

Effects of Image Quality on Facebook Marketplace Bidding

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John Lee, Sanjay Saravanan



Agenda

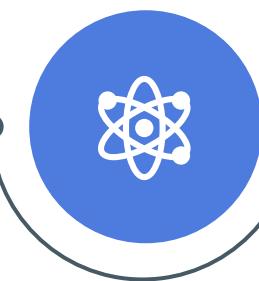
Research Question



Power Analysis



Conclusions



Survey

Experiment

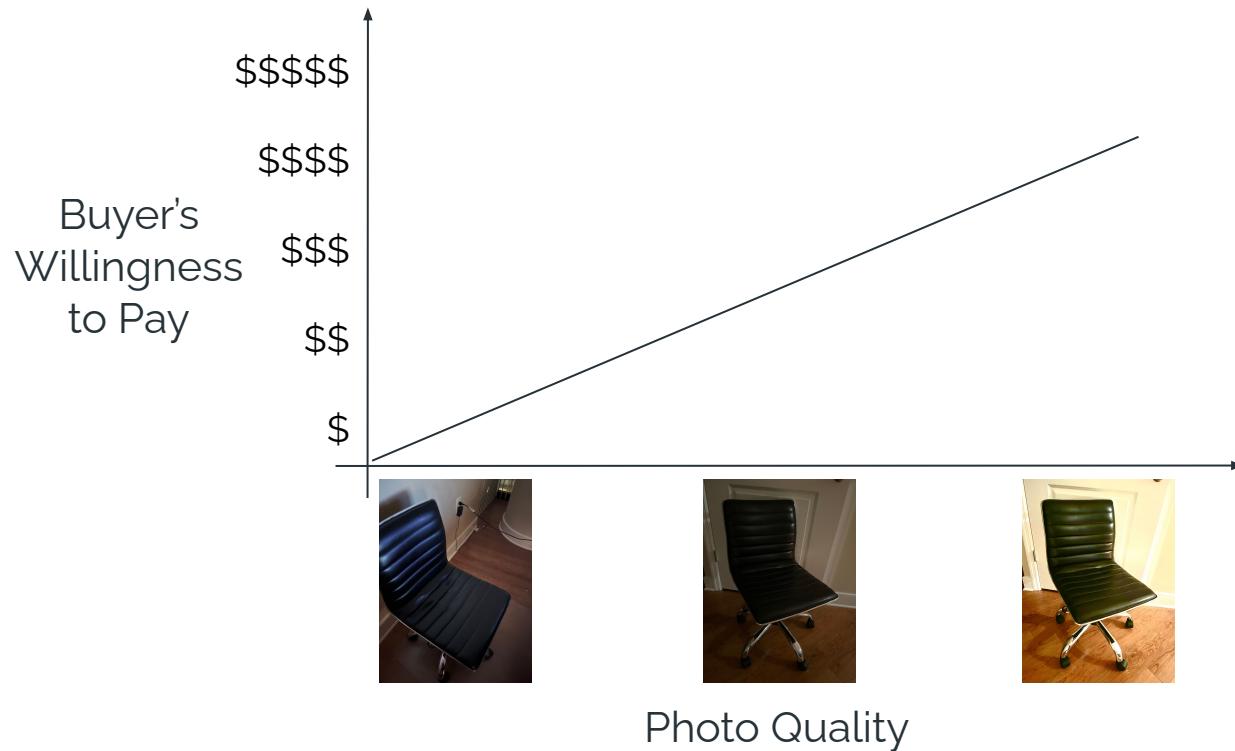
Research Question

Does increasing photo quality on Facebook Marketplace cause an increase in the amount online buyers are willing to offer for a good?

- Online selling of used goods has increased with the rise of platforms like Facebook Marketplace and PoshMark
- Individual sellers want to maximize the money they make from selling products online



Higher quality photos increase a buyer's willingness to pay



Survey

Treatment for Survey

Control

Decreased image's exposure & brilliance. Increased noise reduction.



Treatment

Increased image's exposure, brilliance, highlights, shadows, contrast, brightness, saturation.



Survey

Assume that you're interested in buying this item. Use text box below to type in how much you would offer for this item.



qualtrics^{XM}

Weight Scale

Original Retail Price: **\$25**

Your offer (\$):

x 10
items

Survey Results

Simple Model, no covariates: $\log(\text{offer} + 1) \sim \text{photo_quality}$

Demographic HTEs: $\log(\text{offer} + 1) \sim \text{photo_quality} + \text{retail_price} + \text{vacuum_offer} + \text{age} + \text{gender} + \text{marital_status} + \text{employment} + \text{photo_quality} * \text{gender} + \text{photo_quality} * \text{marital_status}$

Price HTE: $\log(\text{offer} + 1) \sim \text{photo_quality} + \text{retail_price} + \text{vacuum_offer} + \text{age} + \text{gender} + \text{marital_status} + \text{employment} + \text{photo_quality} * \text{retail_price}$

Findings

- Good photo quality treatment effect:
6.5% increase in bid (Demographic HTEs)
10.9% increase in bid (Price HTE)
- Addition of covariates did not help in reducing treatment standard errors
- The higher the retail price of the item with treatment, the lower the bid

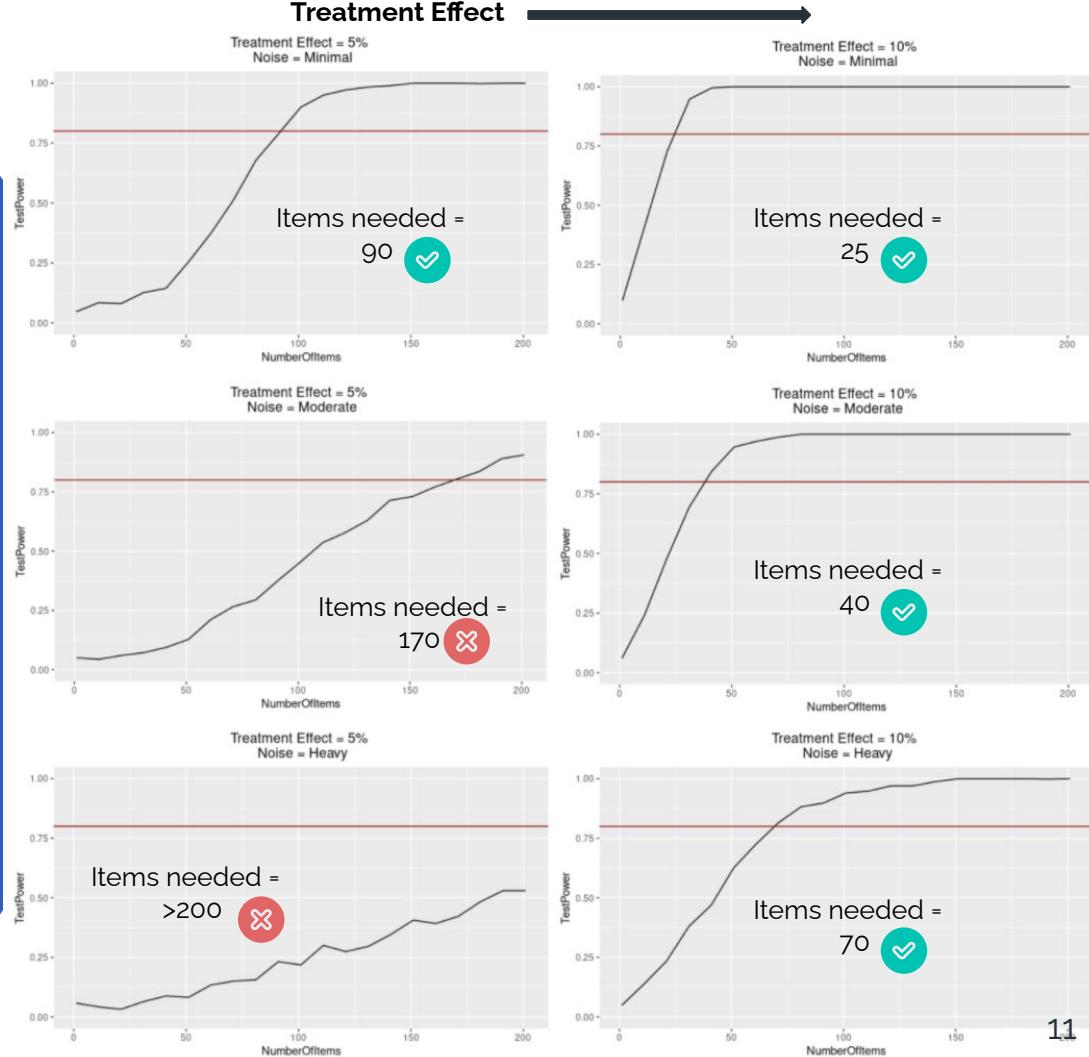
	simple (1)	demographic (2)	HTEs (3)	price HTE (4)
photo_quality	0.105*** (0.034)	0.065* (0.036)	0.109*** (0.038)	0.056** (0.022)
factor(gender)6			0.083*** (0.031)	0.056** (0.022)
factor(gender)9			-0.059 (0.382)	-0.047 (0.126)
factor(marital)2			-0.062 (0.040)	-0.045* (0.026)
factor(marital)3			0.440** (0.178)	0.056 (0.127)
retail_price			0.020*** (0.0003)	0.021*** (0.0004)
vacuum			0.008*** (0.0003)	0.008*** (0.0003)
photo_quality:factor(gender)6			-0.052 (0.042)	
photo_quality:factor(gender)9			0.004 (0.398)	
photo_quality:factor(marital)2			0.029 (0.052)	
photo_quality:factor(marital)3			-0.608*** (0.209)	
photo_quality:retail_price				-0.001** (0.001)
Constant	2.823*** (0.025)	0.953*** (0.204)	0.935*** (0.205)	

