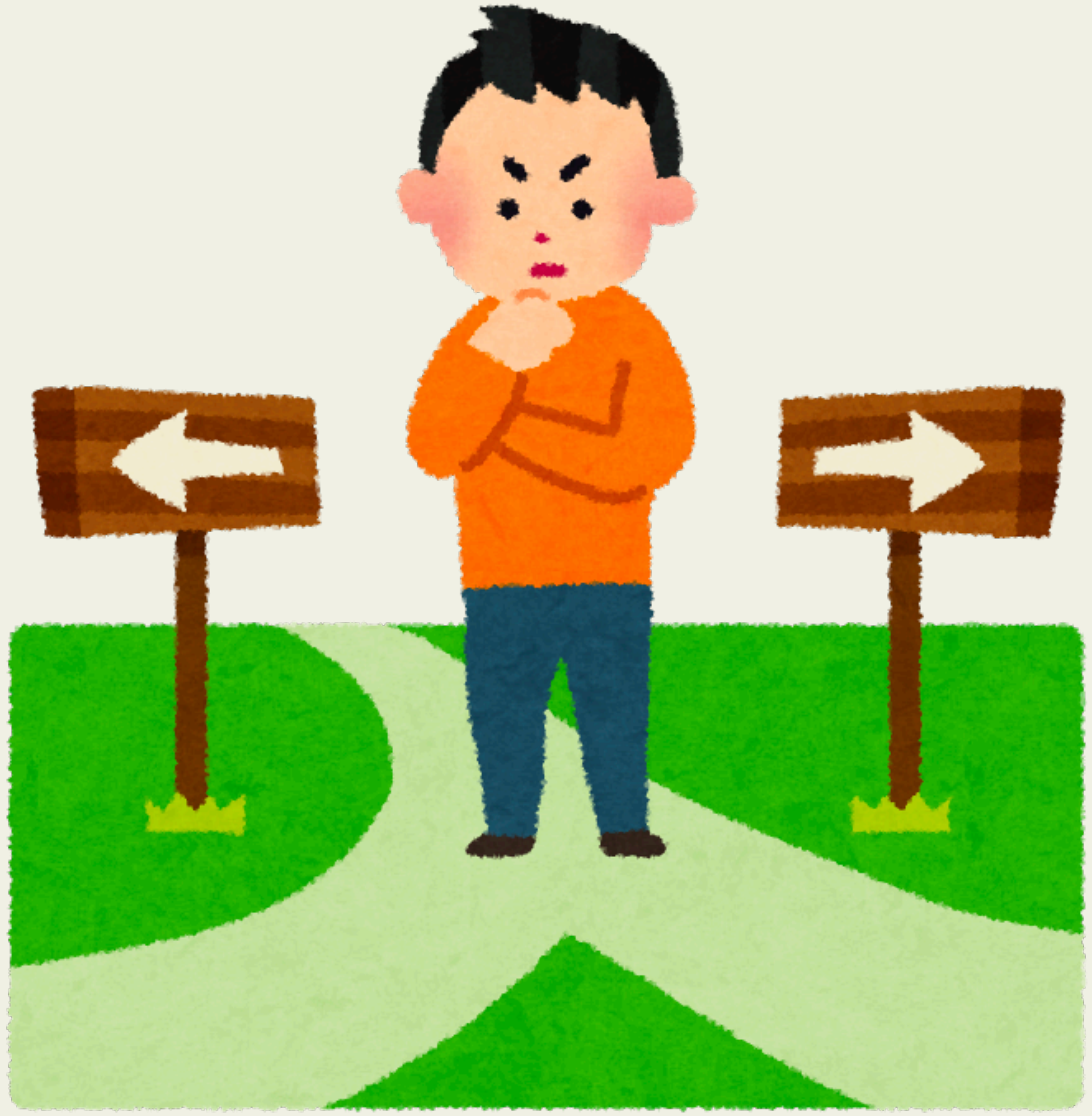
# Modern mobile development

## Native vs cross-platform apps

Sebastiano Poggi

# Scope

- Goal: help you choose
- Agenda
  - Preconditions for success
  - Understanding mobile
  - Native or cross-platform
  - Pick a cross-platform stack



# “It depends”

- Everything in this talk may or may not apply to you
- Apply common sense

# Terminology

## Native app

Uses native build tools

Android: Kotlin/Java/C++

iOS: ObjC/Swift

## Cross-platform app

Non-native build tools

Potentially uses web tech

Same tech across OSes

**Neither runs in the browser**

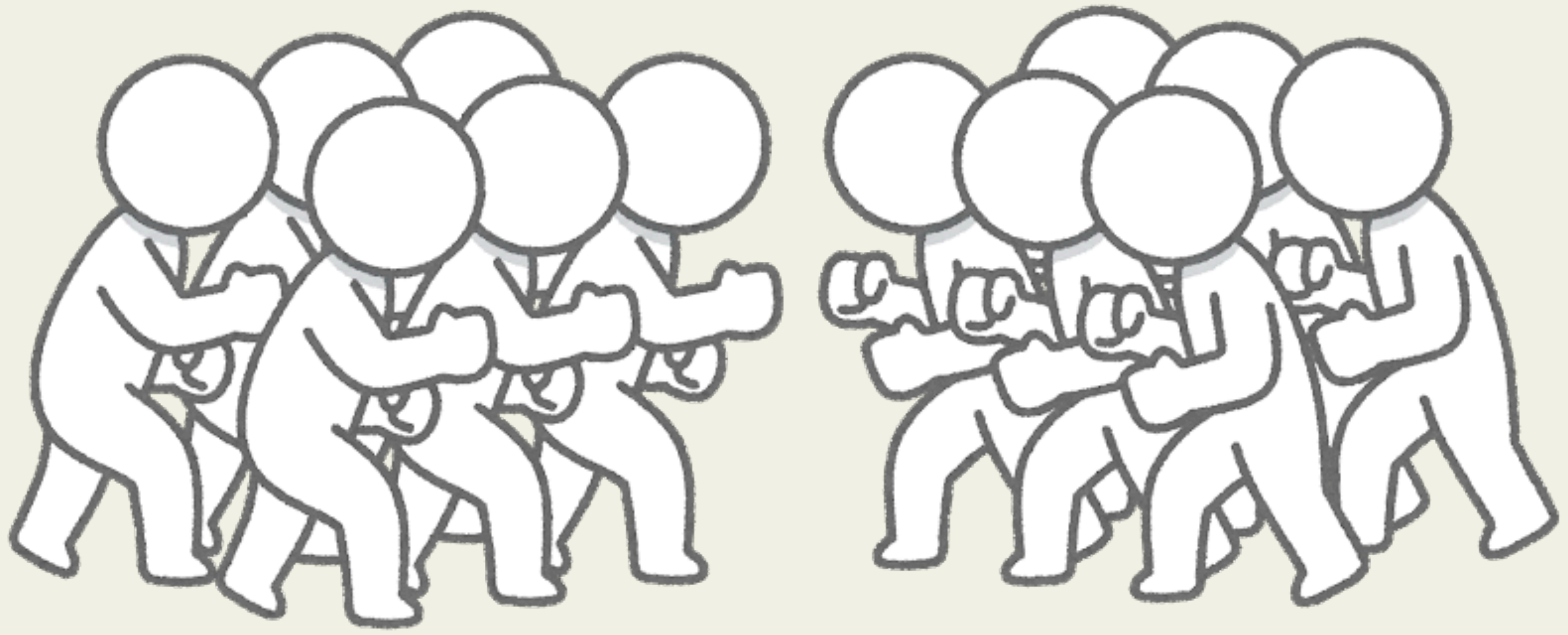
# Company dynamics

# Why are you here?

- You want a mobile app
- Greenfield vs The Big Rewrite™
  - Tech debt
  - Pre-existing team
  - Recovering from failure

# Teams

- No full-stack engineers in mobile
  - Mobile devs dislike backend work
  - ...and vice versa
- Information/knowledge silos
- Misalignment and misunderstandings



# Product vs Tech

- Different chains:
  - Mobile reports to CPO
  - Web and backend report to CTO
- Mobile as nobody’s child
  - Management doesn’t “get” it
  - Tech not built for it

# Not all tech is created equal

- Web is almost always ahead
  - Mobile comes later
- Web is straightforward
- Mobile can exacerbate org issues

# When things go wrong

# Nobody likes failure

- Failure causes management frustration
- Blaming games
- Tech stack as way to shift responsibility
- Wrong choices for the wrong reasons

# Bad apps exist...

- Bad choices —> bad apps
  - Don’t force choices, evaluate assumptions
- Tech stacks don’t always work 1:1 on mobile
- Reach outside comfort zone
  - Ensure higher-ups’ buy-in

Users don't care about the tech

Users don’t care about the tech

They just want to get stuff done

Users **don’t care** about the tech

They just want to **get stuff done**

**Help them**, help your business

# (Re)starting

# Before you (re)start

- Ask the tough questions

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*Do your users want,
or need, a mobile app?*

