**RESEARCH PROJECT PROPOSAL**

Deliverable One

**Food Wastage Application: The Sustainable Spoonful**

**By**

Lea Thumbiran, Lucinda Zachos, Melany Opperman, Santana Bradbury

A Preliminary Project Proposal Submitted as a Partial Requirement for the Bachelor Science in Information Technology: Mobile Application and Web Services

In the Faculty of Information Technology, Eduvos

**Supervisors:**

Mr. William Olivier

Ms. Ndai Mapaso

Date: 15 March 2023

1. **Student Details**

|  |  |  |  |
| --- | --- | --- | --- |
| Student Name | Student Number | Telephone Number | Email Address |
| Bradbury, Santana | CNZJB3199 | 071 864 4170 | cnzjb3199@vossie.net |
| Opperman, Melany | 6P6NPJX46 | 074 709 6778 | 6p6npjx46@vossie.net |
| Thumbiran, Lea | LMTPQFTH6 | 079 898 2004 | lmtpqfth6@vossie.net |
| Zachos, Lucinda | Y34VR5C17 | 071 878 3138 | Y34vr5c17@vossie.net |

1. **Supervisor Details**

|  |  |  |
| --- | --- | --- |
| Supervisor Name | Faculty | Email Address |
| Olivier, W | IT | william.olivier@eduvos.com |
| Mapaso, N | IT | ndai.mapaso@eduvos.com |

# Abstract

In South Africa food, water, and energy wastage has escalated into a widespread problem in recent years. While this is something that occurs in many countries, South Africa is not alone in this problem. Due to this, we will be specifically focusing on South Africa in this study.

According to research, one of the main factors that contributed to the most resources being wasted is poor storage and disposal of food on farms leading to an even greater wastage of resources. This is evident from the amount of food that shops and restaurants throw out weekly.

To address the problem of food wastage, we have conducted research on this problem, its sub-problems, the benefits of the study, delimitations of the study as well as developing a reasonable timeline and budget for the project. The results of the research have concluded that a food saver mobile application will be developed to hopefully assist in addressing these issues.

The food saver mobile application will be developed to help assist in reducing the number of resources that are being wasted by shops, restaurants, cafes, and wholesalers. It will further provide people in need with a platform to find and purchase products on a discount. For any products that are not sold at the end of the day, they will then be donated to a local charity or organization of the retailer's choice and at their discretion.

**Table of Contents**

[1. Abstract 3](#_Toc132315242)

[2. Introduction 5](#_Toc132315243)

[2.1 Background of Research 5](#_Toc132315244)

[2.2 Aim of Research 7](#_Toc132315245)

[2.3 Research Objectives 8](#_Toc132315246)

[3. Problem Statement 9](#_Toc132315247)

[3.1 Proposed solution 11](#_Toc132315248)

[4. Sub-Problems 11](#_Toc132315249)

[4.1 Check there is no current legislation in place that could impede our research. 11](#_Toc132315250)

[4.2 Establish interest amongst retail partners. 11](#_Toc132315251)

[4.3 Establish interest amongst consumers. 11](#_Toc132315252)

[4.4 Determine the experience of food retailers when it comes to food wastage. 11](#_Toc132315253)

[5. Benefits of Study 11](#_Toc132315254)

[6. Delimitation of Study 13](#_Toc132315255)

[7. Benefits of Study 14](#_Toc132315256)

[7.1 Reasonable Timelines 14](#_Toc132315257)

[7.2 Gantt Chart 16](#_Toc132315258)

[7.3 Work breakdown structure 17](#_Toc132315259)

[8. Proposed budget 18](#_Toc132315260)

[9. Research Methodology 19](#_Toc132315261)

[10. Preliminary Literature Review 20](#_Toc132315262)

[11. Outline of Mini-Dissertation 21](#_Toc132315263)

[List of Figures 24](#_Toc132315264)

[List of Tables 24](#_Toc132315265)

[References 25](#_Toc132315266)

# Introduction

In this project, we as a group must create a mobile application that can assist in trying to solve the issue of food wastage. When it comes to food wastage, our group has chosen to focus on food retail stores, cafes, and restaurants.

The issue in question as it pertains to this research project is food wastage and how this loss affects communities both morally and financially as the losses increase rapidly. Some of these issues are due to either the retailer not selling their food products before it reaches its expiry date or customer’s not finishing their meals at restaurants, which ultimately results in food being thrown away.

This mobile application will hopefully assist in taking a step towards helping businesses as well as communities that are struggling in South Africa. Currently communities, who as we draft this document face the issue of not being able to afford food that is needed to keep them healthy.

In this proposal we aim to discuss the background of the research and identify its aims and objectives, this is discussed in sections 2.1, 2.2 and 2.3. We then need to draft the problem statement and mention any sub-problems relating to the topic, this is discussed in sections 3 and 4. Afterwards we need to define the benefits of study which consists of three sections: the benefits to academic area, the benefits to the companies or users, and the benefits to the researchers. These are discussed in sections 5.1, 5.2 and 5.3 respectively. The delimitations of the study are discussed in section 6. The benefits of the study are further broken down to include timelines, a Gantt chart of the project and a work breakdown structure with the different deliverables, this is discussed in section 7. The budget with a summary of the expenses that we will face is covered in section 8. The research methodology is covered in section 9. The preliminary literature review is covered in section 10 and lastly, the outline of the mini dissertation is covered in section 11.