Power Analysis

Power Analysis

- 6 scenarios with varying treatment effect and noise
- Items needed to achieve 80% power ranged from 25 to over 200
- Chose 90 items for experiment to satisfy most scenarios & be feasible
- Increased treatment "dosage" after survey

Noise ↘



Increased Difference in Photo Quality

Control

- Did not center the item.
- Included more background in the image.
- Decreased image's exposure & brilliance.
Increased noise reduction.



Treatment

- Increased image's exposure, brilliance, highlights, shadows, contrast, brightness, saturation.

Experiment

Experiment: Randomized Block Design



Washington, DC



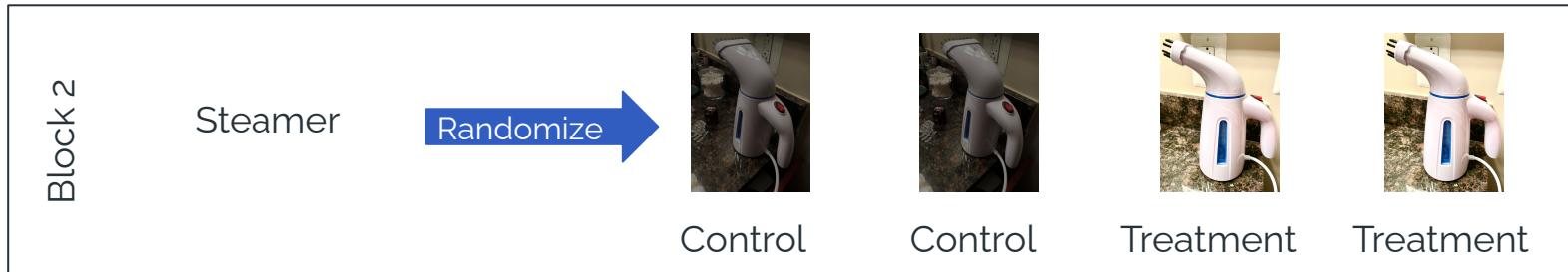
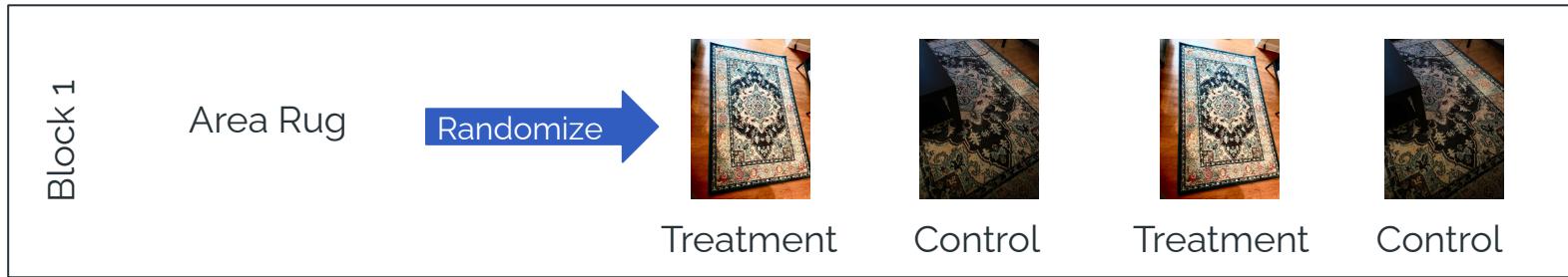
Denver, CO



Austin, TX



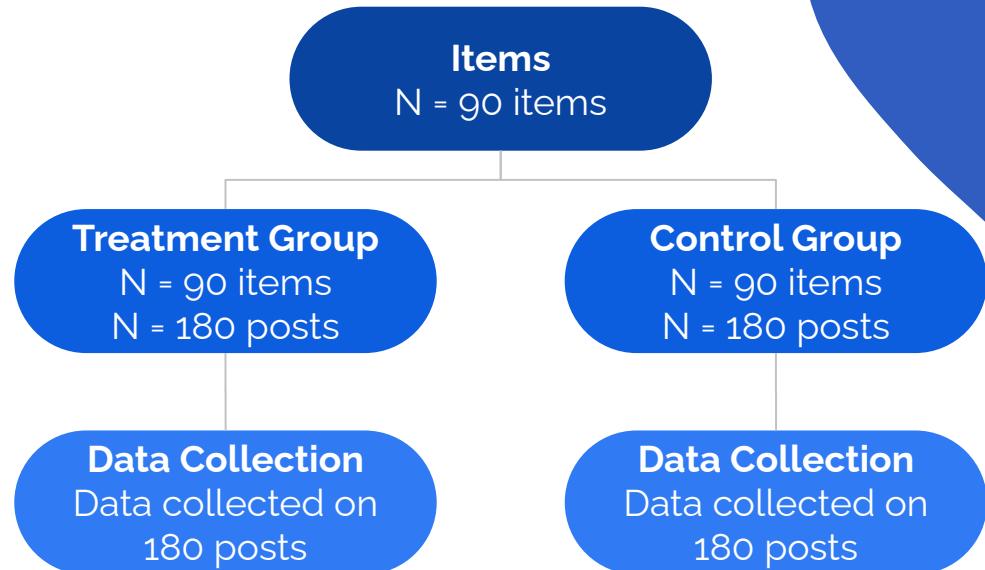
San Jose, CA



1 item per block, 90 Blocks total

Experiment Design

N_1	N_A	R	X	$Y_{1,2,3,4}$
	N_B	R	X	$Y_{1,2,3,4}$
	N_C	R	O	$Y_{1,2,3,4}$
	N_D	R	O	$Y_{1,2,3,4}$
N_2	N_A	R	X	$Y_{1,2,3,4}$
	N_B	R	O	$Y_{1,2,3,4}$
	N_C	R	X	$Y_{1,2,3,4}$
	N_D	R	O	$Y_{1,2,3,4}$
.				
.				
N_{90}	N_A	R	X	$Y_{1,2,3,4}$
	N_B	R	O	$Y_{1,2,3,4}$
	N_C	R	O	$Y_{1,2,3,4}$
	N_D	R	X	$Y_{1,2,3,4}$



Key:

N_1, N_2, \dots, N_{90} = Items
 N_A, N_B, N_C, N_D = Sellers
R = Randomized

X = Treatment
O = Control
 $Y_{1,2,3,4}$ = Outcomes measured

Experiment: Data Collection



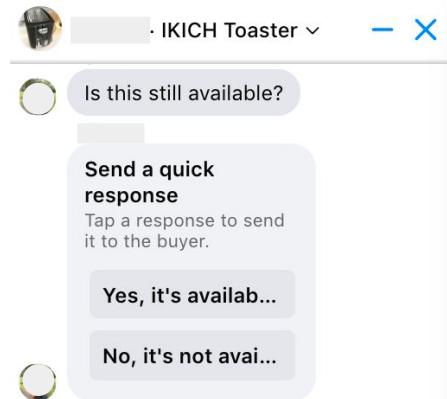
IKICH Toaster
\$1
Listed a few seconds ago in Washington

Details
Condition: Used - Good
Please message with best offer.

