Business Model

# On Campus Delivery Robot

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#Team_03

# Meet the team

**#Team_03**

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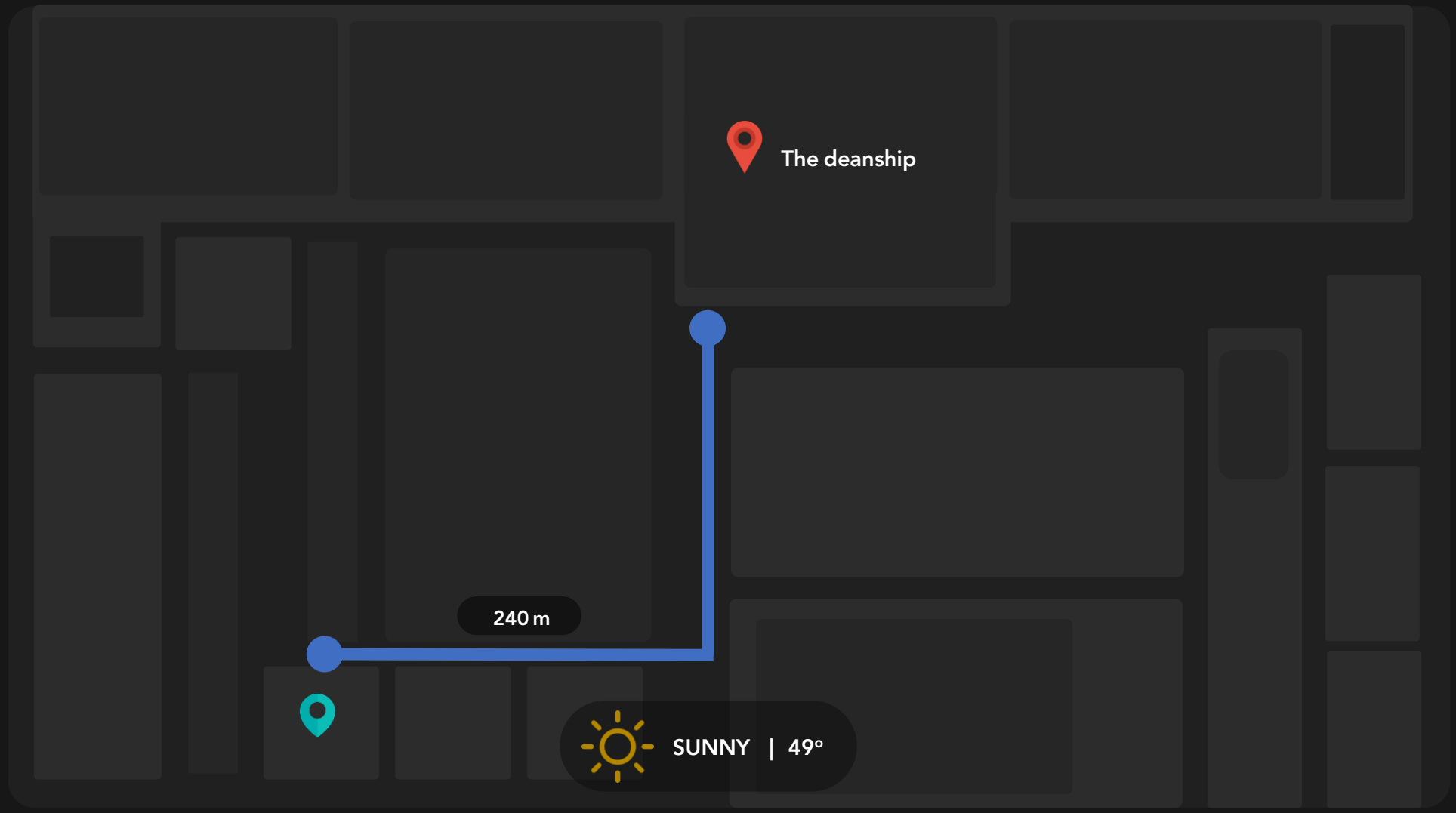
# Project Introduction