The above will form part of deliverable one and it will need to be finalized before we can move onto writing the literature review in deliverable two.

## 2.1 Background of Research

As previously mentioned, food, water, and energy wastage in South Africa has become increasingly more prevalent in recent years.

In an article published by The Franchise Association of South Africa (FASA, 2019), that is titled 'Tackling South Africa's food waste problem’ they stated that about a third (approximately 10.3 million tonnes) of all food produced in South Africa is never eaten, thrown out and ends up in landfills. In addition to this, they state that the water and energy used during the production of food is enough to fill up multiple swimming pools and power an entire city for many weeks (FASA, 2019). As more time passes more resources are being used and wasted. This leads to a deteriorating economy where people are more likely to struggle to get the resources that they need.

In another article, titled 'South Africa: Impact of Covid-19 on Food security' the impact of the lack of these resources becomes more apparent. In the article, it is stated that about 9.34 million people suffer from food insecurity (IPC, 2021).

In another article, titled 'The Extent of Food Security in South Africa' written by Statistics South Africa they stated that almost 20% of all households in South Africa have inadequate access to food (Statistics South Africa, 2019). Even though sufficient food is being produced, it is being wasted, thrown out and it never ends up being consumed.

Another article written by Phumzile Mlangeni, titled 'South Africans decry souring food prices' shows that food wastage and inflation are directly connected (Mlangeni, 2021). In the article, they state that due to food wastage and the costs needed to produce food, many businesses increase their prices to compensate for the food that they have had to throw out (Mlangeni, 2021).

A lot of people cannot afford these food products, and, in turn, they suffer from this as a result.

Previous attempts have been made to address these issues such as those attempted by Shoprite, Woolworths, and Pick n Pay. Spokespeople for the retailers stated that they are making attempts to reduce food wastage in their stores (Bega, 2021).

* One of the ways that they have reduced food wastage is in their bakeries, which have changed from making large batches of baked goods daily to purchasing frozen products that only require to be baked and can then be consumed (Bega, 2021). So, in turn, stores will only bake what will be needed for the day and the chances that baked goods are thrown out is reduced. In addition, the stores have stated that they have removed products that they viewed were unpopular to customers from their deli’s (Bega, 2021). This reduces the chance that stores buy stock that is not in demand that ends up sitting on a shelf and being thrown away.
* The stores have also decided to rotate their stock frequently and only purchased what was needed based on the season, such as ordering fruit and vegetables when they are in season (Bega, 2021).
* Store employees have been further trained to refrigerate perishables, frozen produce, fruit, vegetables, and convenience products within 10 minutes of it being delivered (Bega, 2021).

As mentioned previously, steps have been taken to reduce food, water, and energy wastage, however, it is not sufficient.

According to Bega (2021) most food wastage occurs in the agricultural sector itself, and not with retail stores. Most fruit and vegetables from farms are left out to rot or are thrown away due to not being suitable for sale. This could be due to the produce being an unusual colour, shape, or size from what is seen in stores, this means that food is discarded for not meeting a certain aesthetical standard.

In addition, it was observed that privately owned or small businesses and restaurants took little effort to reduce food wastage.

The purpose of this research is to address the issues observed in the agricultural sector, as well as in the business sector.

The Sustainable Spoonful was formed in 2023 and was formed in response to the problems of food, water, and energy wastage in South Africa. We aim to address these issues by developing a mobile application that enables users, businesses as well as charity organizations to communicate with each another.

## 2.2 Aim of Research

The aim of this project is to create a mobile application that can help minimize the issue of food wastage in South Africa.

We have decided to assist food retailers (such as Woolworths, Spar and Checkers), restaurants, cafes, and wholesalers with their problem of food wastage, which is defined as food that is not sold on time and is then thrown away or wasted when it can still be sold or eaten. This issue is especially pertinent in South Africa where it is often the case that a large majority of the population cannot afford food for their families.

As it is, the problems of food wastage and inflation add further stress to people as the price of food and other necessities are constantly and drastically increasing with food prices expected to increase by 13.4% annually (Statistics South Africa, 2023).

This mobile application may also assist communities, students and people that struggle with accessing clean water, healthy affordable food, or who are unemployed. It will further provide a means for stores or businesses to upload the items that they would normally throw away and enable people to purchase these products at a cheaper price.

Another aim of this project is to increase the number of donations that charities receive. If the products have not been sold at the end of the day, then the food will be donated to a charity of the retailer’s choice.

## 2.3 Research Objectives

The general objective of this project is for us to give less fortunate citizens of South Africa an opportunity to afford better food at better prices as well as to help shops minimize their food wastage.

