CENTRIC 2015, Barcelona

A Primer on User-Centered Mobile App Design

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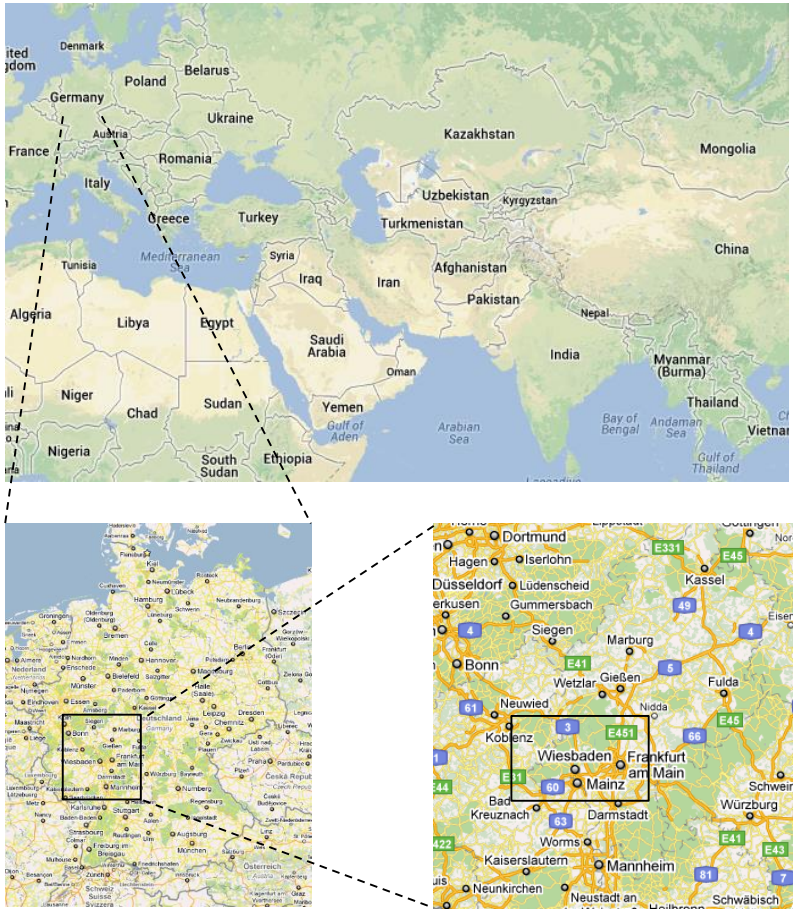
RheinMain University: Facts & Figures

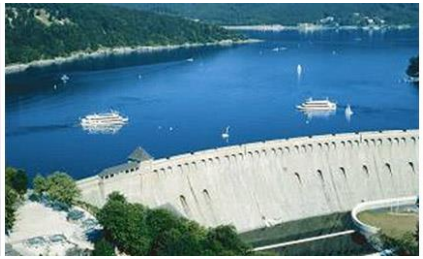
RheinMain University
of Applied Sciences

- Founded in 1971
- All in all about **12.000 students**, roughly 1.200 international students
- **60 degree programs**
- Total of **250 professors** (600 employees in total)