## Problem Statement

Create a unified and comprehensive delivery network across the KAU campus without human involvement

# Situation Description




The Faculty Of Engineering

# Our Solution

## Create an Autonomous On-Campus Delivery Robot

# We are targeting

## Businesses

Deliver the packages from the markets inside the campus to the customers

## Individuals

Deliver the personal shipments between the buildings within the campus

# Business Model

# The Business Model Canvas

| Designed for: | Designed by: | Date: | Version: |
|---|---|---|---|
| | | | |

## Key Partners

- **Businesses within the campus:** Business and markets within the campus could be our main partner as they need to deliver customers' shipments.
- **Internet Services Providers:** The connectivity of our robots and area covered by the internet service provider within the campus affects our business
- **Online Payment Platforms:** e.g. mada, visa, stcpay.
- **Materials suppliers:** Includes all the outer material used for robot and the inner materials used to hold the shipments and ensure its safety

## Key Activities

Firstly, we are responsible for the general upkeep of the product ( robots' maintenance, server hosting, etc.)

We also need to work on R&D to further optimize our pathfinding algorithms, battery life.

We would also manufacture more robots to be able to expand our service area

## Key Resources

Key resources are a big part of the project. As such, we have a few key notes in mind. Physical resources which are the main aspect of the solution will be considered as robots. Moving on, the intellectual resources are consisting of the robot algorithm and delivery network. Both of which will be procured by our team.

## Value Propositions

This project aims to provide campus frequenters (students, professors, etc.) a service that allows them to send or receive items using robots instead of having to go pick up the item or deliver it by themselves. Which saves their time and is much more convenient

The product would also be reasonably priced to be more accessible for students.

Although there are a plethora of delivery apps in Saudi Arabia that deliver to homes/workplaces. To the best of our knowledge, there are neither services that use robots nor services that deliver items within the campus buildings.

## Customer Relationships

- **Excellent Customer Service :** by send/call to ask about the user experience showing that we care.
- **Self-service for FAQ :** Could be a webpage for the most FAQ and articles/videos on how to use.
- **Social Media Engagement**
- **Free Trial First Delivery:** for a while till people accept the idea of having robots to deliver the shipments
- **Gift Cards**

## Channels

Channels are an important aspect to advertise or improve our product. Additionally, the KAU newspaper is a great awareness tool in the university which can be used as an effective recognition tool. Furthermore, evaluation from customers can be a good heads up to where we are heading. Consequently, customer reviews are a powerful asset to have in order to figure out what the customer has in mind. A website or an app could prove useful to be as ways of purchase for the product. On top of that, the delivery aspect will be handled by the actual robot itself. Finally, after sales will be handled by online customer chatting.

## Customer Segments

Fortunately, the university offers a great system integrated into its whole campus. Furthermore, this system divides the university population into segments. These segmentations are based on the ranking of the people. We have doctors/professors, students, employees and visitors to the university campus. This in turn will be our segmentation for the customers:

- **Doctors/Professors**
- **Students**
- **Employees**
- **Visitors**

## Cost Structure

- **Production :**The costs needed to build the robot, includes the hardware costs and the initial software subscriptions and fees.
- **Marketing:** includes all paid ads.
- **Hosting :** hosting fees for the robot server to handle the requests coming from the clients.
- **Customer Services :** includes the service and the content creation for self-service FAQ.
- **Maintenance fees :** includes period and non-periodic maintenance.

## Revenue Streams

While the newness factor might incentivize people to try our product, the thing that would keep them as customers is most likely the convenience of using the delivery robot.

Currently, people aren't paying money to deliver items. However, they are paying using a far more valuable resource, time.

The main source of revenue would be usage fees paid by the users for each delivery. The price can be calculated as a base price + cost per km x distance traveled (km) (e.g., 4 SAR + 0.5 SAR/km)

# Competitor Analysis

# Starship Food Delivery Robot

The Starship Technologies company was found in 2014. The food delivery robot was launched about a year later in November 2015. The Robot has 6 wheels which allows it to basically climb small curbs. It can reach pick up and drop-off locations autonomously.