The specific objectives of this research will be (Indeed Editorial Team, 2023):

* Interviewing the public and determining if people would be interested in using the mobile application that we are planning on developing; this should be done before any mobile application development is done.
* Determining the impact that wastage has on the South African community through research. This can be done in the next 2 weeks.
* Researching which areas would use the mobile application the most; specifically researching which areas are less fortunate.
* Identifying which retailer stores have an increased amount of food wastage. This can be done within the next 3 weeks to identify which stores would benefit from utilizing the mobile application.
* Determining what types of foods are wasted in stores. Are the products fruits and vegetables, meats, carbohydrates, or sealed items?
* Determining the discount percentage that the goods should be sold at. The discount percentage can be discussed and negotiated with the stores during the interview process.
* Determining what stores would be willing to donate their wasted food to charity. We can ensure that stores agree that if their products are not sold by the end of the day, it will be donated to a charity of their choice. The procedure for determining which charity the store would like to work with will be conducted during the interview process.

# Problem Statement

A third of all food in South Africa is wasted each year (FASA, 2019). This food wastage leads to an inflation in prices as businesses try to recover costs for the products that they have lost (Mlangeni, 2021). This leads to South African’s not having the funding or resources needed to obtain healthy nutritious food at an affordable price (Statistics South Africa, 2019).

While the government has pledged to halve current food wastage by 2030, more work needs to be done, such as addressing the current electricity crisis in South Africa (WWF, 2017). With food and water wastage, as well as having an electricity crisis, many experts expect that food wastage will increase in the coming years, not decrease (WWF, 2017).

Studies have found that food is wasted the most during production, agricultural post-harvest handling (by up to 50%), processing and packaging (by up to 25%) and storage (WWF, 2017). These processes are out of the general public’s control and as such, as a company, we can try to mitigate this during the retail phase (by up to 20%) and the consumer phase (by up to 5%) (WWF, 2017).

As current statistics stand the most wasted foods are (WWF, 2017):

* Fruits and Vegetables (by 44%).
* Cereals (by 26%).
* Meat and Dairy (by 15%).
* Roots, Tubers, and Oil Seed (by 13%).

With the above statistics in mind, this could mean (WWF, 2017):

* About 210KG of food is wasted every year on average per person.
* About 16 weeks’ worth of electricity that could have been used to power the entire city of Johannesburg is wasted.
* About 1 billion Rand is wasted every year on producing food that is never consumed.
* About 1/5th of South Africa’s water is wasted every year on food that will never be consumed.
* Up to 90% of food wasted ends up in landfills.

As a result of this, only about 46% of all South Africans have access to healthy and affordable food, this has a negative effect on the country and cannot be ignored (WWF, 2017).

Further studies have found that (WWF, 2017):

* Around 43,6% of all children in South Africa are Vitamin A deficient due to malnutrition, this can further lead to a weakened immune system.
* About 10% of all South African children suffer from iron deficiency which can result in them feeling tired and weak. This can impact their ability to learn and leads to lower IQ’s.
* Adults also suffer from poor nutrition, and this can leave them open to the risk of diabetes, heart disease and certain cancers.This can put adults who already have a compromised immune system under additional stress.

Currently there are legislations put in place to assist with the issue of food wastage, but some legislations may worsen food wastage instead of mitigating it (*The Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972 and the Health Act 63 of 1977*).

As a company, we need to establish how this food wastage affects retail stores (such as Woolworths, Spar and Checkers). From a business point of view this daily wastage can and is affecting profit margins. If we can ensure that food is sold, even at a reduced cost, this can prove to better than food being thrown away long-term.

## 3.1 Proposed solution

As mentioned previously, most of the factors that lead to food wastage are out of the general publics’ control, however, as a company we can try to assist where possible by working with the retail side of the food industry. We propose that a mobile food-saver application should be developed to address the issues of food wastage. The application will provide a means for customers to be notified of specials relating to food items that are nearing their sell-by date. The application will further aid in providing retail stores with the resources to donate their food products to schools, charities, old age homes and pet shelters if they are not sold by the end of the day.

# Sub-Problems

## 4.1 Check there is no current legislation in place that could impede our research.

* Research the current laws surrounding expired food products and donation of food products.

## 4.2 Establish interest amongst retail partners.

* Evaluate whether retail stores would be willing to partner with the mobile food-saver application.
* Do they have any requests or questions regarding its implementation?
* Would they benefit from tax exemptions through the donation clause?

## 4.3 Establish interest amongst consumers.

* Evaluate whether consumers would be interested in utilizing the mobile food-saver application.

## **4.4 Determine the experience of** food retailers **when it comes to food wastage.**

* Determine the approximate loss to income.

# Benefits of Study

**5.1 Benefits to academic area**

There are several advantages to reducing food waste in academic settings, including:

* Food waste results in a loss of resources as well as greenhouse gas emissions from the decomposition of organic waste. Academic institutions can support sustainability initiatives and lessen their environmental impact by getting rid of food waste (U.S. Department of Agriculture, 2010).
* Academic institutions can save money when they buy food and trash disposal costs by minimizing food waste (Bell, 2012). This can assist institutions in re-allocating funds to other crucial initiatives like research and teaching.
* Food waste signifies a lost opportunity to feed those who are hungry. Academic institutions may be able to give extra food to our company or a food bank, in so assisting in the fight against food poverty in their local communities.
* Reducing food waste in educational settings can also give students the chance to learn about the significance of reducing waste and the economic, environmental, and social advantages of doing so. This may encourage future generations to act sustainably.