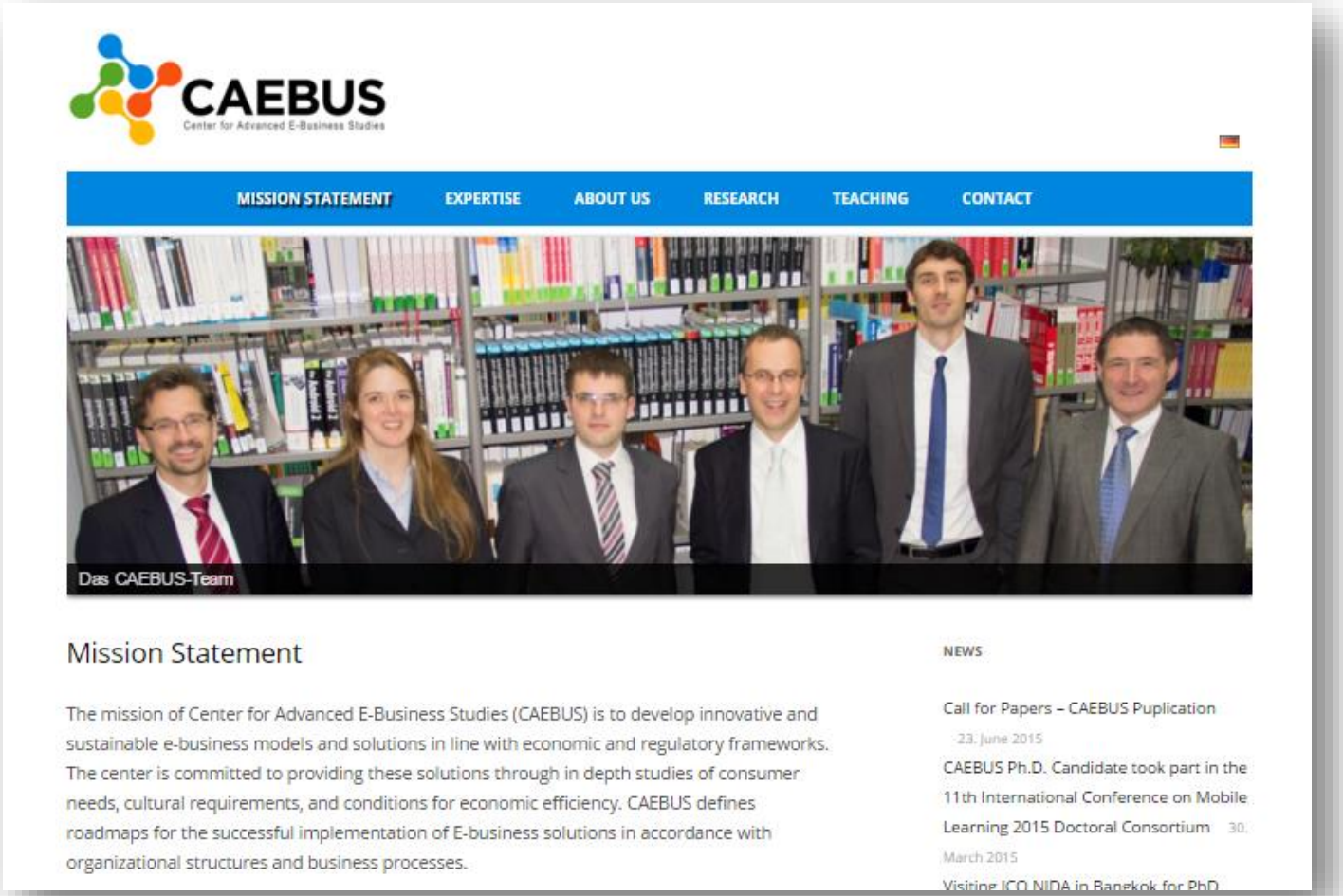


Location: State of Hesse

- Roughly at the **geographical center** of Germany
- About **6.3 million residents**
- Hesse's largest city: Frankfurt am Main
- Hesse's economic powerhouse: **the Rhine-Main area**
- **Lots of options for interesting day trips:**
  - Frankfurt, Wiesbaden, Marburg, Kassel, Darmstadt etc.
  - the Taunus uplands, the Rheingau, the Bergstraße etc.



Center of Advanced E-Business Studies



Please contact us if you like to cooperate! (www.caebus.de, stephan.boehm@hs-rm.de)

Agenda

1. Introduction
2. Designing & Developing Mobile Apps
3. Mobile App Prototyping
4. Mobile App Marketing

History of Mobile Apps

Mobile applications are already offered a longer time – but only the app store concept was the breakthrough.

Tools

Tools

Application manager

Press , and select Applications > App. mgr.. You can install two types of applications and software to your device:

- J2ME™ applications based on Java™ technology with the extension .jad or .jar ( ).
- Other applications and software suitable for the Symbian operating system ( ). The installation files have the .sis extension. Only install software specifically designed for your Nokia N95. Software providers will often refer to the official model number of this product: the Nokia N95-1.

Installation files may be transferred to your device from a compatible computer, downloaded during browsing, or sent to you in a multimedia message, as an e-mail attachment, or using Bluetooth connectivity or infrared. You can use Nokia Application Installer in Nokia Nseries PC Suite to install an application to your device. If you use Microsoft Windows Explorer to transfer a file, save the file to a compatible memory card (local disk).

Install applications and s

indicates a .sis application, a
that the application is not fully install
application is installed on the memor

Important: Only install and us
other software from trusted sources,
that are Symbian Signed or have pass
testing.