# Before you (re)start

- Ask the tough questions

*Can you satisfy your users with
a high quality, responsive website?*

# Before you (re)start

- Ask the tough questions

*Does your competition have an app?*

# Before you (re)start

- Ask the tough questions

*Do their users use it?*

# Before you (re)start

- Ask the tough questions

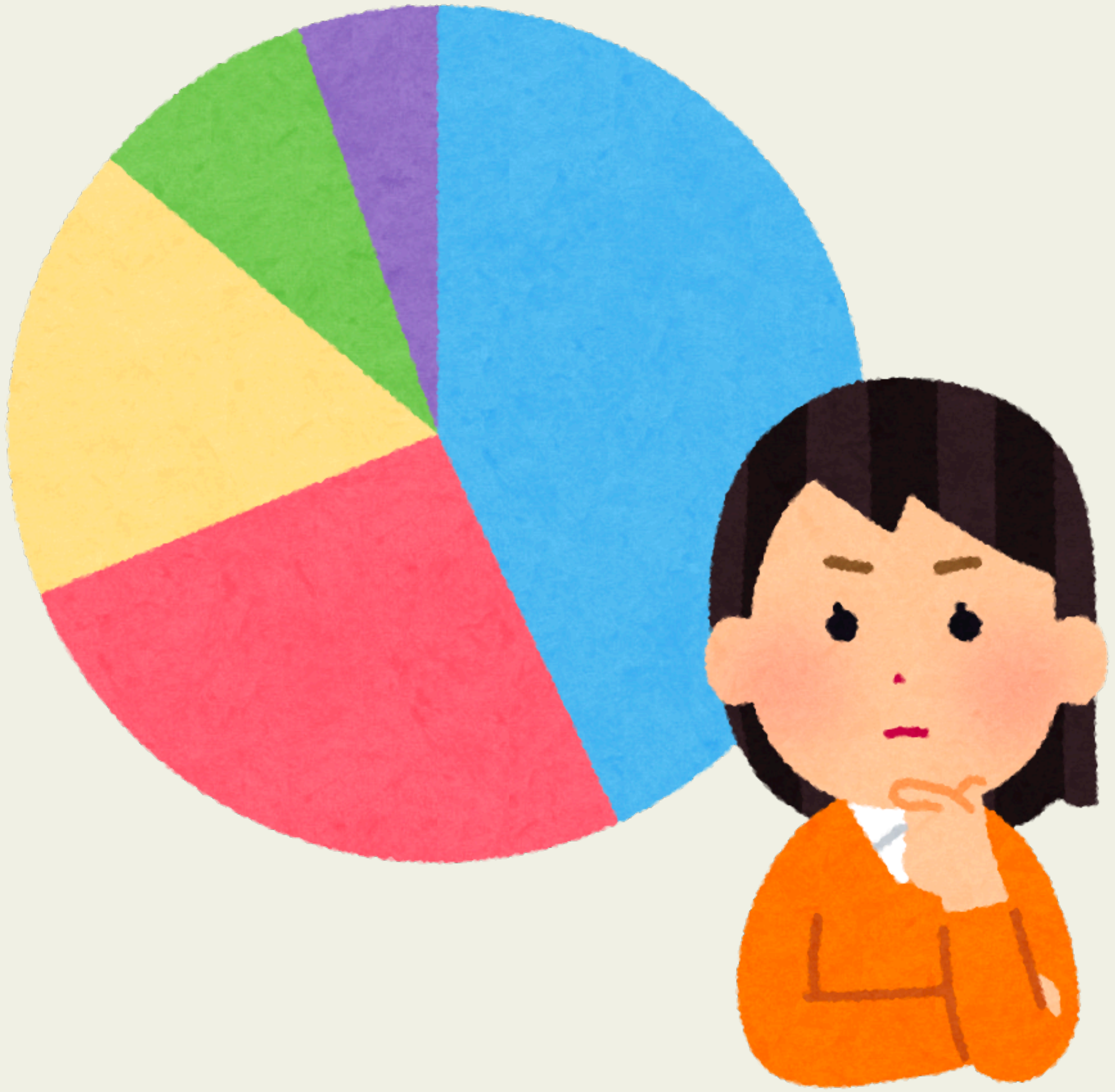
*How good is it?*

# Before you (re)start

- Ask the tough questions
- Use data to drive decisions
  - Focus groups, user studies, etc
- Trust the data
  - Even when you don’t like it

# Scoping and responsibilities

- Who owns mobile?
  - Align with rest of tech if possible
- Think about your users
  - What do they want to do?
- Define app scope and what's not in it

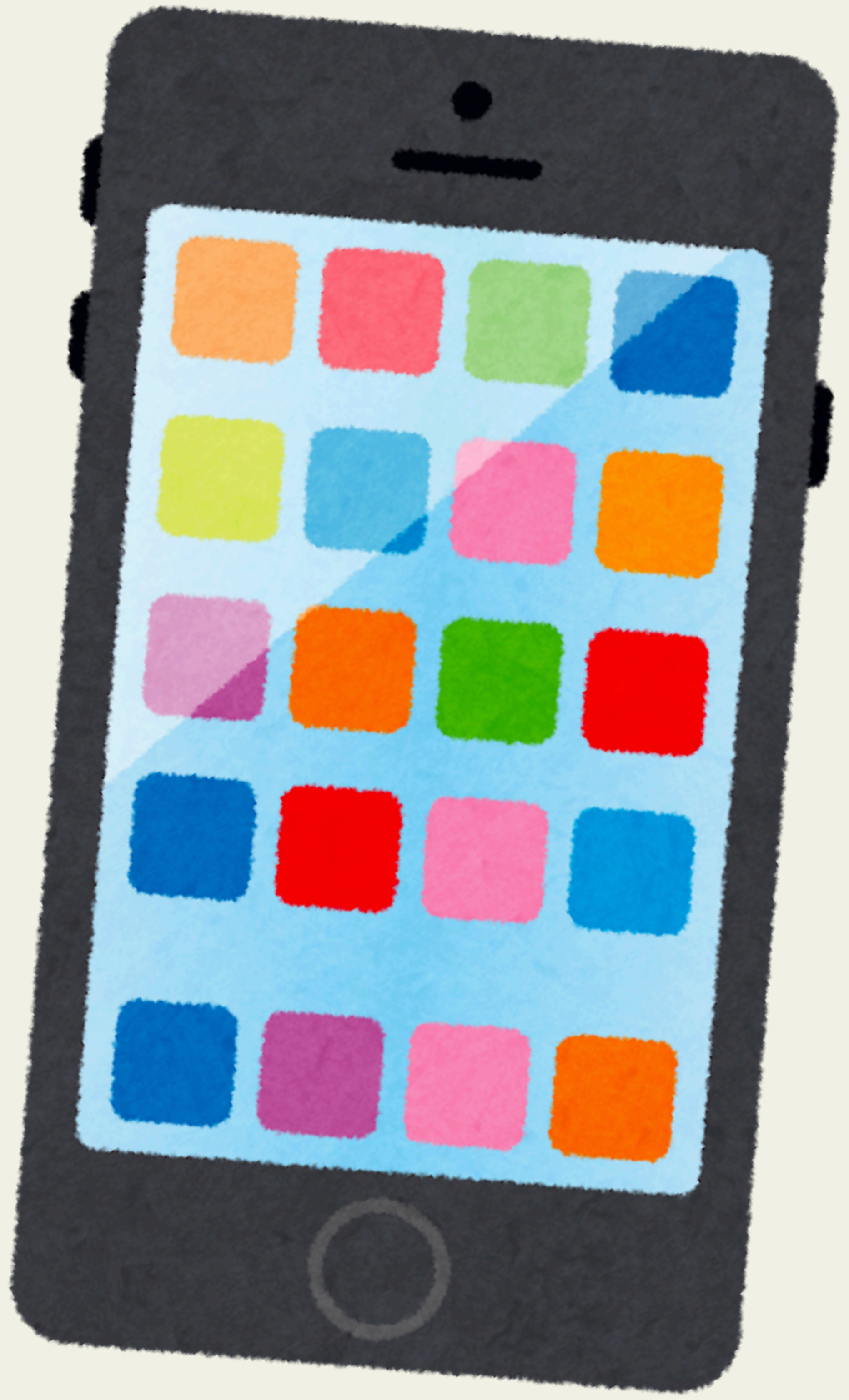


# Capability vs capacity

- What can your existing teams do?
  - Any native mobile devs?
  - Do they want to do cross-platform?
- Ensure platform-native capability
  - You'll need it

# Capability vs capacity

- Most apps require OS interactions
  - If your app doesn't, consider a website
  - "Website apps" waste resources
- E.g.: ReactJS dev team doing mobile?
  - Somewhat different tech and tools
  - Native knowledge required



# Team participation

- Involve your devs in the choice
  - Listen to their fears
  - Provide safety
- Avoid chasing tech fads
- Spikes are good
  - ...but can deceive

# Commitment

- In for the long run
  - Big investment
- Huge switching costs
  - Tech and skill lock-in
  - Change of tech means rewrite