**5.2 Benefits to companies or users**

Food waste reduction can benefit both businesses and consumers in a few ways, including:

* Food waste results in a loss of resources and money. Companies can save money on food purchases and reduce disposal costs by decreasing food waste. As they will need to buy less food (Harvard T.H. Chan, 2003).
* Users will be able to find more affordable groceries, helping families that are struggling financially.
* Food waste signifies a lost opportunity to feed those who are hungry. To combat food poverty in their communities, businesses and consumers might potentially contribute extra food to our company or other charity groups by minimizing food waste.
* The app can provide users with information about the impact of food waste and ways to fight it (Harvard T.H. Chan, 2003). It can help raise awareness to users on food wastage.

**5.3 Benefits to researchers**

Our mobile food-saver application connects retailers with customers who may buy certain food products on a discount, and as such reduce food wastage.

While decreasing food waste is the mobile application’s main advantage, there are other advantages for researchers:

* The mobile application will gather information on the volume of food taken from supermarkets, the kinds of food taken, and the locations of the supermarkets. Researchers who are interested in sustainability and food waste may find this information useful (Dunson, 2021).
* To distribute excess food, the mobile application will partner with a variety of organizations, such as non-profits and food banks. This offers researchers the chance to work with these groups to explore the effects of surplus food redistribution on waste reduction and food security.
* Due to the idea of redistributing extra food being recent, there is still a lot that we do not know about how it will affect food wastage, sustainability, and food security (EPA, 2022). By examining the effects of our mobile application and other comparable mobile applications on these difficulties, researchers who study these topics may discover new areas of inquiry.
* Our mobile application can help increase public knowledge of the value of decreasing food waste and the possible advantages of surplus food redistribution by promoting awareness of both food waste and surplus food redistribution. By fostering more interest in and support for this crucial topic, this raised awareness can aid in funding research in this field.

# Delimitation of Study

The boundaries or restrictions placed on a study to focus and limit the scope of the investigation are referred to as its delimitations (AJE, 2022).

Some potential delimitations for a study on the app include:

* **Geographical scope:** The study can be limited to just South Africa where the mobile application is accessible. This would assist in limiting the study's scope and provide a more specialized review of the app's performance in that field.
* **User demographics:** The study may restrict the users in its sample to a certain demographic, such as working professionals, families with children, or college students. This would enable the researcher to examine how a particular group uses and perceives the mobile application and how well it satisfies their unique demands.
* **Food type:** The study might concentrate on a particular category of food or items sold through the mobile application, such as fresh vegetables, meat, or baked goods. This would assist in limiting the study's scope and enable more thorough research of the mobile application’s effects on the reduction of food waste in that specific category.
* **Timeframe:** To give an overview of how the mobile application is utilized over a certain period, the study could restrict its analysis to a week or a month. This would help to narrow the study's focus and give more detailed information about how the mobile application's users use and view it.
* **Research methodology:** The study may restrict its use of a certain technique, such as a survey, focus group, or case study. This would enable a more concentrated investigation of the study's scope and the effectiveness of the app in attaining its goals (Hamk, 2022).

The following could be used to describe how the geographic boundary for the mobile application is defined:

* Johannesburg in Gauteng, South Africa will be the primary area of interest for the study.

It will focus on the following aspects of the mobile application:

* + This study will look at how residents utilize the mobile application to save money to overstock on food items. The types of food items bought, the frequency of purchases, and the reasons people use the mobile application will all be examined.
  + The study will look at how retailers in the area took part in the initiative. This will include a breakdown of the number of participating stores, the different types of stores, and the motivations behind each store's participation.
  + The study will evaluate the effect of the mobile application on reducing food waste in the country. This will involve a study of the quantity and types of surplus food items saved, as well as the environmental advantages of minimizing food waste (Hutchnizeger, 2022).
  + The study will investigate the mobile application's possible social equality advantages. This will involve a review of how the mobile application might improve low-income households' access to food and lower food insecurity in the area.