Original item link:
https://www.amazon.com/dp/B088W76R3C/ref=cm_sw_r_sms_apl_gif_f6bc_CX8B1XA62YCXYEN7X2Z

Washington Location is approximate

Seller Information
Jaclyn Andrews



99% of postings with at least 1 view

28,129 views total

48% of postings with at least 1 message

1,146 messages total

35% of postings with at least 1 bid

552 bids total

Results

Views



Messages



Offers



Average Max Bid



Models

Baseline, no covariates: $\log(\max_bid+1) \sim \text{treatment}$

Baseline & Blocked Item&Seller: $\log(\max_bid+1) \sim \text{treatment} + \text{seller} + \text{item}$

Baseline & Blocked Item&Seller & High/Low Retail Interaction with Treatment:

$\log(\max_bid+1) \sim \text{treatment} + \text{seller} + \text{item} + \text{high}/\text{low}_\text{retail} * \text{treatment}$

Findings

- Good photo quality treatment effect:
 $\exp(0.4)-1 = \sim 50\%$ increase in bid
- Addition of covariates and interaction terms reduces robust standard errors

	Dependent variable:		
	[Simple]	[Seller&Item]	[Seller&Item&High/LowRetail]
	(1)	(2)	(3)
treatment	0.434*** (0.167)	0.416*** (0.143)	0.298** (0.132)
factor(seller)Jaclyn		0.186 (0.215)	0.197 (0.216)
factor(seller)John		0.223 (0.203)	0.224 (0.204)
factor(seller)Sanjay		0.324 (0.201)	0.325 (0.202)
treatment:high_retail			0.258 (0.303)
Constant	0.887*** (0.112)	0.209 (0.800)	0.135 (0.845)
Item	No	Yes	Yes
Note:	*p<0.1; **p<0.05; ***p<0.01		

Models

Treatment & Blocked Seller & Blocked Item & High/Low Retail Interaction with Treatment:

views ~ treatment + seller + item + high/low_retail*treatment

messages ~ treatment + seller + item + high/low_retail*treatment

offers ~ treatment + seller + item + high/low_retail*treatment

Findings

- Good photo quality treatment effect

	Low Retail Price	High Retail Price
# of Views	+21	+86
# of Messages	+1	+3.6
# of Offers	+0.4	+1.9

	Dependent variable:		
	[# of Views] (1)	[# of Messages] (2)	[# of Offers] (3)
treatment	20.900*** (6.250)	1.020*** (0.326)	0.436*** (0.161)
treatment:high_retail	65.400** (26.900)	2.640* (1.550)	1.420 (0.914)
Constant	-11.500 (30.700)	-0.857 (1.690)	-0.249 (1.060)
Item Seller	Yes Yes	Yes Yes	Yes Yes

Note:

*p<0.1; **p<0.05; ***p<0.01

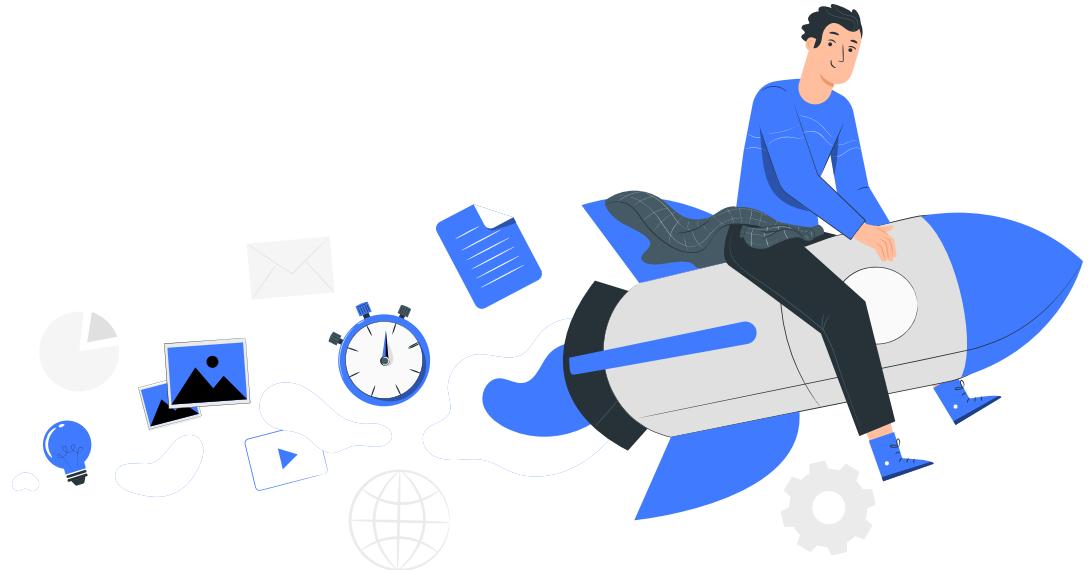
Conclusion

Questions and Concerns

- How to account for Facebook's algorithms? Did certain items get boosted?
- John was banned from Facebook Marketplace for 2 hours. What effect did this have?
- What impact did posting items in 3 different phases have?

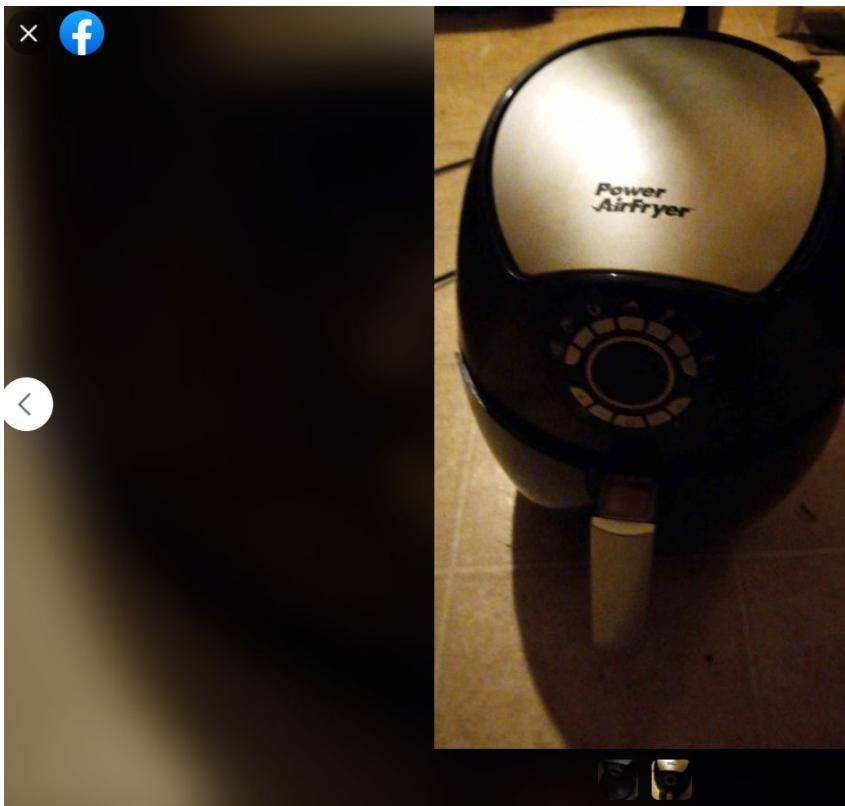
Thanks!

