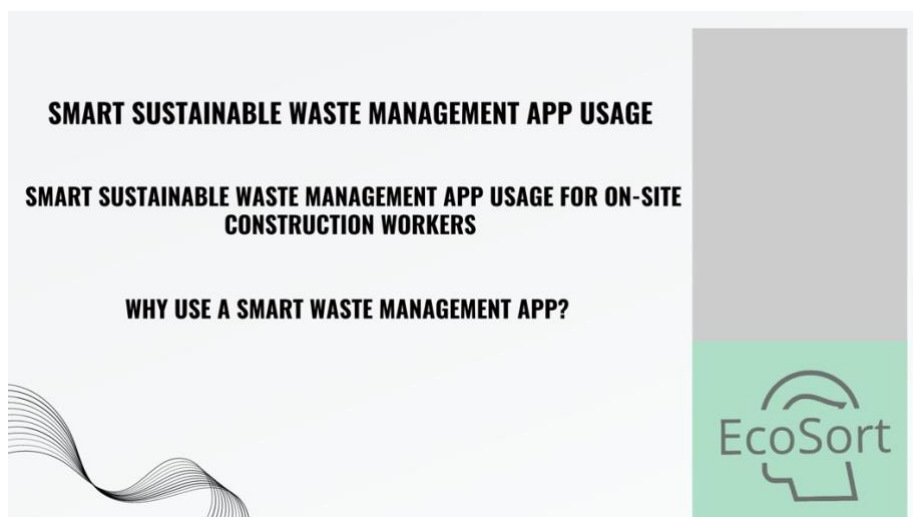


Fig. 12. Third Topic Page

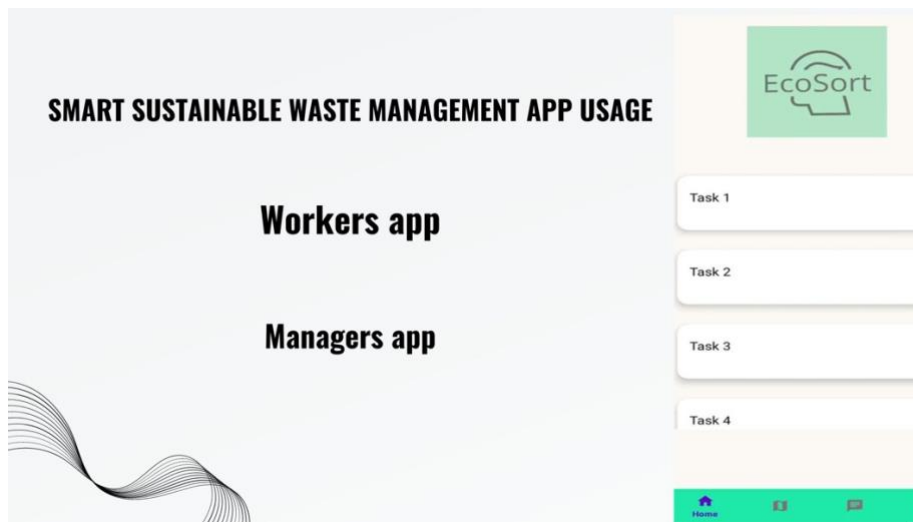


Fig. 13. Third Topic Page 2



Fig. 14. Fourth Topic Page



Fig. 15. Updates Page

In addition to the vast expansion of our course content, we have also created the prototypes for our infographics, which are a part of our product package. These infographics feature a visually appealing

representation of the materials that must be disposed of in their respective designated trash bins. Furthermore, the labels are presented in three languages, including English, Lithuanian, and Russian. This multilingual approach ensures that our product is accessible to a wide range of users, and our attention to detail guarantees that our customers' workers will have a user-friendly and efficient waste disposal experience.

Infographics



Fig. 16. Signs design

In addition, we have designed a dedicated stand to showcase our signage, ensuring enhanced service provision to companies by equipping them with all essential materials for the optimal and efficient utilization of our product.