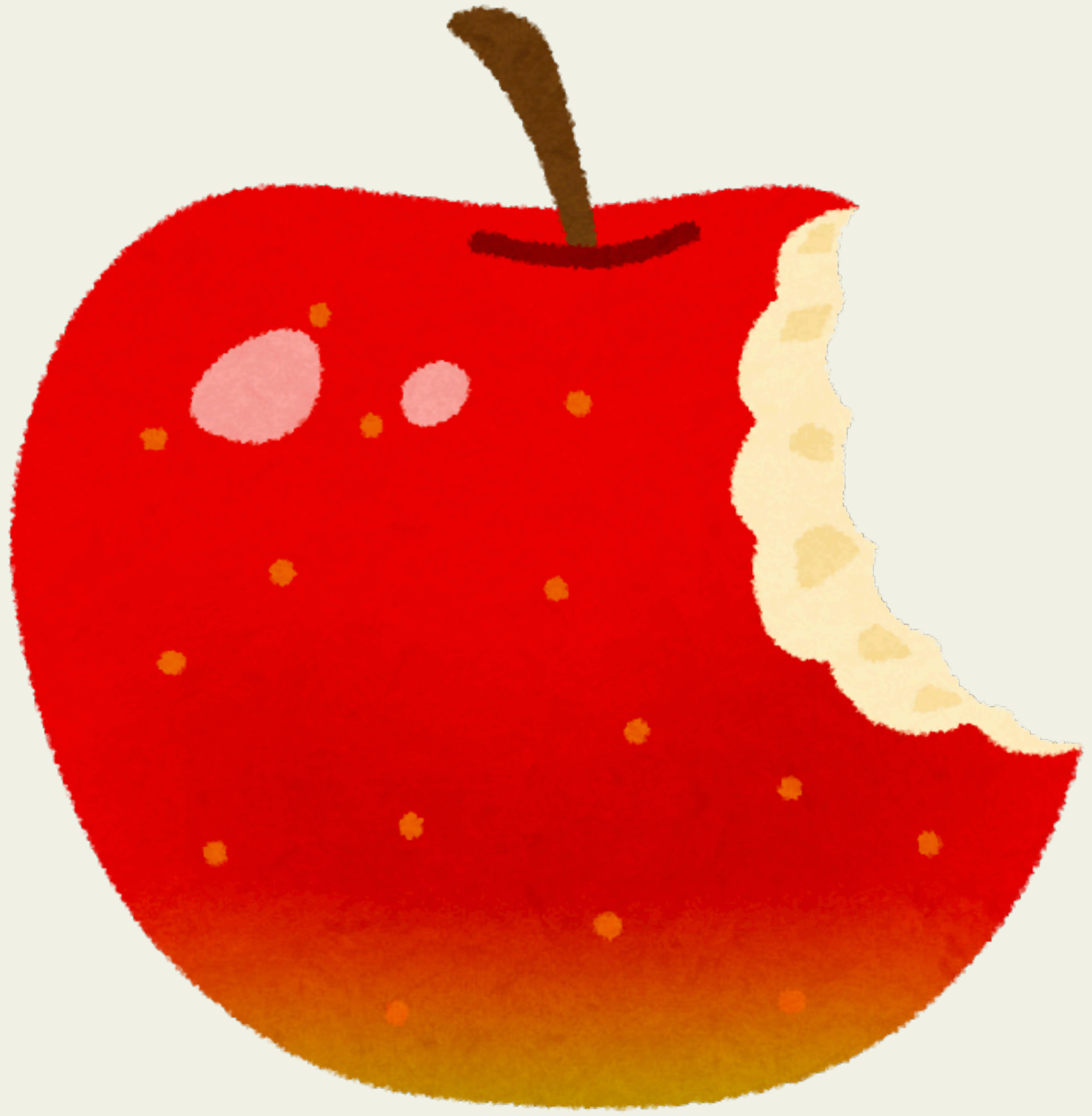
# Native or cross-platform?

# The native advantage

- Native is always “better”
  - Better performance
  - Better integration and support
  - More consistent with the OS
  - More APIs/features
- Tooling is constantly improving

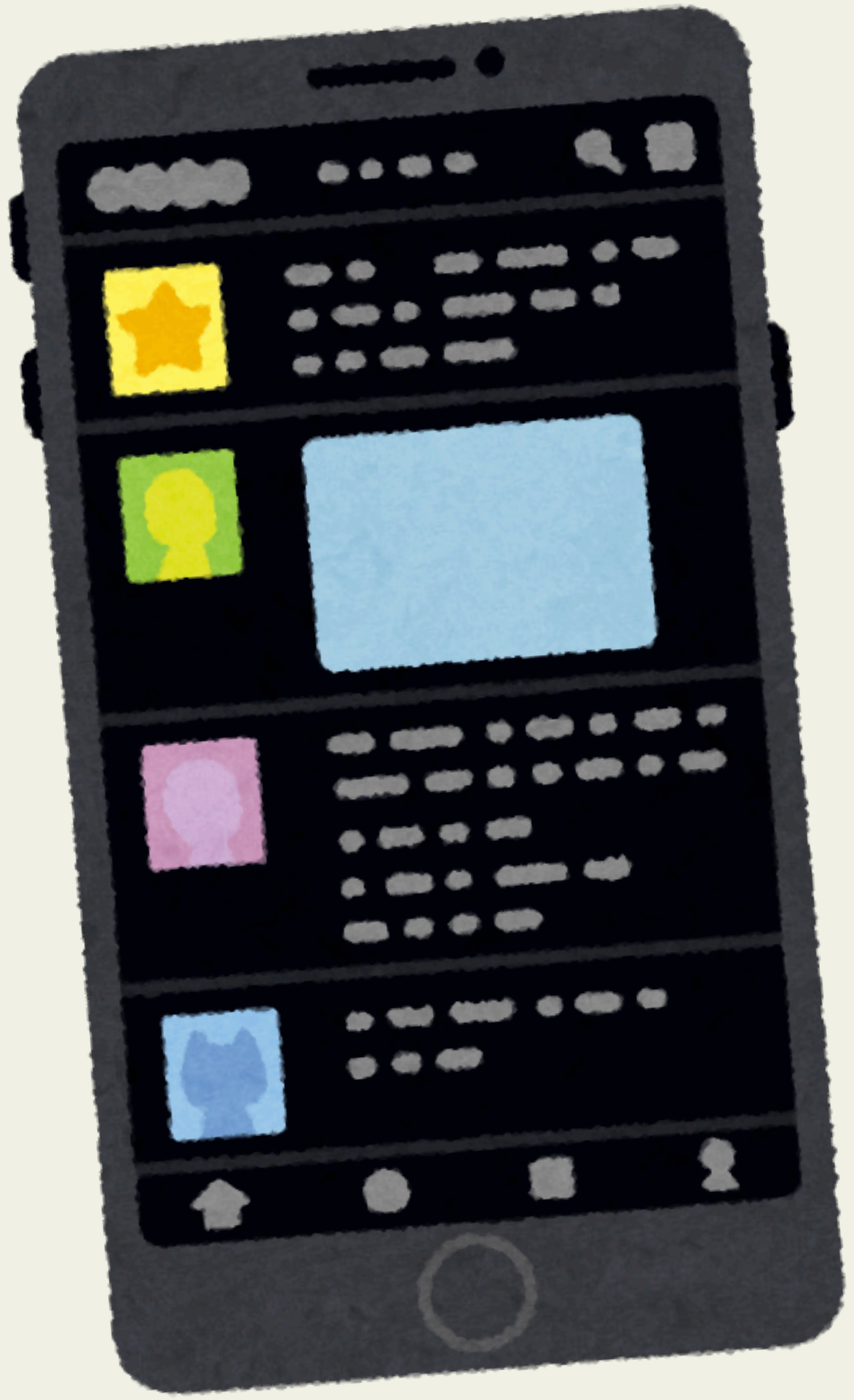
# Not all is rosy

- Native is more expensive
  - Dedicated team per OS
- Infrastructure & processes
  - Different CI setups
  - Different deploy and publishing



# The cross-platform pragmatism

- Native may not be the best *for you*
- Cross-platform may be “enough”
  - Vastly improved over the years
  - Some dev experience advantages
- Prefer strong, non-native design language



# A fictional app case study

- Wearables company
  - Do they need an app?

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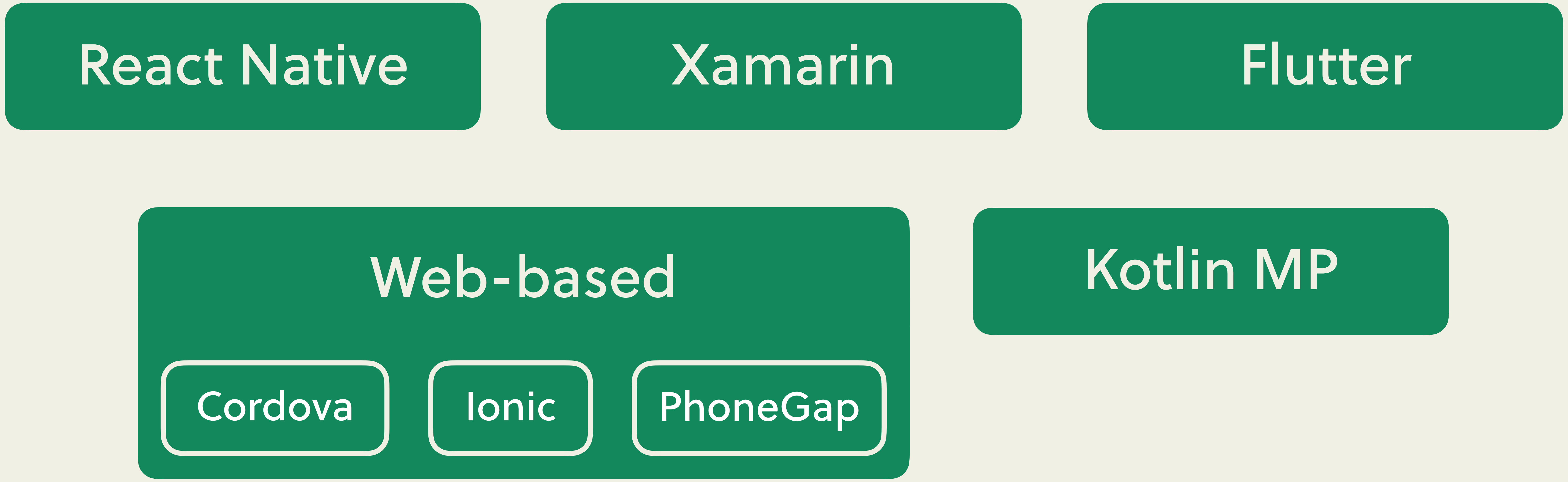
# The main choices



React Native

Xamarin

Flutter

Web-based

Cordova

Ionic

PhoneGap

Kotlin MP

# The main choices

React Native

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Flutter

# The main choices

React Native

Xamarin

Flutter

- From Facebook
- Derived from ReactJS
  - Share skills/code with web team
  - Built on JavaScript and npm
  - 3rd party supports desktop/wearables/tv/...