Any questions?

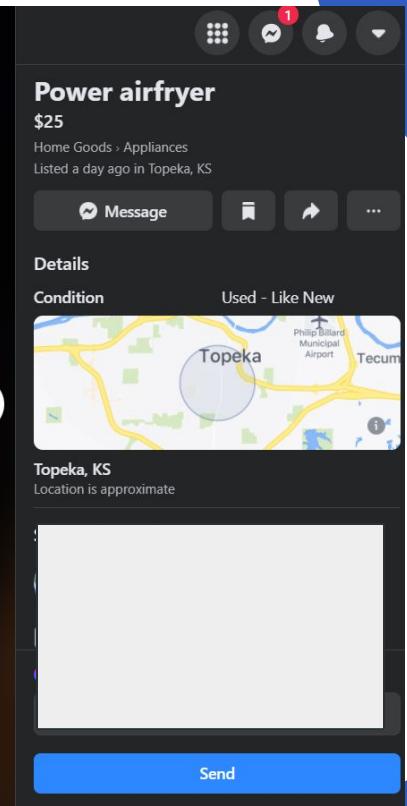


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Example Bad Pictures on FB



A close-up, low-light photograph of a Power AirFryer unit. The device has a silver and black design with a circular control panel featuring a digital display and several buttons. The words "Power AirFryer" are printed on the top left of the main body. The image is taken from a slightly elevated angle, showing the base of the unit which is resting on a surface.



Power airfryer
\$25
Home Goods > Appliances
Listed a day ago in Topeka, KS

Details
Condition: Used - Like New

Topeka, KS
Location is approximate

Send

This screenshot shows a Facebook Marketplace listing for a "Power airfryer". The title is "Power airfryer" at \$25, categorized under Home Goods > Appliances, listed a day ago in Topeka, KS. The "Details" section indicates it is "Used - Like New". A map shows the location in Topeka, KS, near the Philip Billard Municipal Airport. Below the map, there is a large, empty white rectangular area, likely a placeholder for a product image. At the bottom right is a blue "Send" button.

Example Bad Pictures on FB



A photograph of a black Power Airfryer unit. The brand name "Power Airfryer" is visible on the top lid. A red indicator light is illuminated on the front base. The air fryer is placed on a light-colored surface.

X 

< >

Power airfryer
\$25
Home Goods > Appliances
Listed a day ago in Topeka, KS

Message   ...

Details
Condition Used - Like New

Topeka, KS
Location is approximate

Send

Example Bad Pictures on FB

Mosquito Repellant that works...attractive, too!
\$15
Garden & Outdoor
Listed 4 days ago in Manhattan, KS

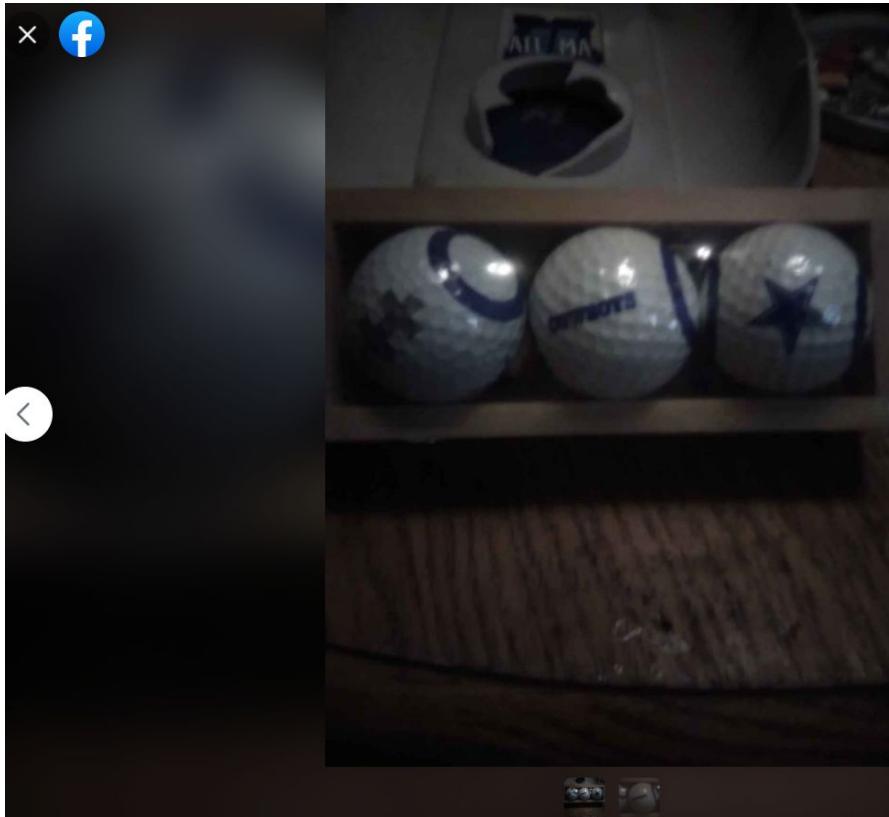
Details

Condition New

MOSQUITO REPELLANT...
These CITRONELLA punks repel Mosquitoes Very well, we have had Great success. Each stick lasts about 2hrs.
Comes with bottle, package of punks, and hanging ring.
Questions, pm and set a time to come by. Thank you

Send

Example Bad Pictures on FB



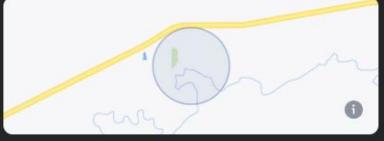
A screenshot of a Facebook post showing three golf balls in a box. The post includes a caption, price, and location information.

Dallas cowboys collectable golf ball set.
\$15
Sporting Goods > Golf Equipment
Listed 14 weeks ago in Chapman, KS

Details

Condition	Used - Like New
Sport	Football
Team	Cowboy's

Set of three golf balls in box



Chapman, KS
Location is approximate

Send

Example Bad Pictures on FB

A Facebook post featuring a close-up photograph of a bicycle wheel's hub and spokes. The hub is black with gold-colored components, including a cassette and a freehub body. The text "SUPER LOW 14-34T" and "SLIMPAK" are visible on the hub. The background is dark, and the spokes are thin and light-colored. To the right of the image is a Facebook listing for a "700c wheel set bicycle" priced at \$75, listed 5 days ago in Topeka, KS. The listing includes a map showing the location in Topeka, KS, and a "Send" button at the bottom.

700c wheel set bicycle
\$75
Listed 5 days ago in Topeka, KS

Details
Brand New 700c wheel set. Front rim is not in picture cause I have it in my car

Topeka, KS
Location is approximate

Send

Example Bad Pictures on FB



A screenshot of a Facebook post showing a dark, cluttered image of a toolbox filled with various tools like hammers, wrenches, and screwdrivers. The image is grainy and poorly lit, making it difficult to identify specific items.