# Benefits of Study

## **7.1 Reasonable Timelines**

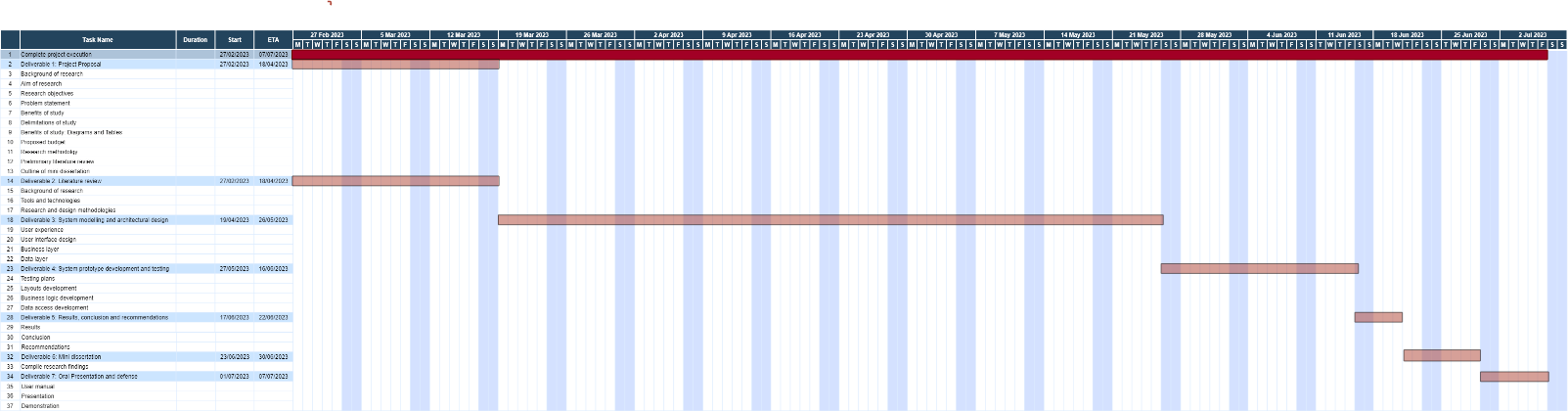
|  |  |  |
| --- | --- | --- |
|  | **Description of Work** | **Start and End Dates** |
| **Deliverable: 1** | **Project proposal** | **27/02/2023 - 05/04/2023** |
|  | Introduction |  |
|  | Abstract |  |
|  | Background of research |  |
|  | Aim of research |  |
|  | Research objectives |  |
|  | Problem Statement |  |
|  | Benefits of study |  |
|  | Delimitations of study |  |
|  | Benefits of study: diagrams and tables |  |
|  | * Reasonable timelines * Gantt chart * Work breakdown structure |  |
|  | Research methodology |  |
|  | Proposed budget |  |
|  | Outline of mini dissertation |  |
|  | Preliminary literature review |  |
|  | Final review |  |
| **Deliverable: 2** | **Literature review** | **06/04/2023 - 18/04/2023** |
|  | Introduction |  |
|  | Background research |  |
|  | Tools and technologies |  |
|  | Research and design methodologies |  |
|  | Conclusion |  |
|  | Final review |  |
| **Deliverable: 3** | **System modelling an architectural design** | **19/04/2023 - 25/05/2023** |
|  | User experience |  |
|  | User interface design |  |
|  | Business layer |  |
|  | Data layer |  |
| **Deliverable: 4** | **System prototype development and testing** | **26/05/2023 - 18/06/2023** |
|  | Testing plans |  |
|  | Layouts development |  |
|  | Business logic development |  |
|  | Data access development |  |
| **Deliverable: 5** | **Results, conclusion, and recommendations** | **19/06/2023 - 25/06/2023** |
|  | Results |  |
|  | Conclusion |  |
|  | Recommendations |  |
| **Deliverable: 6** | **Mini dissertation** | **26/06/2023 - 02/07/2023** |
|  | Compile research findings |  |
| **Deliverable: 7** | **Oral Presentation and Defense: Mini dissertation** | **03/07/2023 - 07/07/2023** |
|  | User manual |  |
|  | Presentation |  |
|  | Demonstration |  |

*Table 1: Reasonable timelines*

Kindly view our live Gantt chart for a more in-depth breakdown of our timelines below:

[Gantt Chart - Full Version](https://eduvosonline-my.sharepoint.com/:b:/g/personal/y34vr5c17_vossie_net/Ef8QWLYbhC5BiYlbSg785zEBAcQhj2vhdzhLzUSJZ-4ToA?e=WPbO78)