# The main choices

React Native | Xamarin | Flutter

- You can make B2C apps with it
  - Plenty of “big” RN apps
- Performance has some limitations
- Custom UI needs per-platform implementations
- Famous cases of apps abandoning it

# The main choices

React Native | **Xamarin** | Flutter

- From Microsoft
  - Used to be paid, now it’s free and OSS
- Uses C# tools and NuGet, “full stack”
- Unique UI approach
  - Xamarin.Forms or native views

# The main choices

React Native | **Xamarin** | Flutter

- Wraps and exposes platform-native APIs
- Limited support and tools
  - Best for internal and unsophisticated apps
  - Very enterprise-oriented
  - Unsuitable for B2C apps?

# The main choices

React Native | Xamarin | **Flutter**

- From Google
  - Quickly rising in popularity
  - Lots of investments & marketing
  - Great 1st party integrations (Firebase)
- Uses Dart and Pub

# The main choices

React Native | Xamarin | **Flutter**

- Mobile, desktop, web, embedded
  - No WatchOS and tvOS
  - Full-stack: backends in Dart
- Best-in-class testing capabilities
- Dev audience skewed to Android

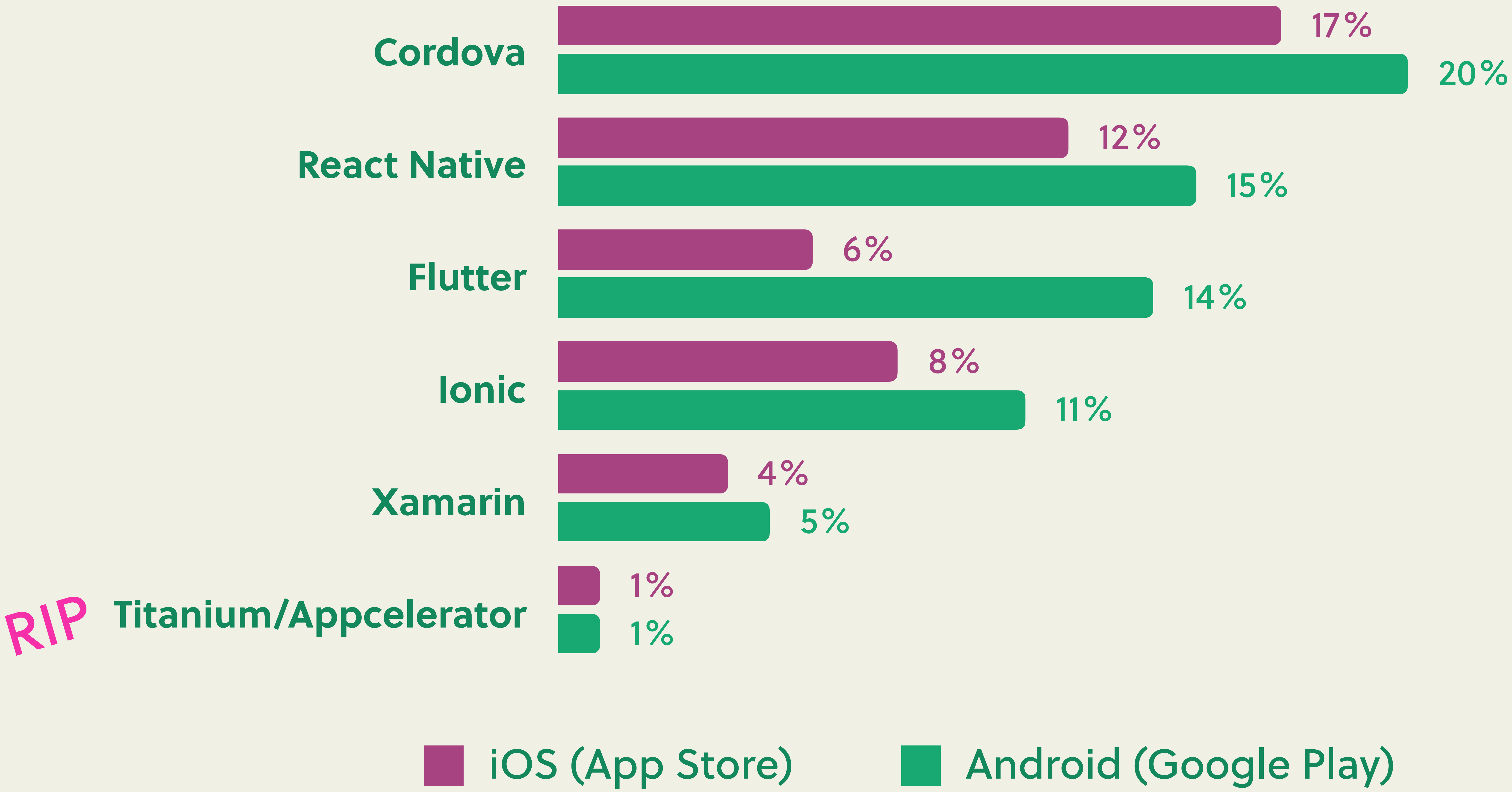
# The main choices

React Native

Xamarin

Flutter

# A sense of scale



Source: AppFigures.com

# Numbers can deceive

~1/3rd of all mobile developers uses cross-platform tech

Source: Statista.com

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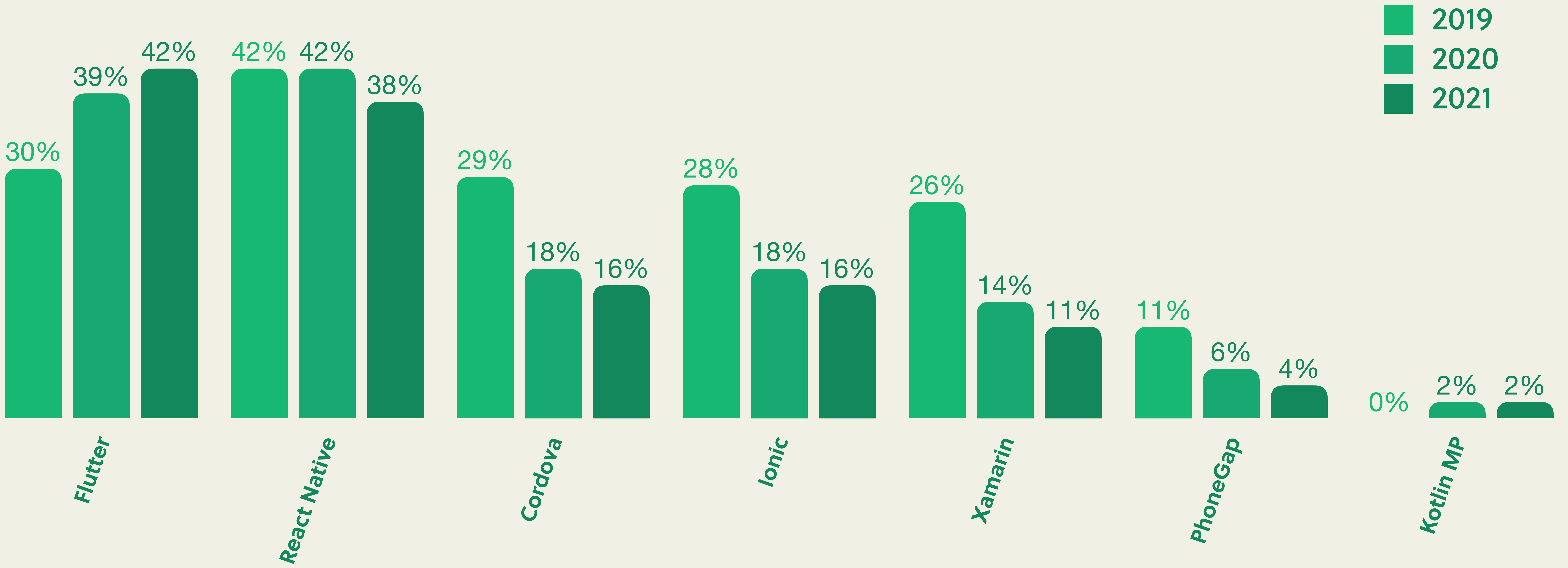

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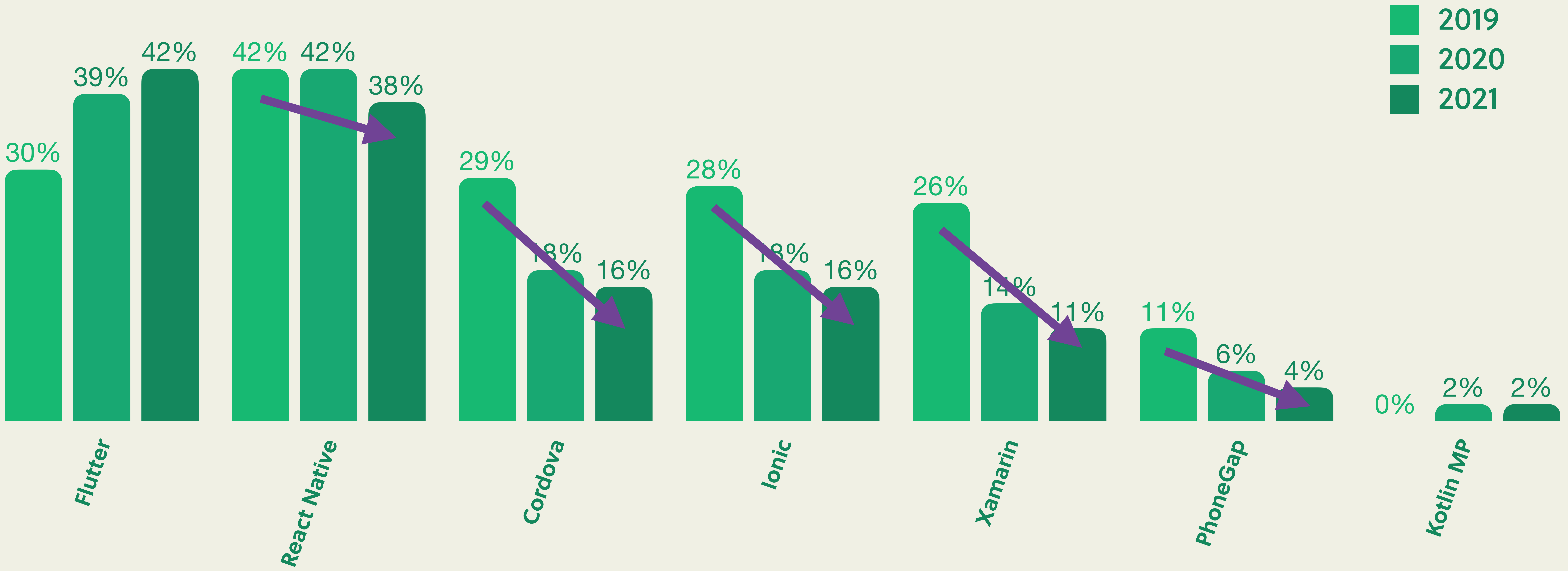