The robot is also integrated with restaurants and markets with the assistance of an app similar to normal food delivery apps. The app sends the order to the restaurants, they prepare the order, and the robot goes to pick it up. The package is then safely secured inside the robot and to access the package the user unlocks the robot using the app.

The robot uses ultrasonic sensors, stereo cameras, radar, time-of-flight camera to map and navigate the enviroment of the robot. [1]

The robot can carry packages up to ~10 kg which makes it's use limited to lightweight packages. It is available in different states in the US, the United Kingdom, Estonia, Germany. However, there are currently no Starship robots in anywhere in the Middle East. [2]

# Amazon Prime Air

Amazon Prime Air is a new type of delivery that has been released in December, 2016. Furthermore, the new delivery system uses fully autonomous drones that are capable of delivering packages within 30 minutes. Consequently, the feature is still not as big as it seems, the company requires fulfillment facilities that store specific type of packages that the quadcopters can carry. To add on, the drones are fully autonomous and can launch and land at locations it deems applicable. The packages being carried must be within 5 lb so that the drone can lift up to 40ft and use GPS.

Amazon makes the interaction between the customer and the drones very easy. The regular Amazon website is used to create an order and the delivery process is automated by Amazon. Consequently, this makes the user experience quite straightforward. As is before, the customers are accustomed to using their services before and therefore, using a new way of delivery might not cause hassle. Delivery time is also reduced by using this method which in turn saves time for everyone and increases customer recurrency.

Disadvantages of using drones depend on many factors such as location, wind speed, weather and safety of the drone. For example, if the delivery location Is underground then the drone wouldn't be able to deliver the package. Furthermore, weather affects drones heavily since they are lightweight and a sunny day differs than a rainy day or a very windy day. Finally, we cannot deny that people might not abide laws and may tamper with the drone and could harm it.

In conclusion, Amazon boasts a very innovative way of delivering packages in select places. The drones are very up to date in technology and boast good specifications. However, they are prone to natural causes and humans.

# Classical Shipping Companies

One for example local classical shipping companies is Zajil. It was founded in 1999. it Provides package delivery and mail services that covers the whole country with more than 28 distributed office all around Saudi Arabia. With expansion plans to cover the whole all the Arabian Gulfs countries. Zajil is usually known with its low shipping fees compared to other alternatives which is a competitive advantage compared to other shipping companies .

Although the shipping is faster compared to other alternatives, Zajil does not provide on campus delivery. for this, if a person needed to deliver a shipment within a campus the person needs to take the shipment to the office and wait till the shipment leaves the depository which may take another day, thus it is unreasonable to use it to deliver an on campus shipment. This whole process does not make senese as the person could simply go the building within the campus instead of leave the whole campus to deliver it the office and pay the shipping fees for a shipment that will be finally delivered back to person's campus again.

According to Zajil's strategic plan built by Kadi Group Holding in 2009 one objective is to expand their services to all sectors which may include a future expansion in the on campus delivery service for businesses. So, we expect, some competition in case zajil's plan included joining the robotics delivery field early.

# Market Survey

# Survey Questions

Q1: While on campus, have you ever had an item that you wanted to deliver but didn't have the time/energy to deliver it?

Q2: Would you be willing to use a delivery robot to deliver those items?

# Survey Questions

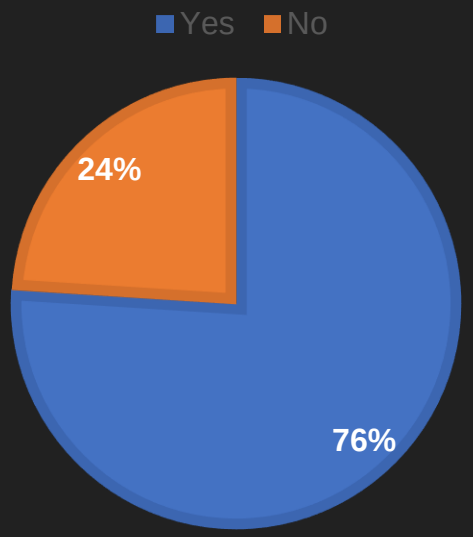
**Q3: How often do you think you would use a delivery robot?**

**Q4:**
**4. Would you be willing to pay a base price of 1 SAR plus 0.5 SAR per km to deliver an item?**
eg. 3 SAR for a 4 km trip

# Results

Q1: While on campus, have you ever had an item that you wanted to deliver but didn't have the time/energy to deliver it?