## 7.2 Gantt Chart

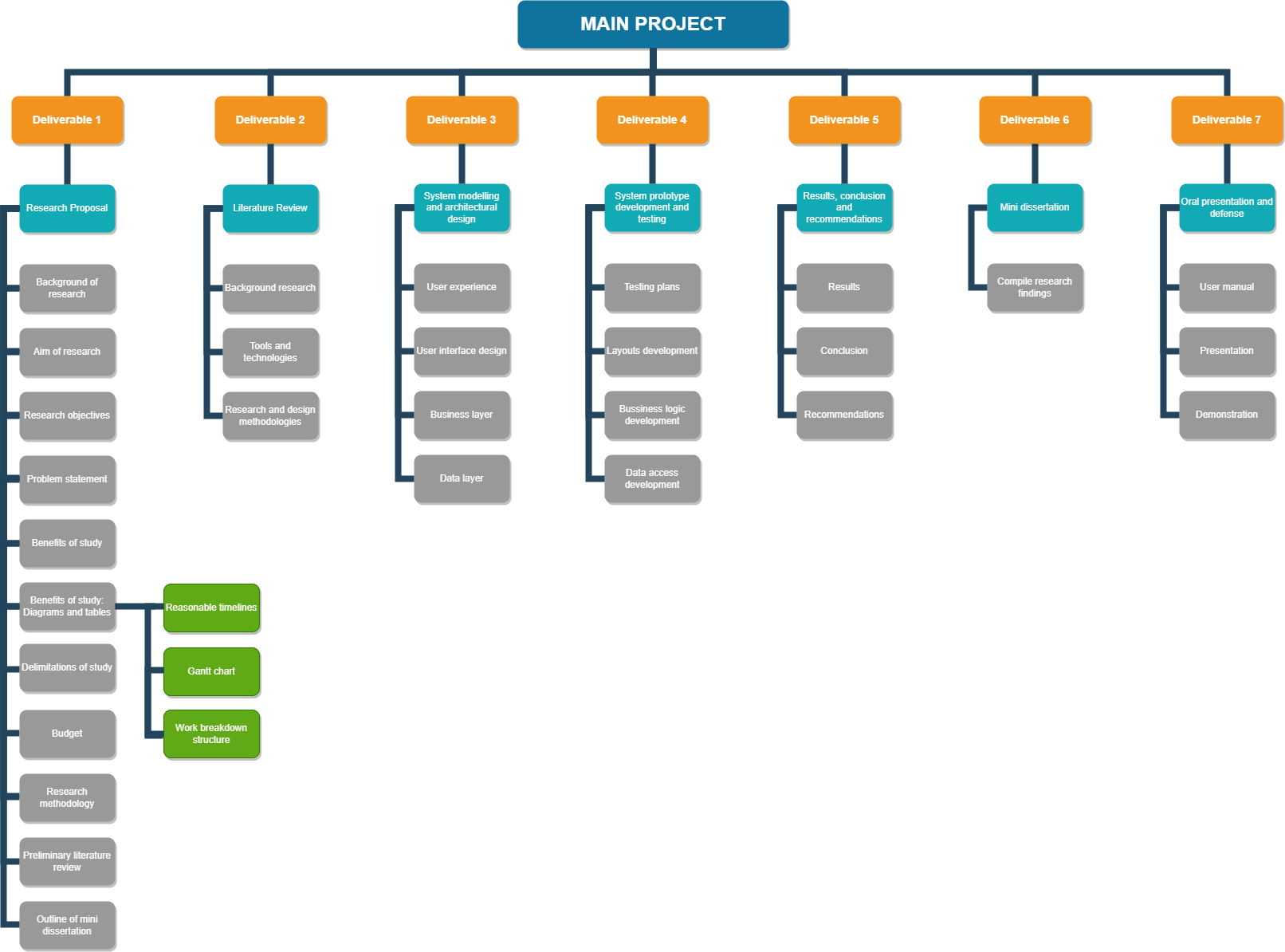


*Figure 1: Gantt Chart*

Kindly follow the link [Gantt Chart - Full Version](https://eduvosonline-my.sharepoint.com/:b:/g/personal/y34vr5c17_vossie_net/Ef8QWLYbhC5BiYlbSg785zEBAcQhj2vhdzhLzUSJZ-4ToA?e=WPbO78) to view the image in detail.

Kindly follow the link to our live version: <https://itmdagroup.youtrack.cloud/gantt-charts/166-0>

7.3 Work breakdown structure



*Figure 2: Work breakdown structure*

Kindly follow the link below to view the image in detail: [Work break structure](https://eduvosonline-my.sharepoint.com/:i:/g/personal/y34vr5c17_vossie_net/EQ2tT6YpnC9MrvmcgwJNKNMBnbEmPE-MRKLMEfvmrHSMTg?e=fnRbkd)

# Proposed budget

To manage the budget, it is important to establish a detailed project plan and budget breakdown. This will help ensure that costs are carefully tracked and managed throughout the project’s lifecycle. Regular monitoring and reporting of actual costs versus budgeted costs will also be necessary to identify and address any discrepancies or overruns.

Finally, collaborating closely with each other to ensure effective communication and collaboration will be essential to manage the budget effectively (SOVTECH, 2022).

|  |  |  |
| --- | --- | --- |
|  | **Description of Work** | **Cost (R)** |
| **Deliverable: 1** | **Problem Settings:** *Creating a proposal outlining the scope of the project, the app’s features, target audience, timeline, and budget.* |  |
|  | Writing the proposal. | 0 |
| Compiling the proposal into a document. | 1500 |
| Printing and distributing the proposal amongst team members and the client. | 500 |
| **Deliverable: 2** | **Literature Review:** *This stage involves researching existing literature and studies related to the problem the app will solve.* |  |
|  | Researching existing literature and studies. | 0 |
| Compiling the research into a document. | 1500 |
| Hiring a proofreader. | 2500 |
| **Deliverable: 3** | **System Modelling and Architectural Design:** *This involves designing the overall system architecture, database schema, and API structure.* | 6000 |
| **Deliverable: 4** | **System Prototype Development and Testing:** *This involves developing a functional prototype of a mobile app and assessing it for bugs and glitches.* |  |
|  | Hiring system testers. | 2500 |
| Hosting the mobile application (R200 x 36 months). | 7200 |
| **Deliverable: 5** | **Results, Conclusion, and Recommendations:** *This stage involves analyzing the results of the testing and making conclusions and recommendations for future improvements.* | 3000 |
| **Deliverable: 6** | **Mini-Dissertation:** *This stage involves documenting the entire app development process in the form of a* *mini-dissertation.* | 3000 |
| **Deliverable: 7** | **Oral Presentation and Defence:** *This stage involves presenting the project and defending the work before a panel of experts.* |  |
|  | Printing business cards (double-sided cards: R1,75 x 50 ). | 87,50 |
| Printing posters (Size A4 poster: R65 x 2). | 130 |
| Renting a webcam (R500 x 1). | 500 |
| Renting a microphone (R175 x 1). | 175 |
| Renting a projector (R500 x 1). | 500 |
|  | **Total** | **29 092,50** |

*Table 2: Proposed budget* (Thomas, 2022)

# Research Methodology

1. **Research Problem and Questions:**

The research problem for this project proposal is to identify the feasibility and effectiveness of developing the app to reduce food waste and promote sustainability in the food industry. To address this the following research questions will be explored:

* What are the current food waste reduction practices in the food industry?
* What are the factors contributing to food waste in the industry?
* What are the potential benefits and limitations of developing our app to reduce food waste?
* How effective is our app in reducing food waste and promoting sustainability in the food industry?