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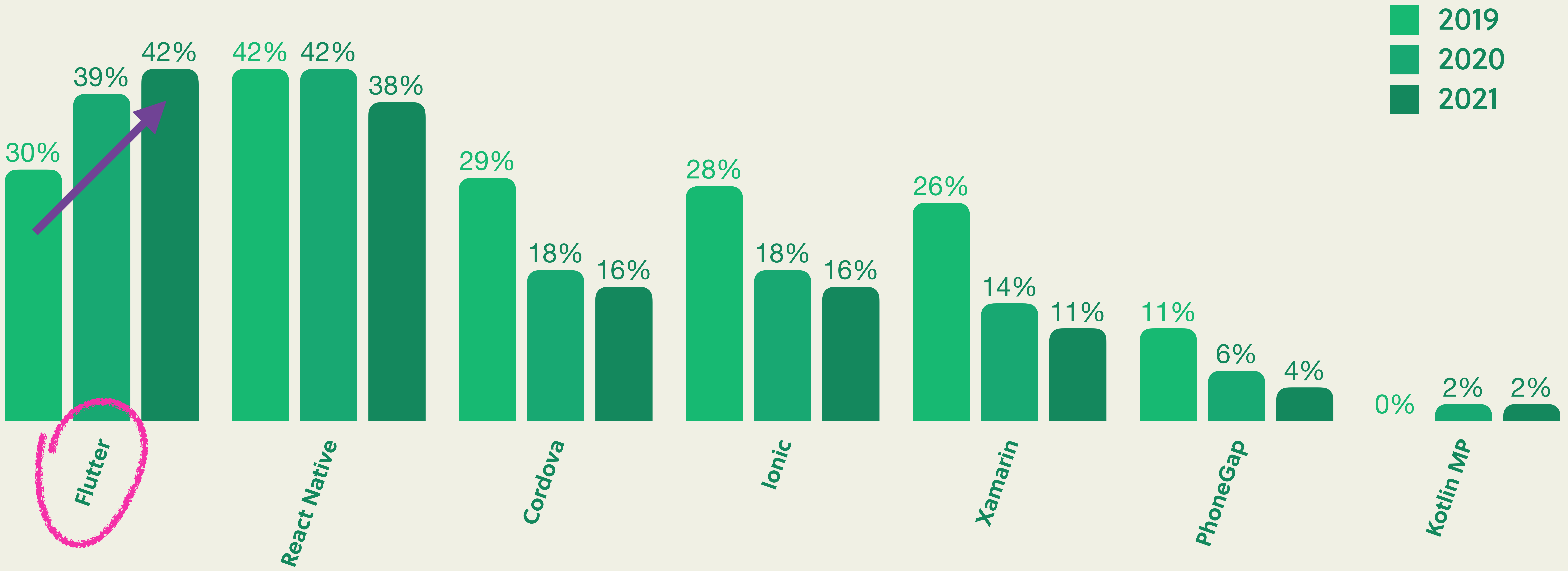

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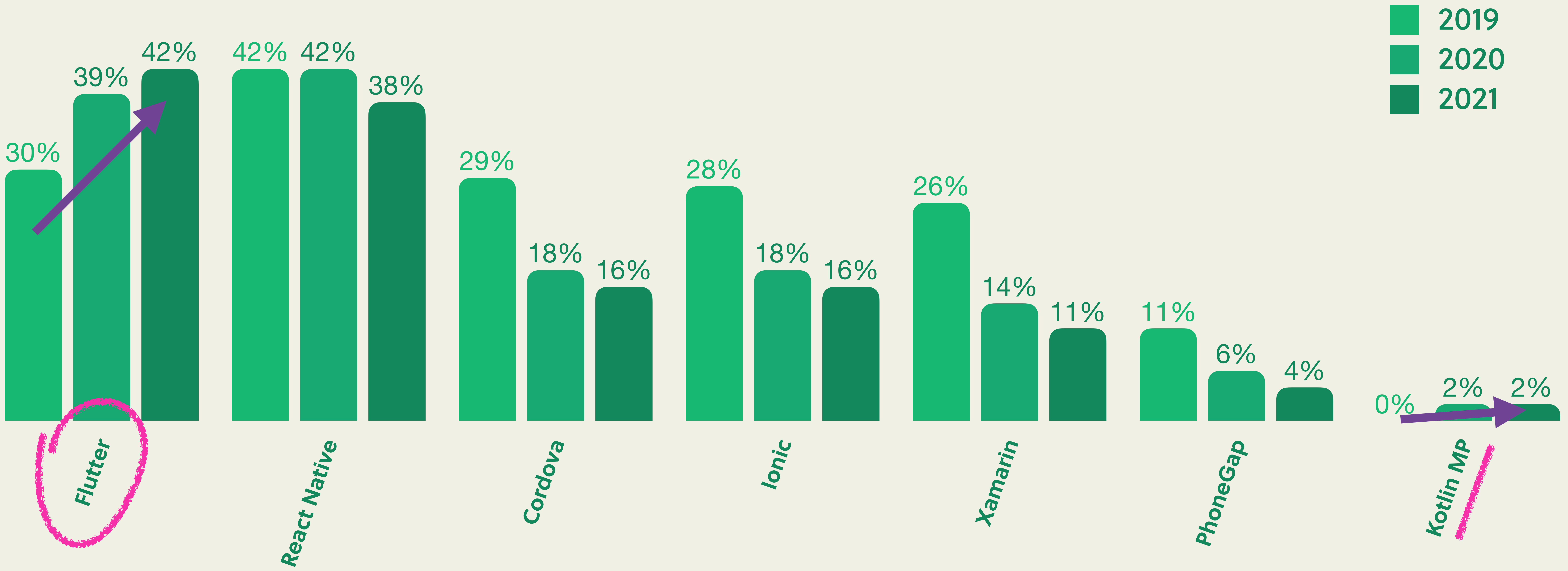

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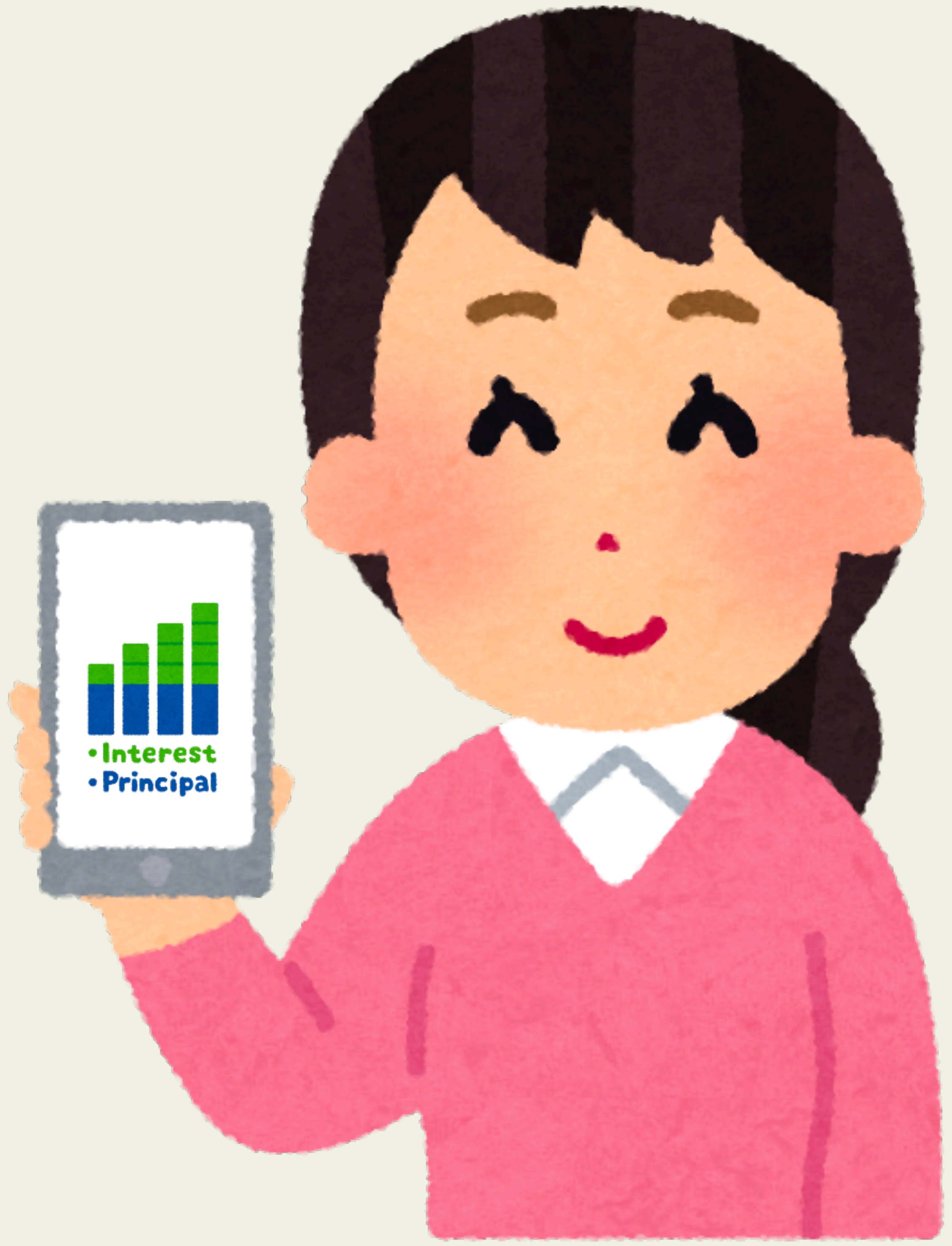