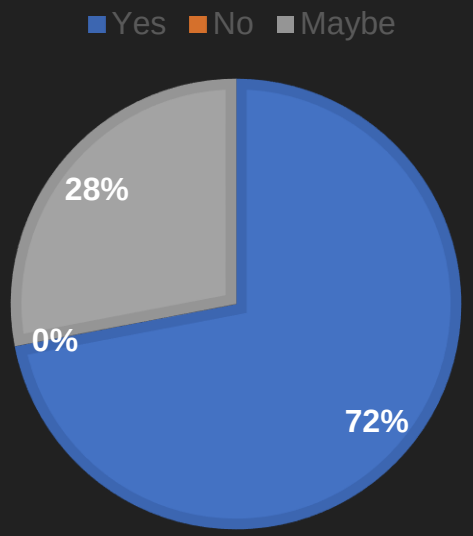
25 respondents




As shown in the figure, 76% of the respondents have been in this situation, where our product would have helped.

# Results

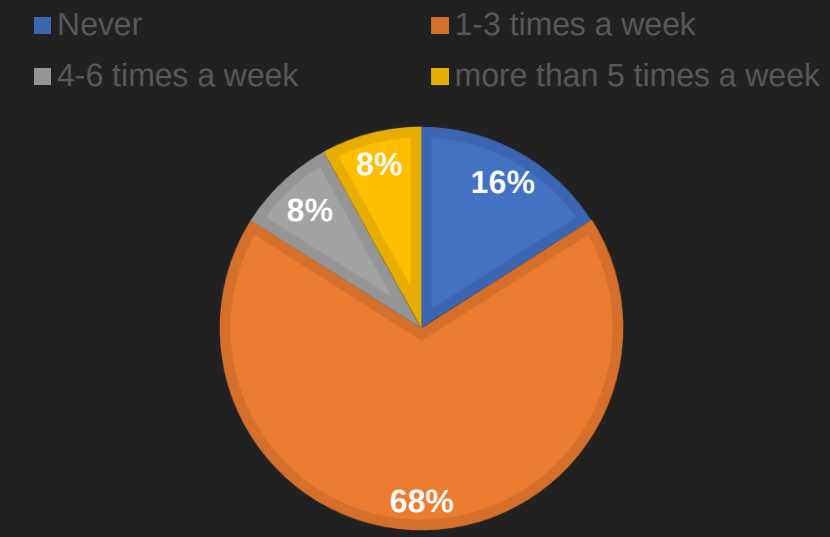
## Q2: Would you be willing to use a delivery robot to deliver those items?




The figure shows that 72% of the respondents are willing to use a delivery robot and the rest of the respondents don't reject the idea either but are a little hesitant.

# Results

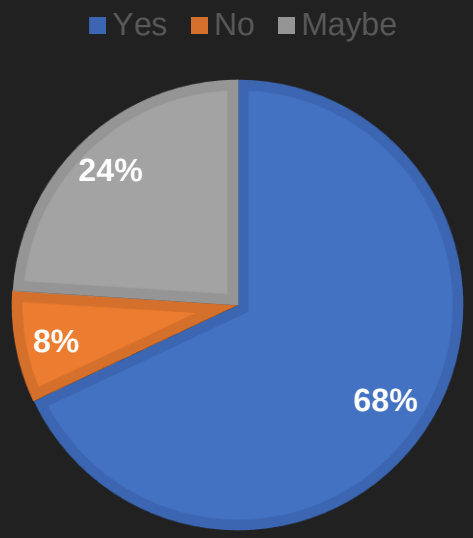
Q3: How often do you think you would use a delivery robot?