1. **Research Design:**

To address the research problem and questions, a mixed-methods research design will be used. This design uses both quantitative and qualitative research methods to provide a comprehensive understanding of the research problem and answer the research questions.

1. **Data Collection:**

The following data collection methods will be used:

* **Literature review:** This will involve a comprehensive review of relevant literature, including academic journals, articles and reports related to food waste reduction.
* **Surveys:** Surveys will be used to collect data from potential users and food retailers.
* **Interviews:** Qualitative data will be collected through interviews with experts in the food industry.

1. **Data Analysis:**

The data collected from the literature review, surveys, and interviews will be analysed using both quantitative and qualitative data analysis techniques. Quantitative data will be analysed using statistical software, and qualitative data will be analysed thematically to identify key themes and patterns related to the research questions.

1. **Expected Results:**

The expected results of the study will be a comprehensive understanding of the current food waste reduction practices in the food industry, the factors contributing to food waste, and the potential benefits and limitations of developing our app to reduce food waste and promote sustainability. Additionally, the study will provide insight into the effectiveness of our app in reducing food waste and promoting sustainability in the food industry.

1. **Limitations:**

Some limitations may include a limited sample size, potential bias in data collection and potential limitations in the data collection methods used (McCombes, 2023).

# Preliminary Literature Review

In this deliverable, we have discussed businesses with a problem of food wastage that is becoming a large problem in South Africa (A third of South Africa's food is wasted every year).

The group will develop a mobile application to try and help reduce that amount. We have been researching the topic of food wastage in South Africa and how it effects other problem areas in the country by exacerbating them.

We have found that the rampant wastage of food has far-reaching consequences to other areas such as the wasting of electricity, which is currently being used to produce food that is just being wasted; considering that South Africa already has an electricity crisis and we are currently experiencing loadshedding, we really do not have electricity to waste.

We have also found that the issue of food wastage can cause water wastage as well; where water is used in growing food that will only be wasted. Therefore, our plan for this app is to help minimize the issues caused by food wastage, because water and electricity are two of South Africa’s major concerns.

This mobile application will also help people gain access to food where previously they had little hope; people work extremely hard to afford the bare necessities and can only afford the cheapest/ bare minimum food to survive off. This leads to malnutrition in parents and children, affecting learning capabilities. Hunger can also lead to death; where children can be left orphans in the system, people lose family and friends.

The goal would be to start decreasing hunger in the country by the time this mobile application is created; as well as give the people an opportunity to look after their family and themselves even if they are struggling financially. The group will aim to find food retailers and restaurants that experience a lot of food wastage and add them to the mobile application. We will also try to find charities that the food retailers can partner with if the food is not sold at a decreased price.

Other mobile applications that have been created for the same reason of food shortage is “Too good to go” which is been used with food retailers and restaurants in major European cities; “Imperfect Food” that is available along the West Coast, and “Flashfood” which is used in Canada and the United States of America.

# Outline of Mini-Dissertation

Below is a breakdown of what will be explored in our mini-dissertation. We will use this as a guide to ensure that we are as comprehensive in our research as possible.

* Abstract
* Acknowledgements
* Chapter 1: Problem Settings
  + Background of Research
  + Aim of Research
  + Research Objectives
  + Problem Statement
    - Sub-Problems
  + Benefits of Study
  + Delimitation of Study
  + Timelines
  + Outline of Mini Dissertation
* Chapter 2: Literature Review
  + Introduction
  + Mobile Apps
  + Mobile Apps in your area of research
    - Technologies used in the existing mobile apps
  + Mobile Apps 2
    - Technologies used in the existing mobile apps
  + Desktop Apps or Websites
  + Mobile App Tools and Technologies
  + Mobile Apps Research and Design Methodologies
  + Conclusion
* Chapter 3: System Modelling and Architectural Design
  + Introduction
  + Presentation Layer
    - User Experience
      * Fact-Finding Technique(s)
      * Facts Analysis
    - User Interface
      * User Interface Design
        + Iterations
  + Business Layer
    - Operations/Process Models Design
      * Iterations
    - Data Handling Operations
      * Iterations
  + Data Layer
    - User Data
      * Iterations
    - System Data
      * Iterations
  + Conclusion
* Chapter 4: System Prototype Development and Testing
  + Introduction
  + Testing Plan
  + Testing Types
  + Layouts Development
    - User Interface 1
      * Iterations
    - User Interface 2
      * Iterations
    - User Interface 3
      * Iterations
  + Business Logic Development
    - Algorithm one
      * Iterations
    - Algorithm two
      * Iterations
  + Data Access Development
    - Database Implementation
      * Database Creation Class
        + Iterations
    - Data Access Adapters
      * Accessor Methods
        + Iterations
  + Conclusion
* Chapter 5: Results, Conclusion, and Recommendations
  + Results
    - Research Findings
    - Successes
    - Challenges
    - Benefits
  + Conclusion
  + Recommendations
* Appendices
* List of Figures
* List of Tables
* References

# List of Figures

[*Figure 1: Gantt Chart* 16](#_Toc132315217)

[*Figure 2: Work breakdown structure* 17](#_Toc132315218)

# List of Tables

[*Table 1: Reasonable timelines* 16](#_Toc132315225)

[*Table 2: Proposed budget* (Thomas, 2022) 19](#_Toc132315226)

# References

AJE, 2022. *Scope and Delimitations in Research | AJE*. [Online] www.aje.com. Available at: https://www.aje.com/arc/scope-and-delimitations-in-research/ [Accessed 13 April 2023].