Tools
\$70
Listed a week ago in Junction City, KS

Details

Condition Used - Fair

Tools and tool boxes all go with Text [hidden information]

Junction City, KS
Location is approximate

Send

Example Bad Pictures on FB

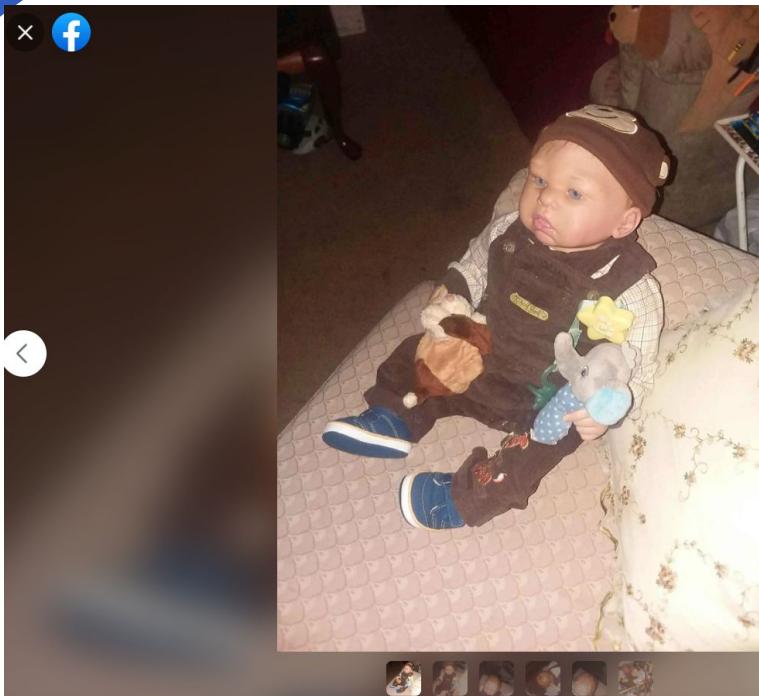
A screenshot of a Facebook post. On the left is a photograph of a black glass and metal TV stand with a flat-screen TV mounted on top. The TV displays a video of a person standing in a room with a window. On the right is a screenshot of a Facebook marketplace listing for the TV stand.

TV Stand (NOT THE TV)
\$20
Home Goods · TV Stands
Listed 6 hours ago in Fort Riley, KS

Details
Condition Used - Like New
Glass and metal TV stand
Nothing wrong with it, just PCSing
Pickup on Fort Riley, NO DELIVERIES OR MEETUPS
(sorry, we just don't have time)

Fort Riley, KS

Example Bad Pictures on FB

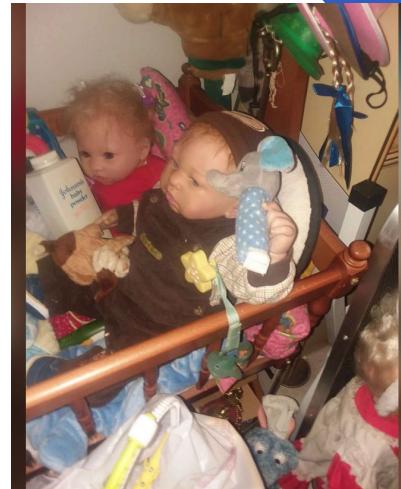


This is Josh 22 in tall and sneezes says mama and papa retired
\$135 \$150
Toys & Games > Dolls
Listed 7 weeks ago in Topeka, KS

Details
Condition Used - Good

In very good shape he talks says Moma and da da he sneezes he is an ashton drake doll comes with what you see in picture pacifier and toy and pup cloth body full soft legs and arms cash only pick up in nw topeka

A small map icon is shown below the text.



You could use three columns, why not?



Mercury

Mercury is the closest planet to the Sun



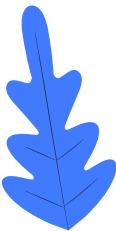
Jupiter

It's the fourth-brightest object in the sky



Mars

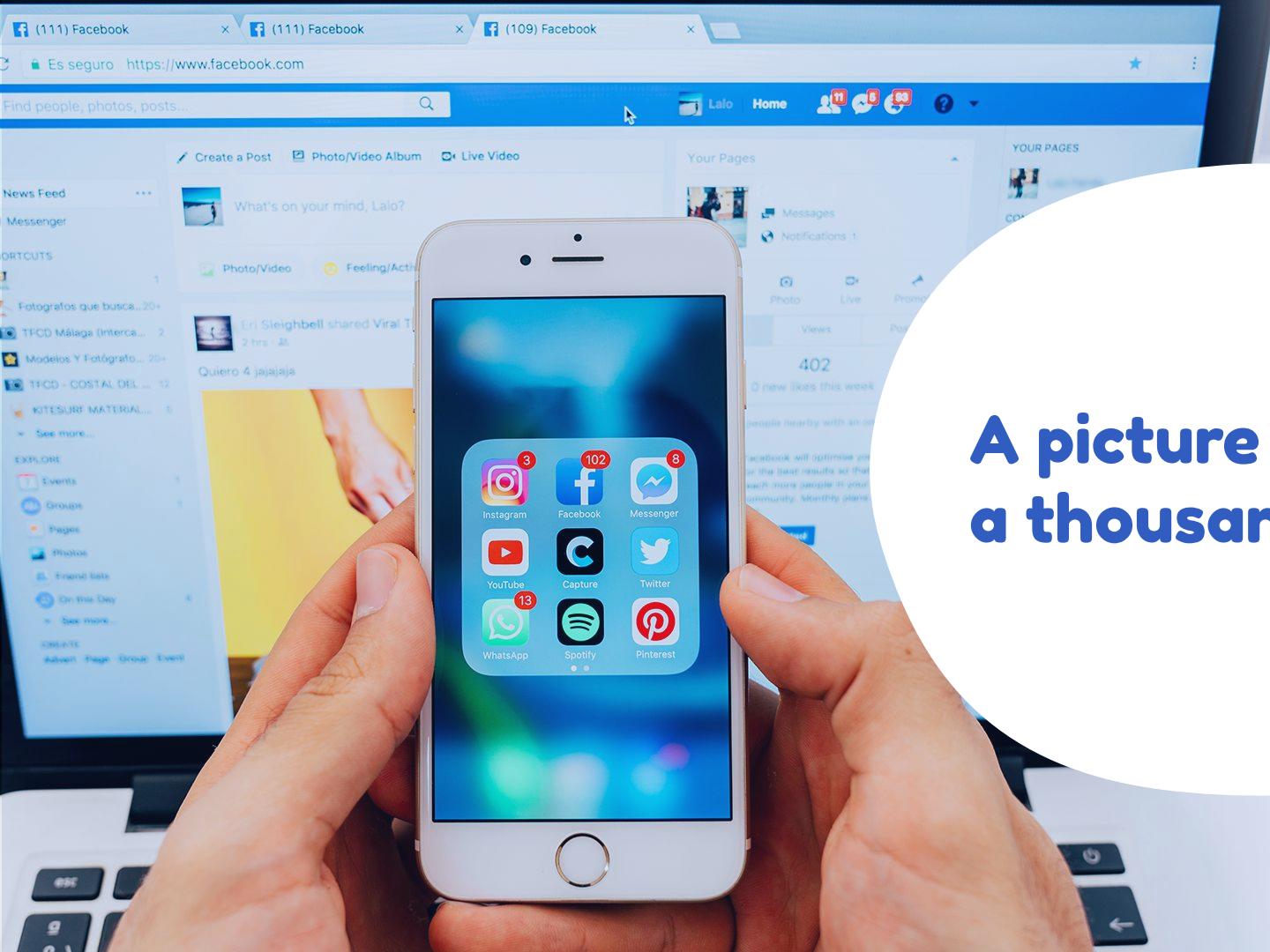
Despite being red, Mars is a cold place



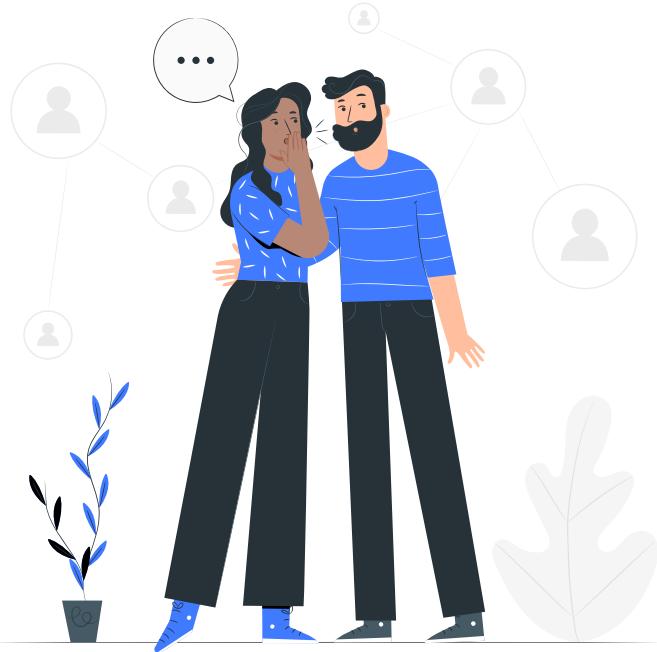
A picture always reinforces the concept

Images reveal large amounts of data, so remember: use an image instead of long texts