As shown in the figure, 84% would use the robot at least once a week. The majority of the respondents (64%) would use the robot 1-3 times a week

# Results

Q4: Would you be willing to pay a base price of 1 SAR plus 0.5 SAR per km to deliver an item?




It can be seen from the figure that 68% of the respondents would pay the proposed price. And 24% are uncertain and they might decide later depending on the delivery time, safety, etc.

# Experience

We have touched a very repetitive problem as 76% voted they had been through this problem

This motivates us to start to start a business that solves the problem those people

The assignment improved our business sense, so instead of just keeping the ideas we may be solving a problem that affects the whole society and start a business from it

From the people responses, we can say we are interested in starting our business as soon as possible in-sha'a-allah.

# References


[1] "Starship - ROBOTS: Your Guide to the World of Robotics." https://robots.ieee.org/robots/starship/?gallery=photo1 (accessed Oct. 24, 2021).

[2] "Follow Our Robots on Their Adventures Around the World – Starship." https://www.starship.xyz/follow/ (accessed Oct. 24, 2021).

[3] J. Bezos, "Amazon.com: Prime Air", Amazon.com, 2021. [Online]. Available: https://www.amazon.com/Amazon-Prime-Air/b?ie=UTF8&node=8037720011. [Accessed: 24- Oct- 2021]

# Appendix A – Copy of Questionnaire


## Delivery Robot Feasibility Study

We are EE499 Senior design project students and we are working on a project titled "On-Campus Delivery Robot". This questionnaire aims to study the feasibility of our project.

نعمل على مشروع بعنوان "روبوت للتوصيل داخل الحرم الجامعي". الهدف من هذا EE499 نحن طلاب مادة مشروع التخرج الاستبيان هو دراسة الجدوى لهذا المشروع.

waaldhaheri@gmail.com (not shared) Switch account  Draft restored

* Required

Please choose your preferred language فضلا اختر اللغة *

- (●) English
- ( ) العربية

# Appendix A – Copy of Questionnaire

1. While on campus, have you ever had an item that you wanted to deliver but didn't have the time/energy to deliver it? *

- ◯ Yes
- ◯ No

2. Would you be willing to use a delivery robot to deliver those items? *

- ◯ Yes
- ◯ No
- ◯ Maybe

3. How often do you think you would use a delivery robot? *

- ◯ Never
- ◯ 1-3 times a week
- ◯ 4-6 times a week
- ◯ more than 5 times a week

4. Would you be willing to pay a base price of 1 SAR plus 0.5 SAR per km to deliver an item? *

eg. 3 SAR for a 4 km trip

- ◯ Yes
- ◯ No
- ◯ Maybe

# Appendix A – Copy of Questionnaire

1. أثناء وجودك في الحرم الجامعي, هل سبق أن احتجت أن توصل غرض لكن لم تجد الوقت أو القدرة على ايصالها بسبب الانشغال او غيره ؟ *

- نعم
- لا

2. هل لديك استعداد أن تستخدم روبوت توصيل لتوصيل ذلك الغرض؟ *

- نعم
- لا
- ربما

3. في اعتقادك, كم مرة ستسخدم روبوت التوصيل في الاسبوع؟ *

- لن أستخدمه أبدا
- مرة إلى 3 مرات في الاسبوع
- 4 مرات إلى 6 مرات في الاسبوع
- أكثر من 6 مرات في الاسبوع