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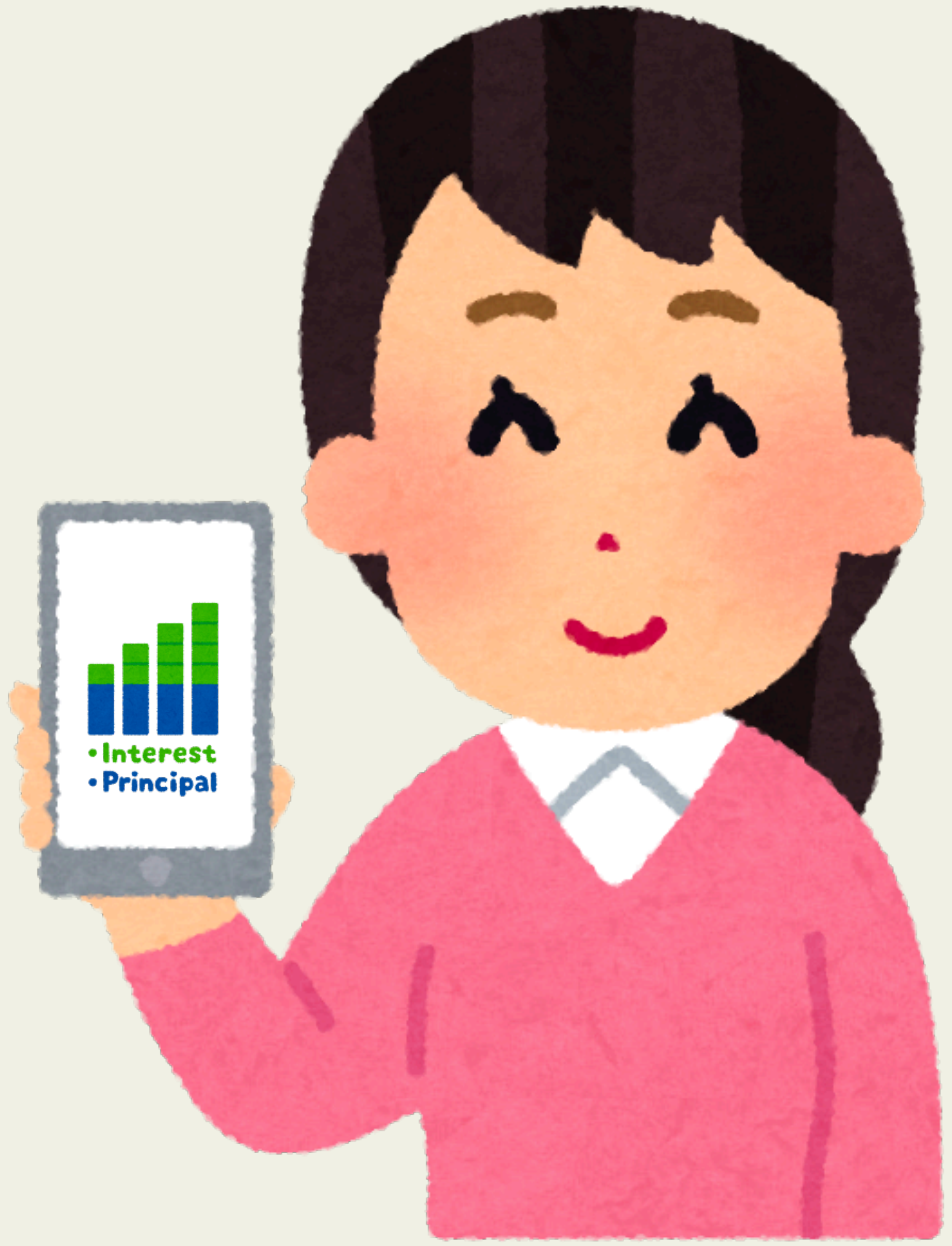

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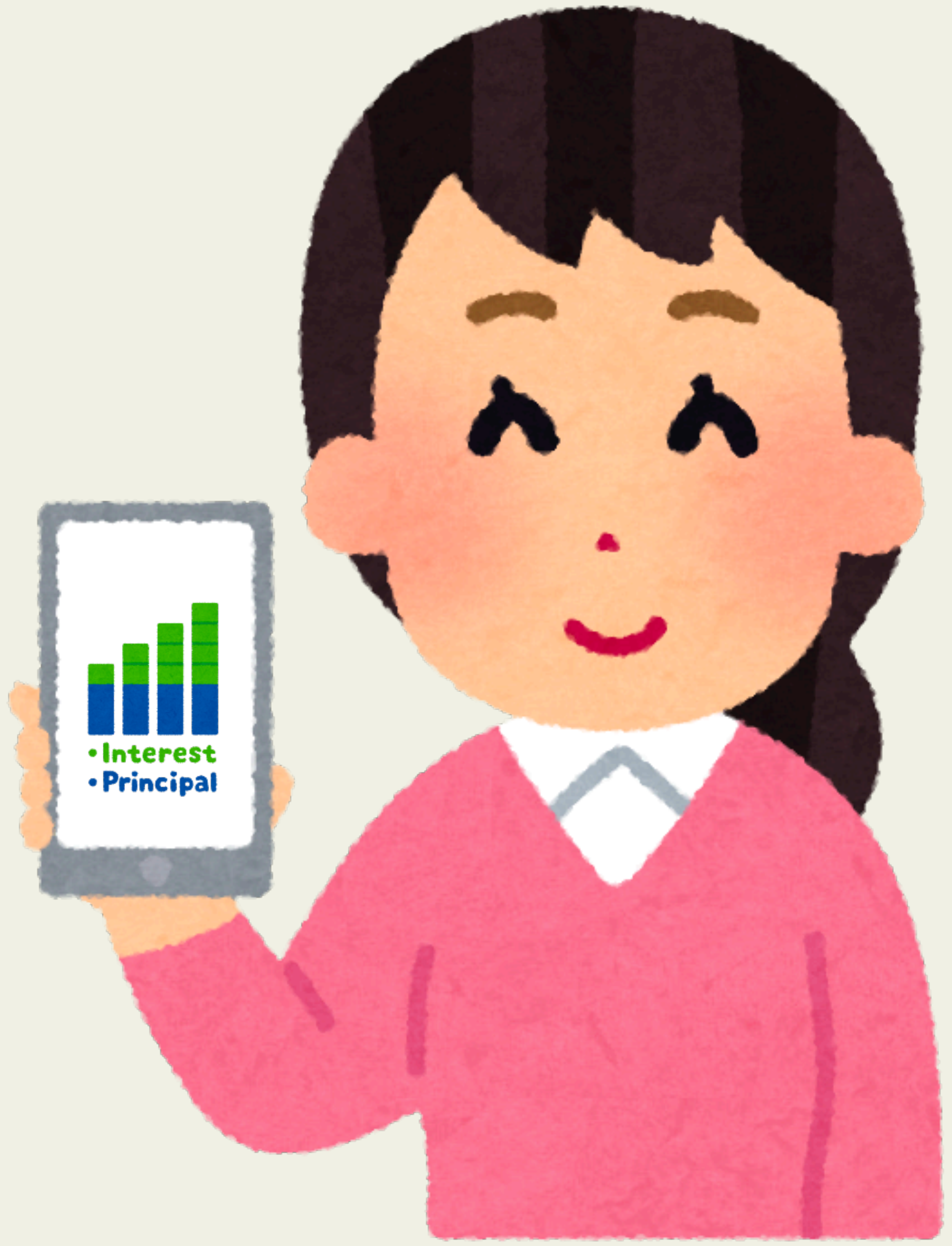