Before installation, note the followin

- To view the application type, vers
supplier or manufacturer of the a
Options > View details.
To display the security certificate
application, in Certificates, selec
'Certificate management', p. 123.
- If you install a file that contains a
an existing application, you can o
original application if you have th
file or a full back-up copy of the
package. To restore the original ap
application, and install the applic
original installation file or the ba

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- The .jar file is required for installing Java applications. If it is missing, the device may ask you to download it. If there is no access point defined for the application, you are asked to select one. When you are downloading the .jar file, you may need to enter a user name and password to access the server. You obtain these from the supplier or manufacturer of the application.

1 To locate an installation file, press , and select Applications > App. mgr.. Alternatively, search the device memory or a compatible memory card (if inserted) in File mgr., or open a message in Messaging > Inbox that contains an installation file.

2 In App. mgr., select Options > Install. In other applications, scroll to the installation file, and press ◉ to start the installation.
During installation, the device shows information about the progress of the installation. If you are installing an application without a digital signature or certification, the device displays a warning. Continue installation only if you are sure of the origin and contents of the application.

To start an installed application, locate it in the menu, and press ◉. If the application does not have a default folder defined, it is installed in the Applications folder.

To see which software packages are installed or removed and when, select Options > View log.

Source: http://nds1.nokia.com/phones/files/guides/Nokia_N95-1_UG_en.pdf

Mobile Application Defined

Mobile App/Application:

Application software to run on mobile devices, such as Smartphones, with which the functionality given by hardware and operating software can be applied ***to solve user-specific problems****.*

Typically, Mobile Apps consist of programs and data that will be ***installed by the end users*** *themselves to the devices and thus are also an important* ***element of handset personalization****.*

Source of pictures:
http://tweakyourbiz.com

App Stores

The major app stores now offer quite a vast number of applications.