4. هل لديك استعداد أن تدفع 1 ريال + 50 هللة لكل كيلو متر لتوصيل غرض ما؟ *

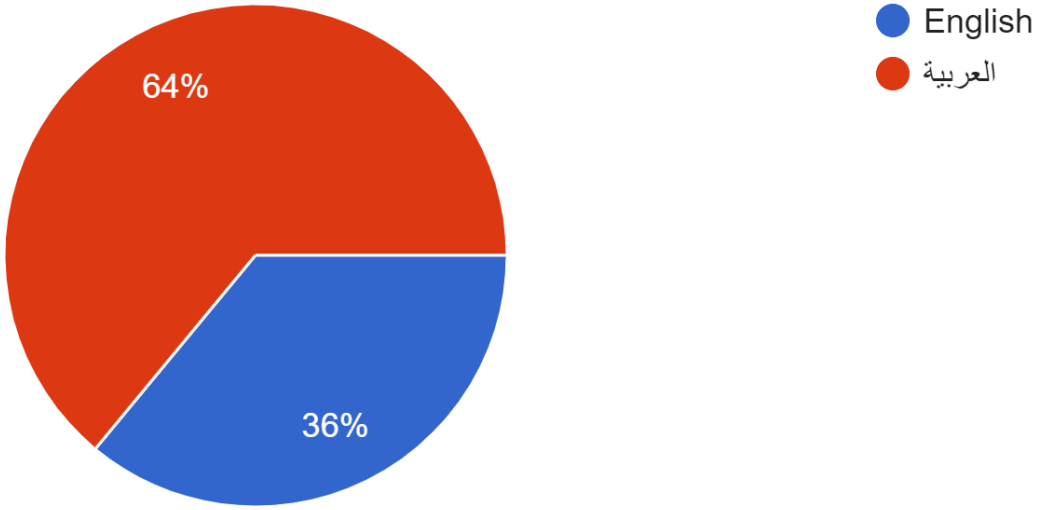
مثال: 3 ريالات لتوصيل غرض لمكان يبعد 4 كم

- نعم
- لا
- ربما

# Appendix B – Copy of Results

Please choose your preferred language فضلا اختر اللغة

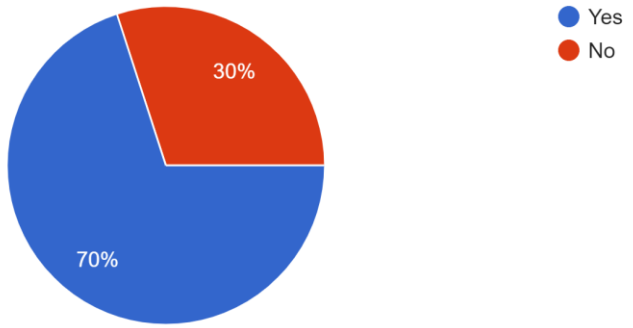
25 responses



# Appendix B – Copy of Results

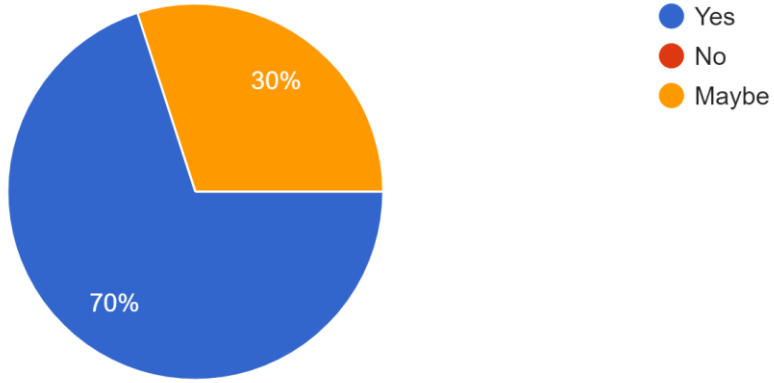
1. While on campus, have you ever had an item that you wanted to deliver but didn't have the time/energy to deliver it?