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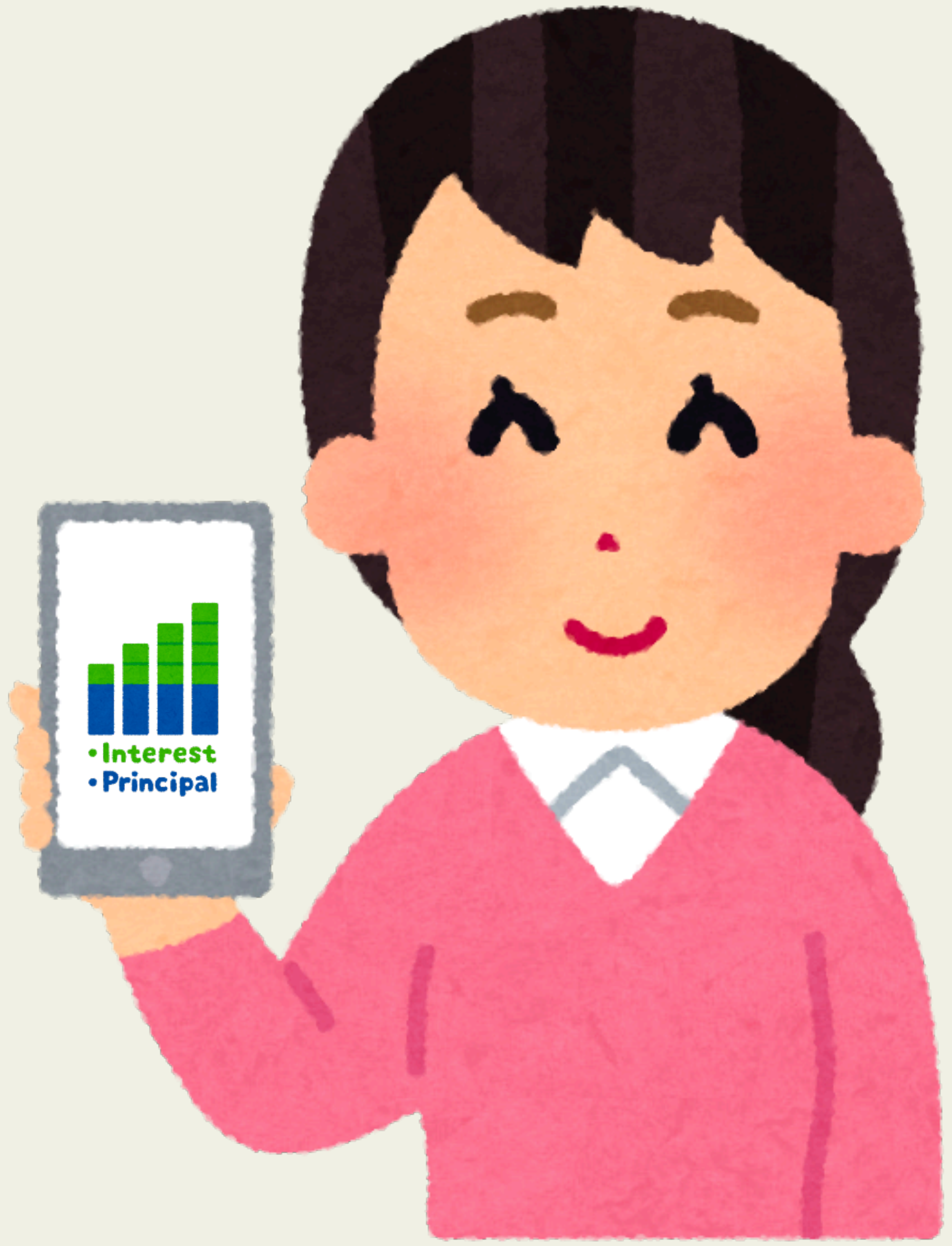

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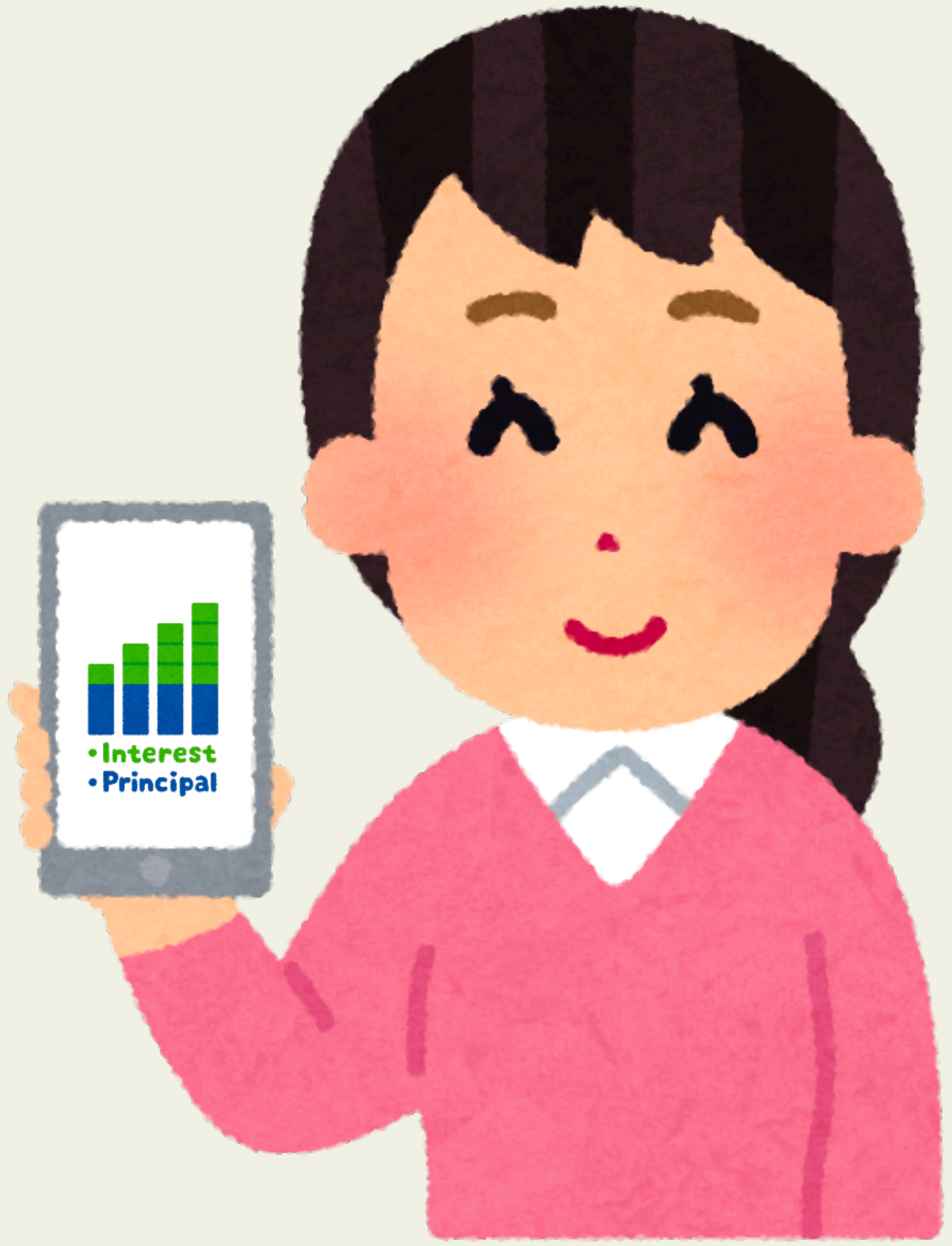

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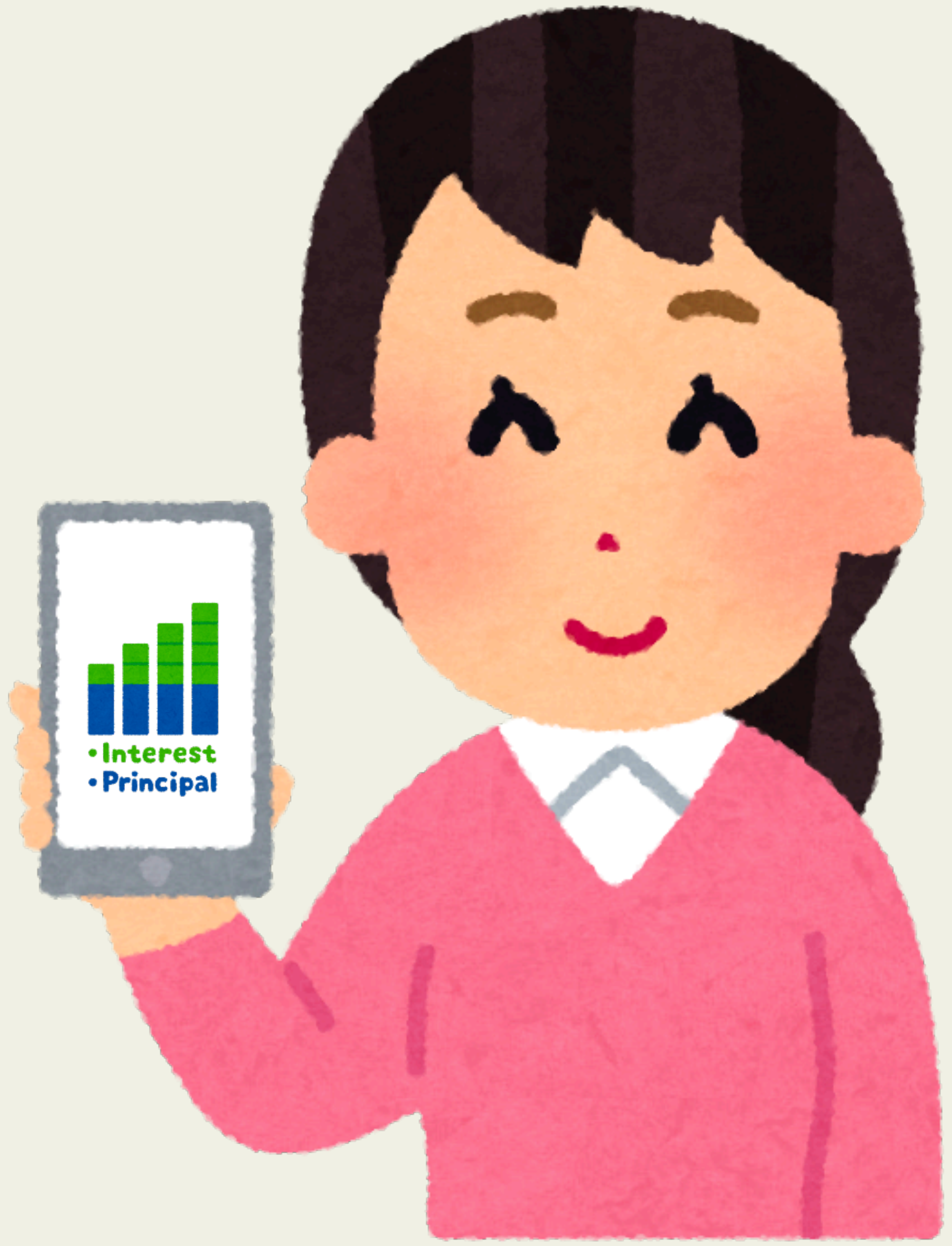