Bega, S., 2021. *South Africa wastes 10mn tons of food a year.* [Online] The Mail & Guardian. Available at: <https://mg.co.za/environment/2021-08-21-south-africa-wastes-10-million-tons-of-food-a-year/#:~:text=South%20Africa%20wastes%2010mn%20tons%20of%20food%20a> [Accessed 12 March 2023].

Bell, R., 2012. *Reducing food waste has economic, environmental and social benefits.* [Online] Available at: <https://www.canr.msu.edu/news/reducing_food_waste_has_economic_environmental_and_social_benefits> [Accessed 12 March 2023].

DiscoverPhDs, 2020. *Scope and Delimitations - Explained & Example*. [Online] DiscoverPhDs. Available at: https://www.discoverphds.com/blog/scope-and-delimitations [Accessed 11 March 2023].

Dunson, J., 2021. Food Waste in Schools and Strategies to Reduce It. [Online] Available at: <https://extension.sdstate.edu/food-waste-schools-and-strategies-reduce-it> [Accessed 12 March 2022].

EPA, 2022. *Food Waste Research | US EPA*. [Online] Available at: https://www.epa.gov/land-research/food-waste-research [Accessed 13 April 2023].

FASA., 2019. Tackling South Africa’s food waste problem. [Online] FASA Franchise Association of South Africa. Available at: <https://www.fasa.co.za/tackling-south-africas-food-waste-problem/> [Accessed 12 March 2023].

Fredrick,T., 2022. usda.gov. [Online] Available at: <https://www.usda.gov/foodlossandwaste/why> [Accessed 12 March 2023].

Harvard T.H. Chan, 2017. *Food Waste*. [Online] The Nutrition Source. Available at: https://www.hsph.harvard.edu/nutritionsource/sustainability/food-waste/ [Accessed 13 April 2023].

Hautzinger, D., 2022. App prevents food waste- And Gives Customers a Deal on Groceries, Too [Online] Available at: <https://interactive.wttw.com/playlist/2022/10/04/flashfood> [Accessed 13 March 2023].

Indeed Editorial Team., 2023. Research Objectives: Definition and How to Write Them. [Online] Indeed Career Guide. Available at: <https://www.indeed.com/career-advice/career-development/research-objectives> [Accessed 18 March 2023].

IPC., 2021. South Africa: Impact of Covid-19 on Food security. [Online] Integrated Food Security

Phase Classification. Available at: <https://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1153024/?iso3=ZAF> [Accessed 12 March 2023].

King, M., 2021. 5 tips on how to write a research aim. [Online] Available at: <https://timesofindia.indiatimes.com/readersblog/mabast-king/5-tips-on-how-to-write-a-research-aim-36047/> [Accessed 9 March 2023].

McCombes, S. and George, T., 2022. *What Is a Research Methodology? | Steps & Tips*. [Online] Scribbr. Available at: <https://www.scribbr.com/dissertation/methodology/> [Accessed 11 March 2023].

SABC News., (2021). *South Africans decry souring food prices - SABC News*. [Online] Available at: <https://www.sabcnews.com/sabcnews/south-africans-decry-souring-food-prices/> [Accessed 3 April 2023].

SOVTECH., 2022. How much does it cost to build an app? [Online] Available at: <https://www.sovtech.co.za/how-much-does-it-cost-to-build-an-app#:~:text=One%20can%20develop%20a%20custom,ROI%20and%20exponential%20business%20growth>. [Accessed 20 March 2023].

Statistics South Africa. 2019. The Extent of Food Security in South Africa | Statistics South Africa. [Online] stats-SA. Available at: <https://www.statssa.gov.za/?p=12135> [Accessed 12 March 2023].

Thomas, R., 2022. How much does it cost to build an app in South Africa. [Online]   
Available at: <https://zarecruitment.com/how-much-does-it-cost-to-build-an-app-in-south-africa/> [Accessed 20 March 2023].

U.S. Department of Agriculture, 2010. *Why should we care about food waste?* [Online] Available at: https://www.usda.gov/foodlossandwaste/why [Accessed 12 March 2023].

WWF, 2017. *Food Loss and Waste: Facts and Futures Taking steps towards a more sustainable food future 2017 report za* [online] Available at: https://wwfafrica.awsassets.panda.org/downloads/WWF\_Food\_Loss\_and\_Waste\_WEB.pdf [Accessed 26 March 2023].

Wwf.org.za., 2017. The truth about our food waste problem. [Online] Available at: <https://www.wwf.org.za/?21962/The-truth-about-our-food-waste-problem> [Accessed 12 March 2023].

‌