10 responses




2. Would you be willing to use a delivery robot to deliver those items?

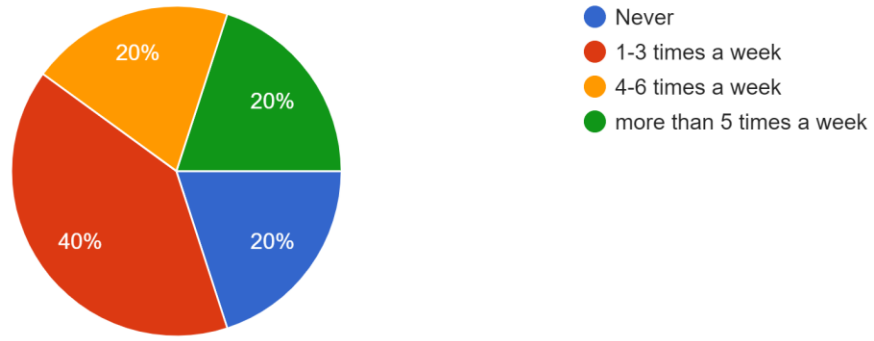
10 responses



# Appendix B – Copy of Results

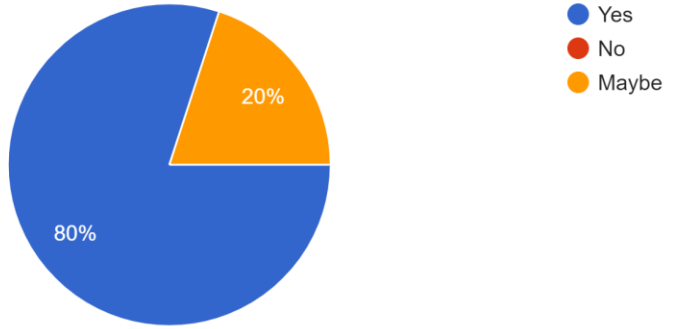
3. How often do you think you would use a delivery robot?

10 responses




4. Would you be willing to pay a base price of 1 SAR plus 0.5 SAR per km to deliver an item?

10 responses



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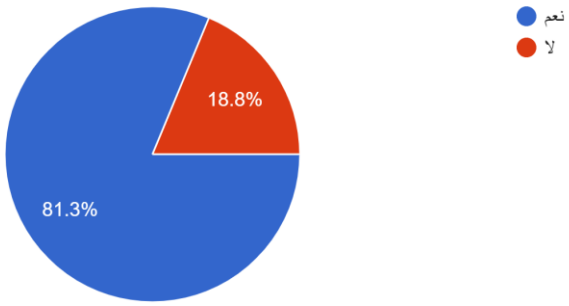
16 responses

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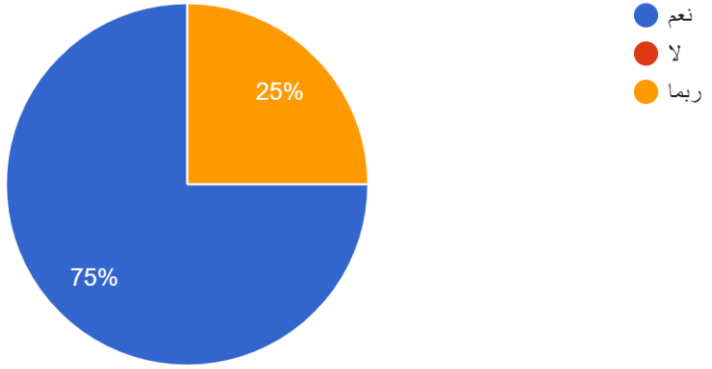
16 responses



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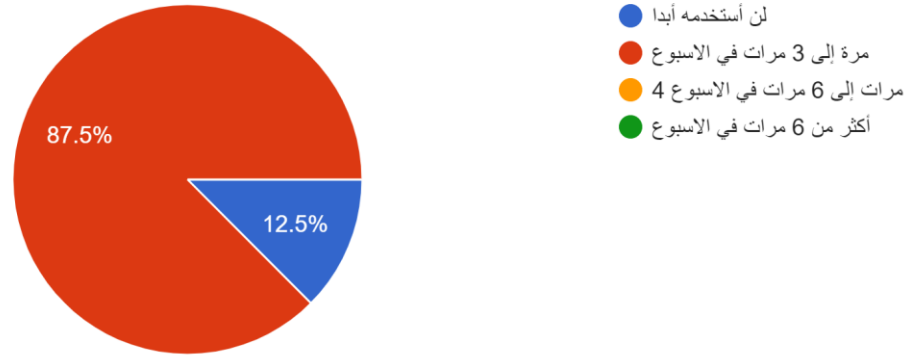
3. في اعتقادك, كم مرة ستسخدم روبوت التوصيل في الاسبوع؟

16 responses

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16 responses