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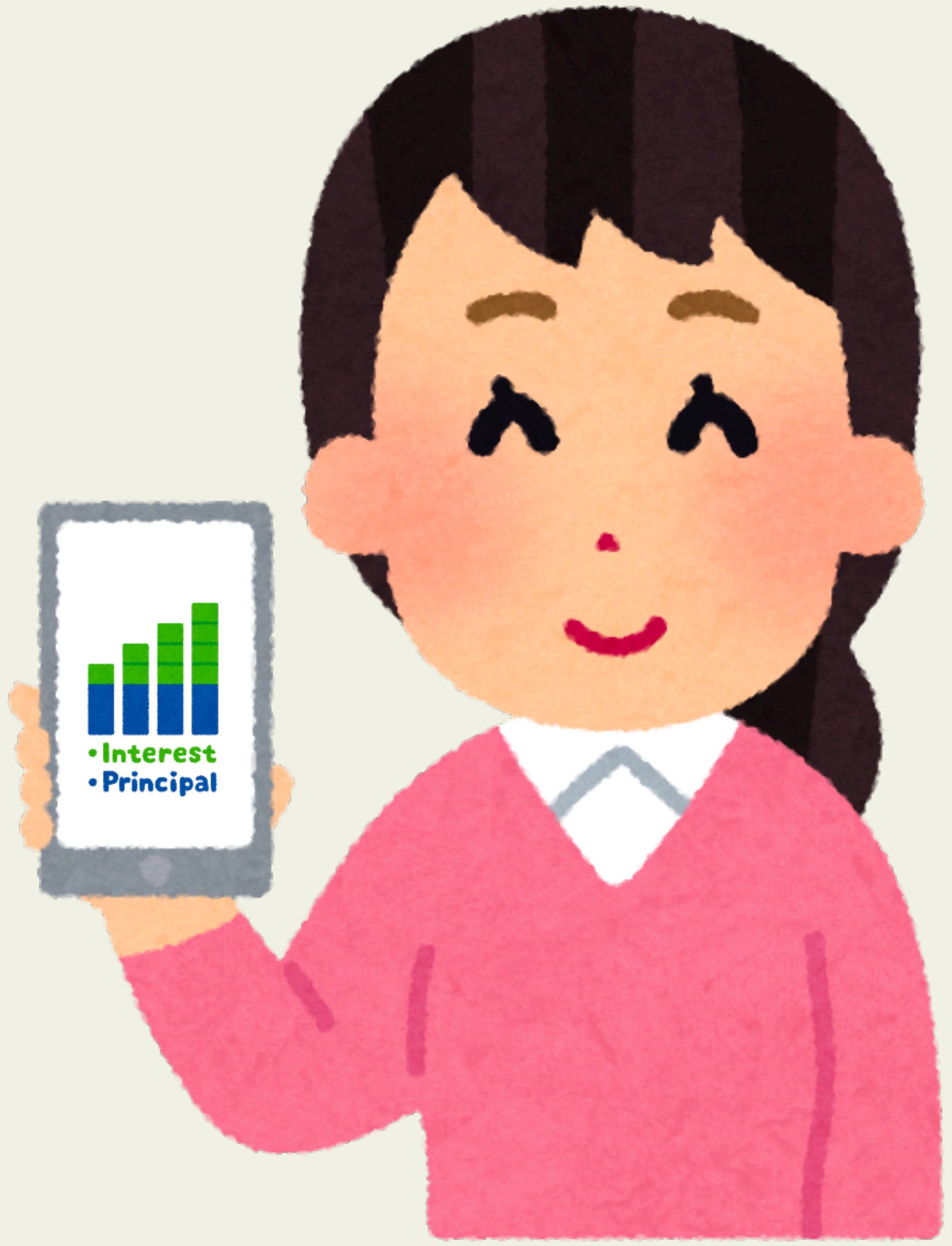

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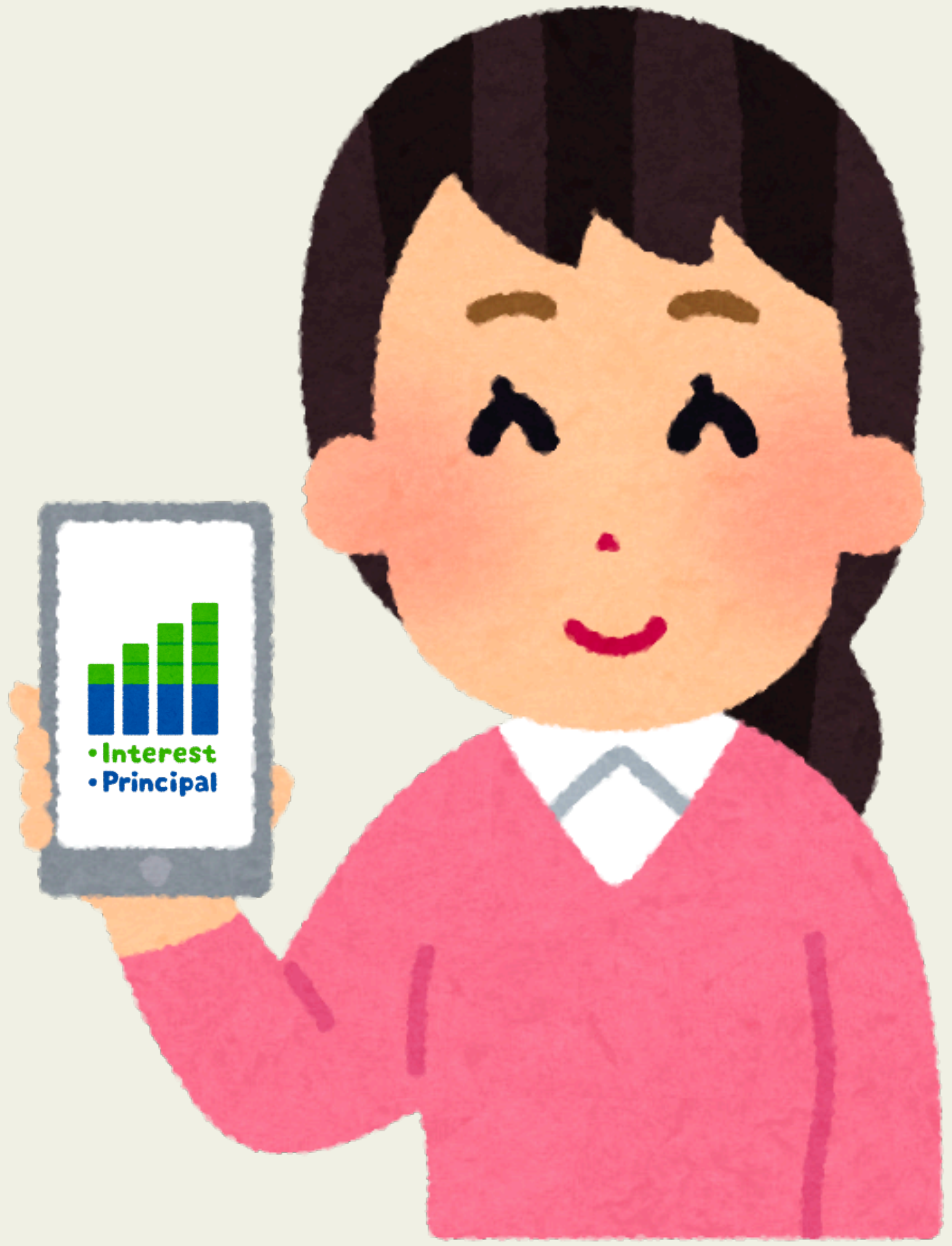

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- Which cross-platform framework?

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  ✓ Using Firebase services

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**Flutter**

# Testing on mobile

- Unit testing
  - More or less a solved problem
- UI testing
  - Easier in Flutter (widget tests)
  - Native, React Native use per-platform tools
  - Xamarin too, but custom

# Testing mobile UI on CI

- Instrumented tests
  - Slow, runs on virtual/physical devices
  - Cloud services exist, but expensive
  - Complex to set up and maintain
- Workarounds: more unit testing
- Specialised mobile CI solutions

# Review decisions

- Bad choices will not be immediately clear
  - RN apps abandoning RN after years
  - Flutter may turn out the same
- Keep an eye on the progress
  - Failure will be expensive…
  - …but stopping early will help

# Takeaways

1. Understand if mobile can work for you

Make data-driven decisions

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2. Create the right environment

   Sort out organisation and teams

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3. Assess the compromises

   There is no silver bullet

1. Understand if mobile can work for you

   Make data-driven decisions

2. Create the right environment

   Sort out organisation and teams

3. Assess the compromises

   There is no silver bullet

4. Make the right choice and GO!

   Hopefully this talk helped you

# That’s all, folks!

# Questions?

Illustrations courtesy of Irasutoya

# Sebastiano Poggi

twitter.com/seebrock3r

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