A picture is worth
a thousand words



Awesome words

Because key words are great for catching your audience's attention

Reviewing concepts is a good idea



Mercury

Mercury is the closest planet to the Sun



Venus

Venus has a beautiful name, but it's terribly hot



Mars

Despite being red, Mars is actually a cold place



Jupiter

It's the biggest planet in the Solar System



Saturn

Saturn is the ringed one and a gas giant



Neptune

Neptune is the farthest planet from the Sun

Our history



Venus has a
beautiful name,
but it's terribly hot

2016

Despite being red,
Mars is actually a
very cold place

2017

Neptune is the
farthest planet
from the Sun

2018

Mercury is the
smallest closest
planet to the Sun

2019

How about porcentages



70%

Mercury is the
smallest closest
planet to the Sun



90%

Venus has a
beautiful name, but
it's terribly hot



40%

Despite being red,
Mars is actually a
very cold place

Our areas of expertise

Neptune

Neptune is the farthest planet from the Sun



Mercury

Mercury is the closest planet to the Sun



Venus

Venus is the second planet from the Sun



Mars

Despite being red, Mars is a cold place



This is a table

	Mass	Diameter	Surface Gravity
Mercury	0.06	0.38	0.38
Mars	0.11	0.53	0.38
Saturn	95.2	9.4	1.16