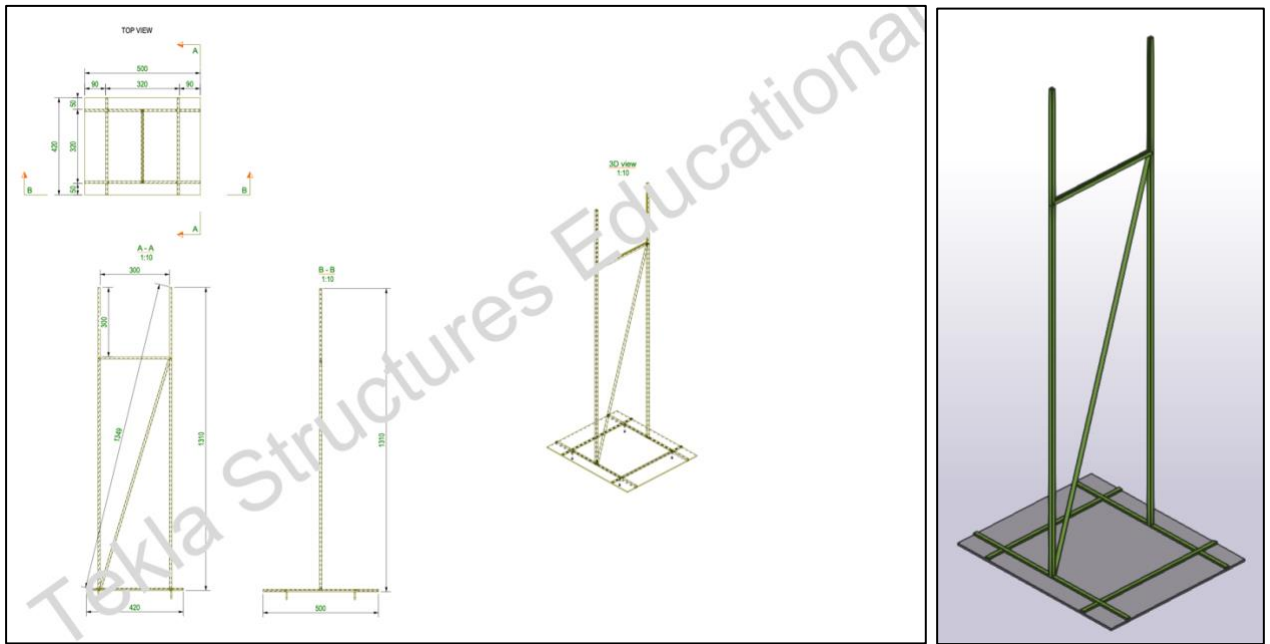


Fig. 17. Signage Stand Prototype

Application

We utilized cutting-edge technologies such as Android Studio and Kotlin to develop our mobile application. To ensure that our development process was efficient, we relied on a variety of resources, including the official Android development documentation website and the Android Developer YouTube channel. Andrius Paulauskas, a smart devices lecturer, also provided valuable advice and assistance throughout the development process. In addition, we drew inspiration and guidance from the M2 and M3 design websites to create an aesthetically pleasing app. By combining these tools and resources, we are going to be able to develop a high-quality mobile application.

Presented below are the distinct views of the Interphase application catered to each user type.