Infographics are a good idea

Gender

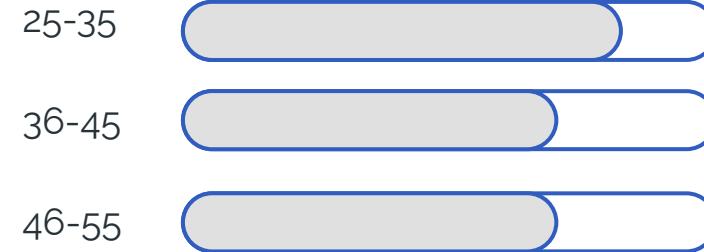


40%

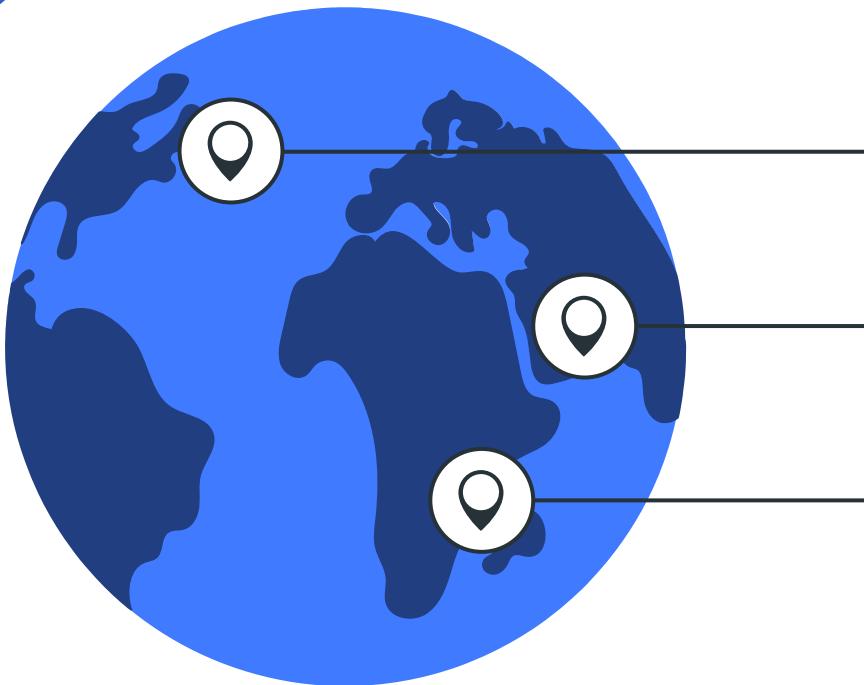


60%

Age



This is a map



Mercury is the smallest closest planet to the Sun

Venus has a very beautiful name, but it's terribly hot

Despite being red, Mars is actually a very cold place

Our team



Helena James

You can replace the image on the screen with your own



Jenna Doe

You can replace the image on the screen with your own



4,498,300,000

Big numbers catch your audience's attention

Strategy

Step 1

Neptune is the farthest planet from the Sun



Step 3

Jupiter is the biggest planet in the Solar System



Step 5

Mercury is the closest planet to the Sun



Step 2

Venus has a beautiful name, but it's terribly hot



Step 4

Despite being red, Mars is a cold place



Budget



\$333,000



Instagram

\$386,000

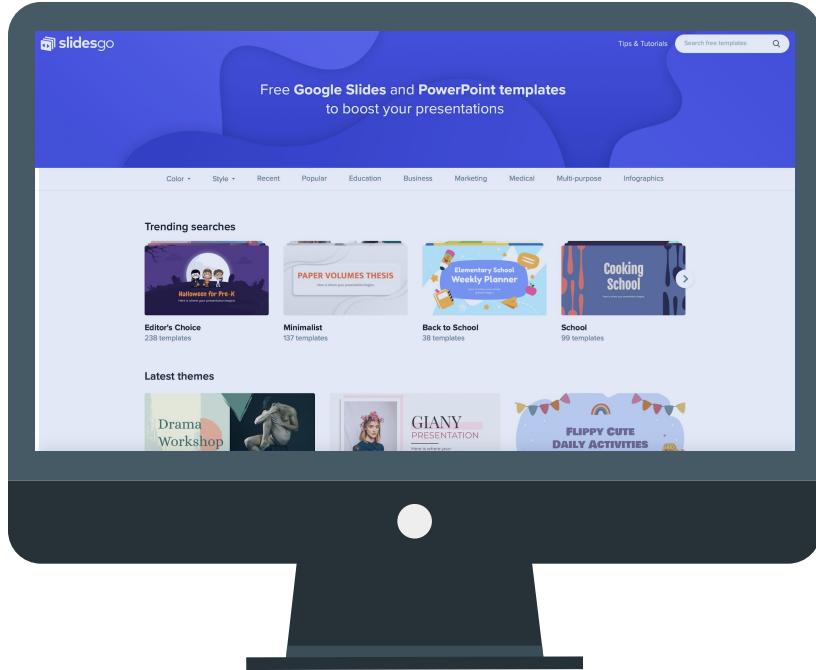


Facebook

\$240,000



Twitter

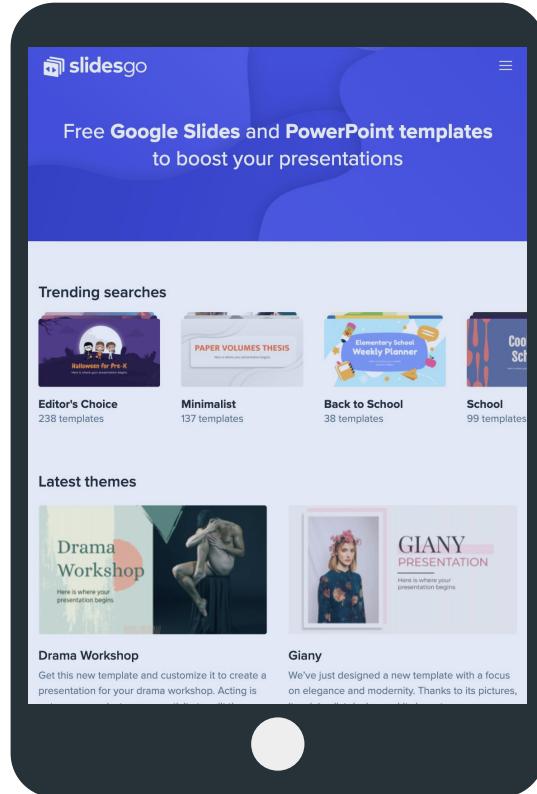


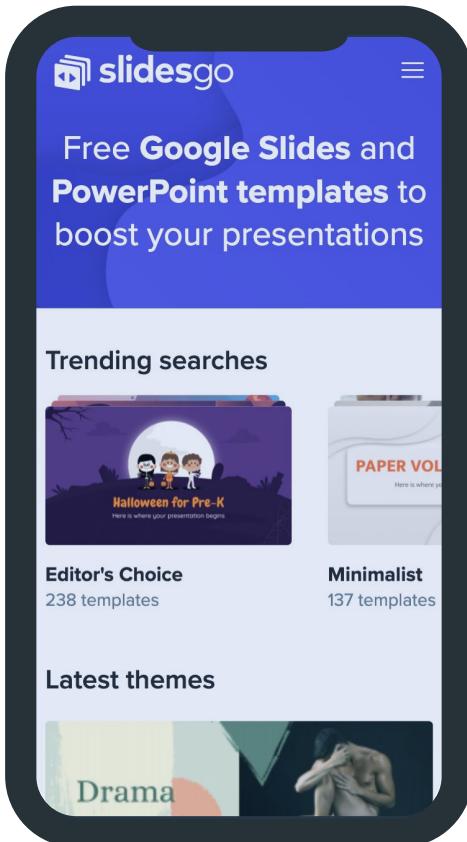
Desktop software

You can replace the image on the screen with your own work. Just delete this one, add yours and center it properly

Tablet app

You can replace the image on the screen with your own work. Just delete this one, add yours and center it properly





Mobile web

You can replace the image on the screen with your own work. Just delete this one, add yours and center it properly

What sets us apart?



Here you could state one
of your qualities



Here you could state one
of your qualities



Here you could state one
of your qualities



Here you could state one
of your qualities

Buyer persona

Age: 25-35

Gender: Female

Studies: Degree in Advertising

Location: Madrid, Spain

Job: Publicist

Income Range: \$1500-\$2000

Marital Status: Single

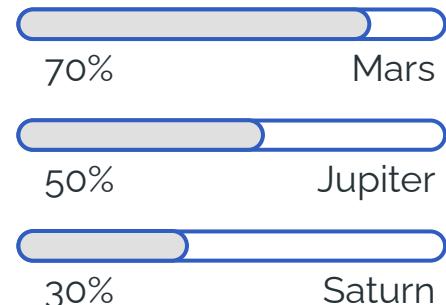
Hobbies: Sports and social media

Goals

- Neptune is the farthest planet
- Mercury is the closest planet
- Venus has a beautiful name



Motivations



Goals



Venus

Venus has a beautiful name, but also a poisonous atmosphere



Mercury

Mercury is the smallest closest planet to the Sun



Jupiter

It's a gas giant and the biggest planet in the Solar System



Mars

Despite being red, Mars is actually a very cold place

What platforms are we going to use?



Twitter

2010-2019

Mercury is the closest planet to the Sun



WhatsApp

2010-2019

Venus has a beautiful name, but it's terribly hot



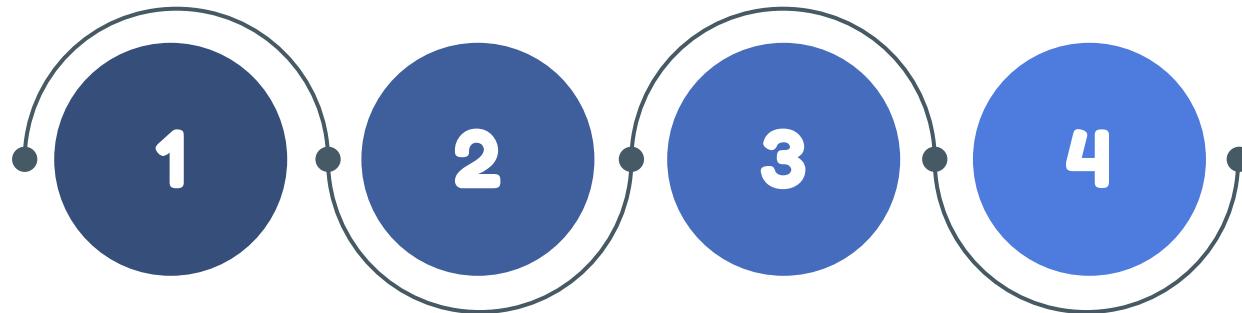
LinkedIn

2010-2019

Despite being red Mars is actually a cold place



Process



Venus is the
second planet
from the Sun

Mercury is the
closest planet to
the Sun

Jupiter is the
biggest planet in
the Solar System

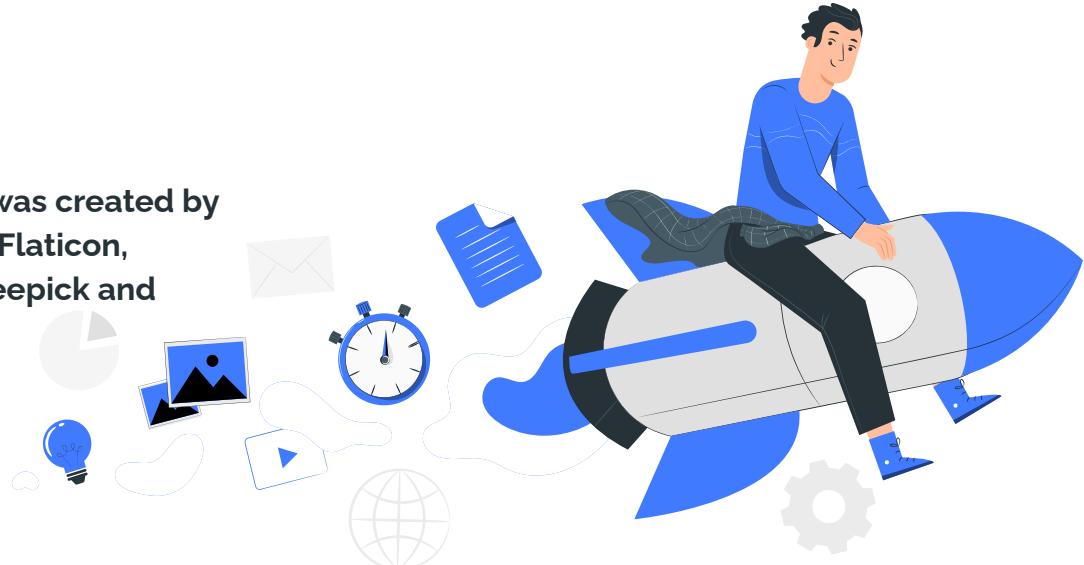
Despite being
red, Mars is a
cold place

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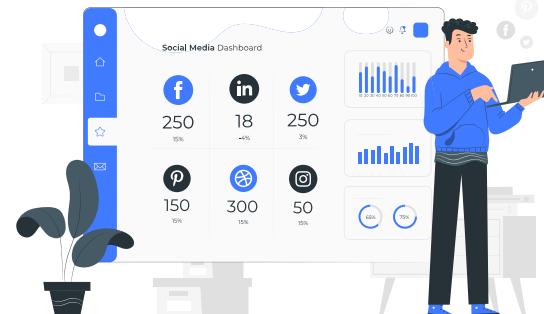


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Resources

Stories:

- Blog post
- To the stars
- Social ideas
- Live collaboration
- About us page
- Target
- Mobile Marketing
- Make it rain
- Experts
- Market Launch
- Social Dashboard

- Connected
- Profile pic
- Mention
- Word of mouth
- World map

Photos:

- Coworkers using devices at work
- Phone with apps and laptop

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(<https://fonts.google.com/specimen/Raleway>)

#F5F5F5

#6695ff

#407BFF

#263238

#455A64

#E0E0E0

#203E80

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Pana



Amico



Bro



Rafiki



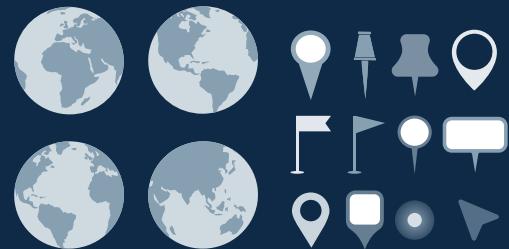
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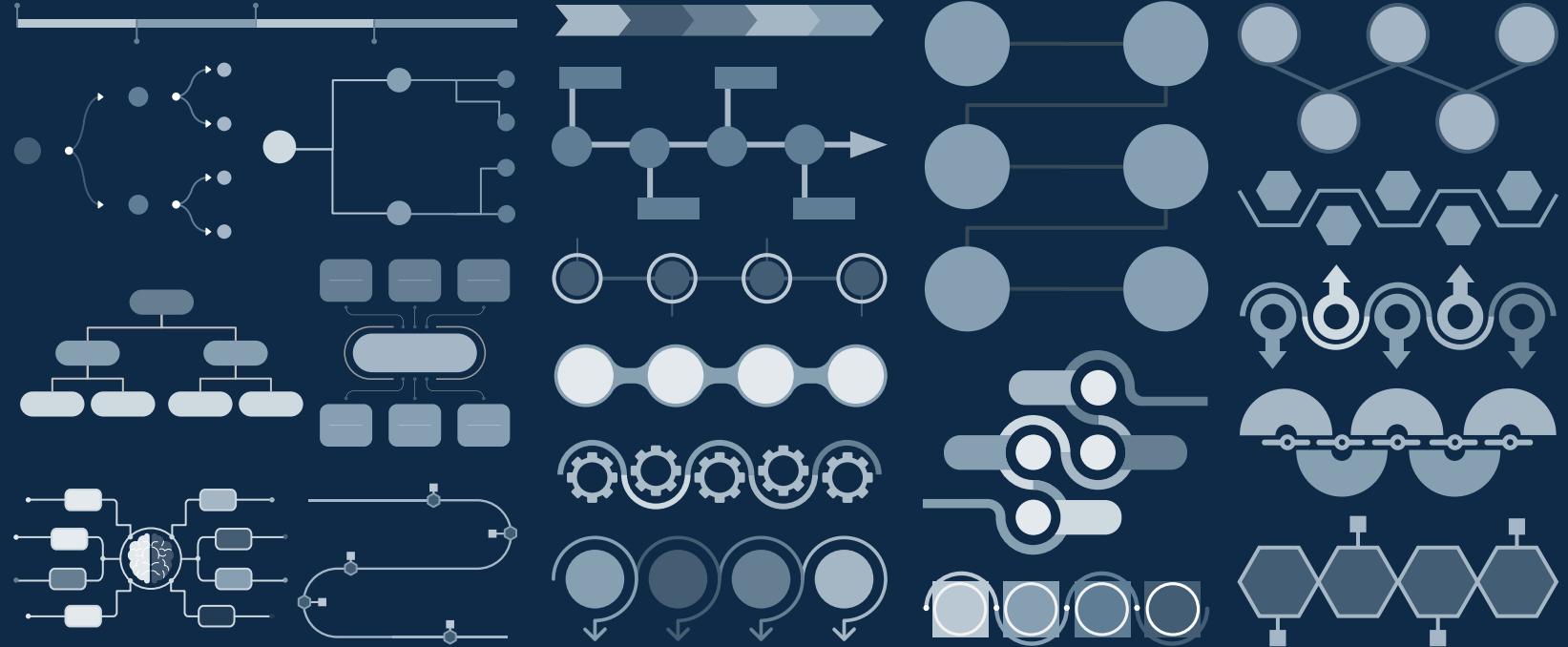
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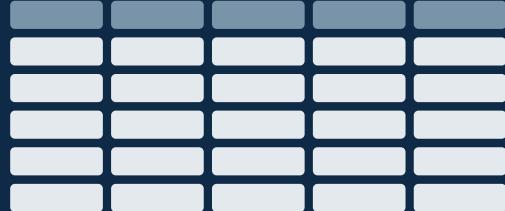
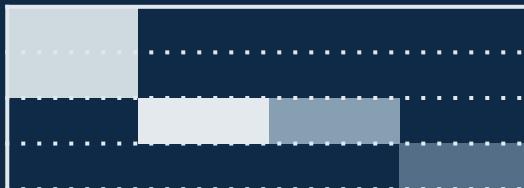
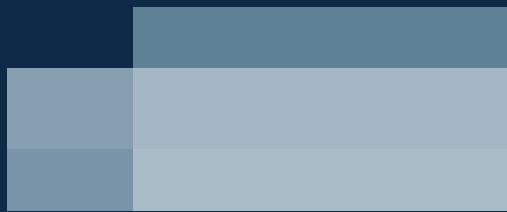
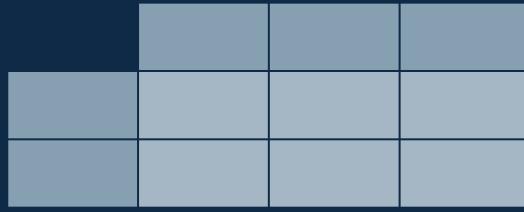
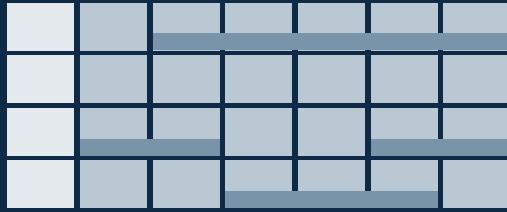
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Group the resource again when you're done. You can also look for more infographics on Slidesgo.

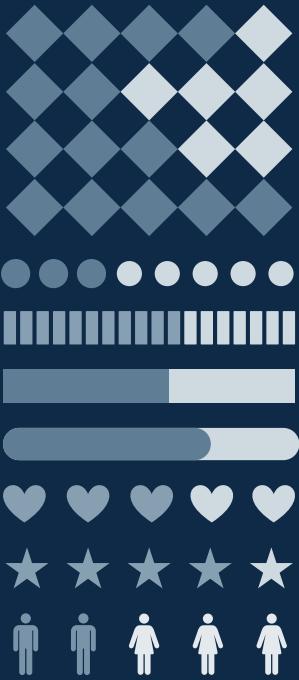
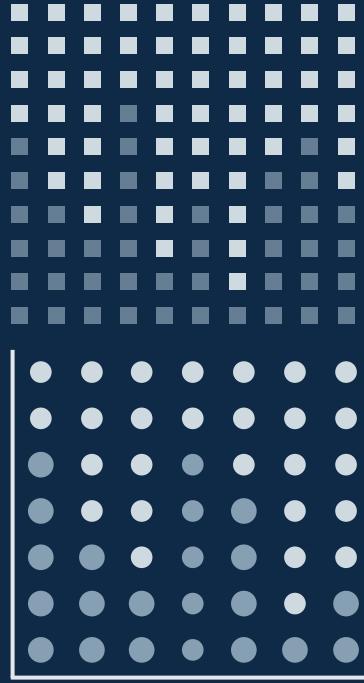












...and our sets of editable icons

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In Google Slides, you can also use Flaticon's extension, allowing you to customize and add even more icons.



Educational Icons



Medical Icons



Business Icons



Teamwork Icons



Help & Support Icons



Avatar Icons



Creative Process Icons



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