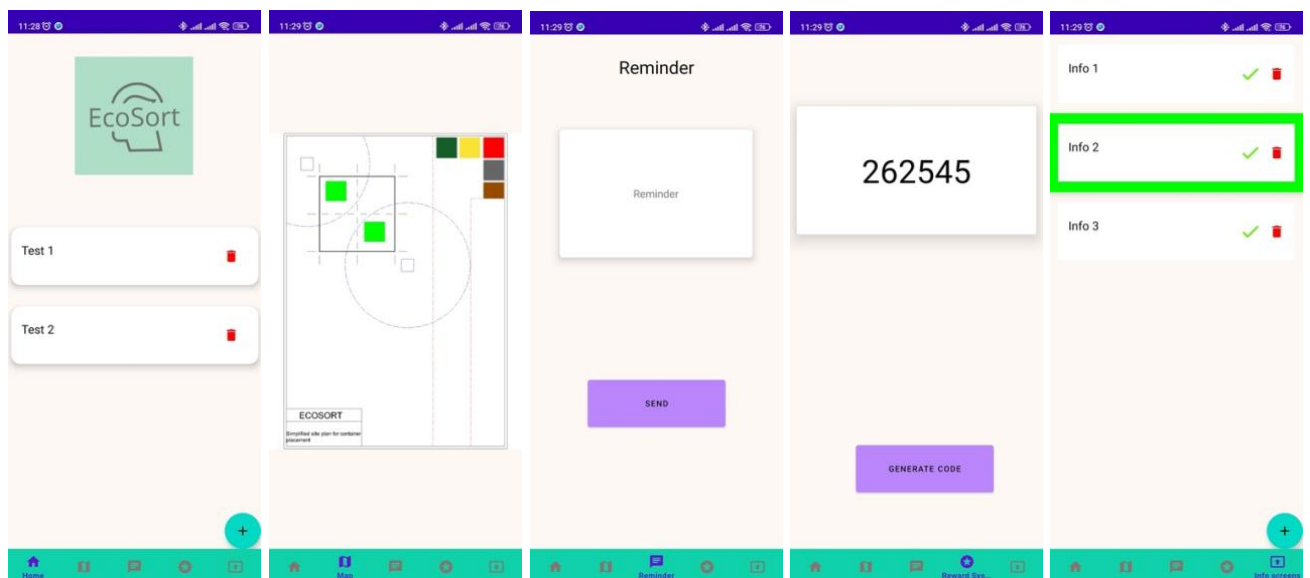


Fig. 18. Managers App View

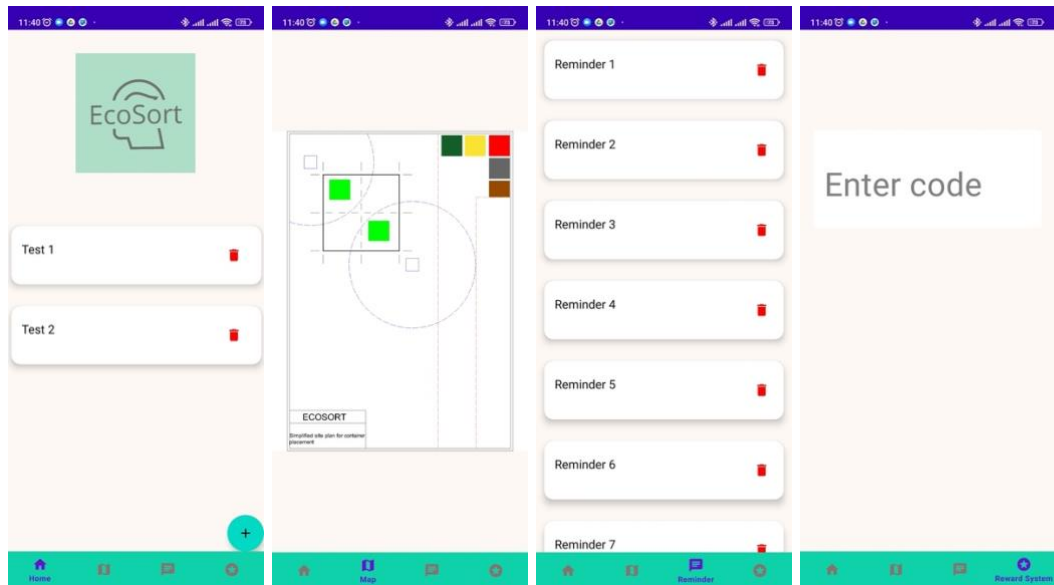


Fig. 19. Workers App View

New Rules

An additional benefit offered by the application is its streamlined management of mobile containers, which are already widely deployed across various sites. Users can conveniently request a mobile container by simply initiating a request, subsequently dispatched to their location by the crane worker following confirmation from the manager. This innovative feature expands waste sorting capabilities beyond the building's ground levels, facilitating improved waste management practices.

Furthermore, to ensure clarity and ease of use, the waste boxes are color-coded in accordance with our established coloring standards. This systematic approach enhances visual recognition and promotes efficient waste segregation throughout the process.



Fig. 20. Crane lift box Sample

4. Results and Discussions

In retrospect, the outcomes of the project have proven to be not only highly satisfactory but also brimming with promise, both in theory and practice.

From a theoretical perspective, we have accomplished significant milestones by conducting an extensive market analysis that encompasses both the macro and micro economy. Our evaluation of competitors and suppliers has been meticulous and insightful. By diligently adhering to the principles of Design Thinking, we have successfully devised a robust financial plan, meticulously incorporating an appropriate budget and projecting a favorable profit margin.

Transitioning to the practical realm, our efforts have yielded tangible results that validate our endeavors. Our application is now readily available for download on the Android store, and we have conducted fruitful testing in collaboration with the esteemed YIT company, receiving commendable feedback. Furthermore, we have painstakingly crafted an educational course that encompasses comprehensive theoretical content and meticulously prepared slideshows, ensuring effective worker presentations. In addition, we have developed a range of visually captivating infographics, meticulously designed to meet the highest standards of aesthetics and colors, ready for immediate printing and utilization.

As we gaze into the future, our aspirations for the project extend far beyond its current state. With the acquisition of a suitable sponsor, we envision further technological advancements for the application, propelling it to new heights of innovation. Moreover, we remain committed to continuously refining and enhancing the course content, diligently considering the ever-evolving laws and regulations pertaining to sustainability in Europe.

The achievements thus far inspire us to continue our quest for excellence, eagerly anticipating the exciting possibilities that lie ahead in this transformative project.



General Report Conclusions

We are delighted to present the outcomes and conclusions of our three primary objectives. Through thorough research and analysis, we have gathered valuable insights and data, enabling us to attain a profound understanding of our target market, refine our product offering, and establish a robust foundation for our business operations. These conclusions serve as a solid basis for future decision-making and reinforce our commitment to delivering exceptional value to our esteemed customers:

1. Product Development Excellence:

Throughout the product development journey, we have made remarkable strides in augmenting our mobile application by integrating cutting-edge technologies and leveraging invaluable insights from a renowned smart devices lecturer. Emphasizing user-centered design, we have crafted an intuitive and highly accessible user interface (UI) that caters to the needs of both workers and managers. With unwavering dedication to excellence, we are poised to create a functional and user-friendly app that guarantees unparalleled value for our customers.

2. Comprehensive Course Offering:

As an integral part of our product development process, we have meticulously designed a comprehensive range of course topics, expertly packaged for our customers. These topics span a wide spectrum and provide workers with practical and valuable knowledge. Ensuring adherence to the highest industry standards, we have crafted course content that delivers an exceptional learning experience, meeting the diverse needs of our valued customers.

3. Innovative Waste Sorting Signs:

We take pride in successfully developing our initial prototypes for waste sorting signs. These signs have been thoughtfully designed to be intuitive and user-friendly, empowering workers to efficiently manage waste sorting processes. By leveraging these signs, we are confident that our customers will achieve substantial advancements in waste management practices, fostering sustainability and operational efficiency.

List of references

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