App Store **> 1.400.000 Apps** Mid of 2015

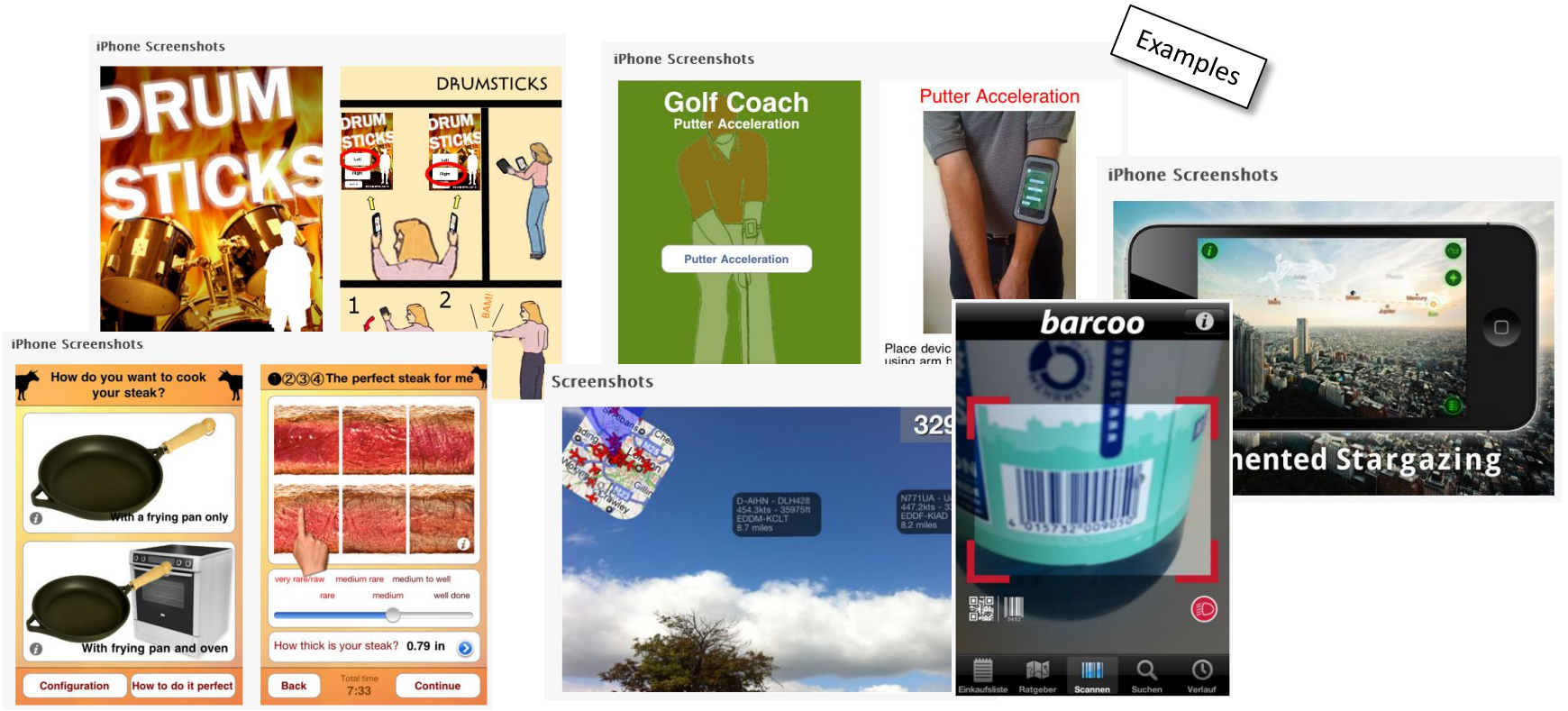
Google play **> 1.600.000 Apps**

Windows Phone Marketplace **> 350.000 Apps**

Sourcen: Unternehmenswebsites; Source of pictures: http://blog.mobiles.co.uk/app-reviews/how-many-apps-2012/

Advanced Mobile Apps

Many Mobile Apps establish a direct relation to the real mobile usage context in other word the provide a "Real World Connection".



Augmented Service Offerings

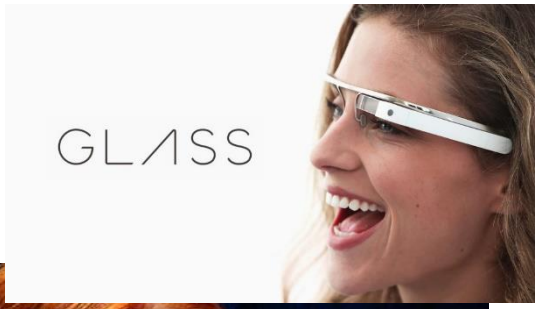
Augmented Service Offerings provide functionalities that are based on an access to other connected devices.

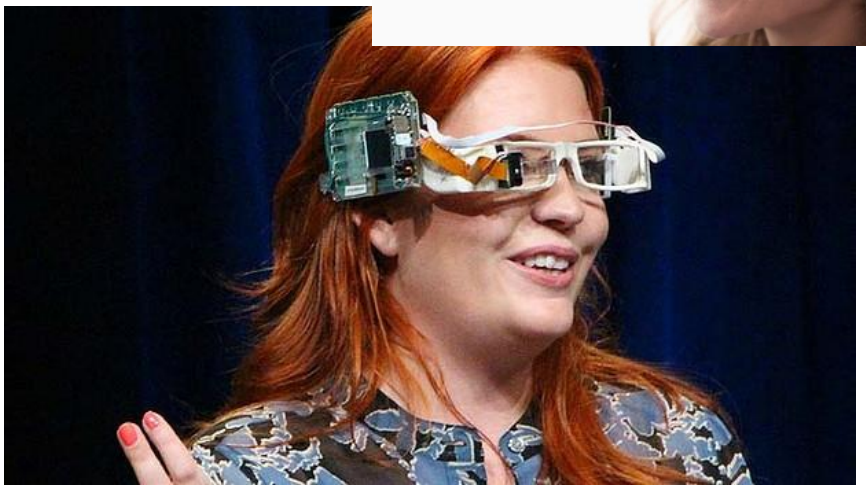
Examples

Source: http://www.withings.de/de/waage, http://www.igrillinc.com/

Next Generation Mobile Apps: Wearable Devices

- Potential disruptive technology
- Social impact (privacy)
- Lifestyle product („Cool or Creepy“)
- New user experience/usability
- New areas of application
  (in both – business and consumer segments)
- New eco system





“We removed everything that wasn't absolutely essential.”

Isabelle Olsson, senior industrial designer, Google Glass

Sources: Google, http://www.smh.com.au/digital-life/digital-life-news/google-glass-wasnt-always-so-slick-20130521-2jxgv.html

Next Generation Mobile Apps: Mobile Device Trends

- New interaction/usage scenarios
- Screen independent interaction
- Non-intrusiveness
- Smartphone as a hub
- Increasing device fragmentation

Gear, Samsung
(Smartwatch)

MYO, Thalmiclabs
(Muscle Activities)

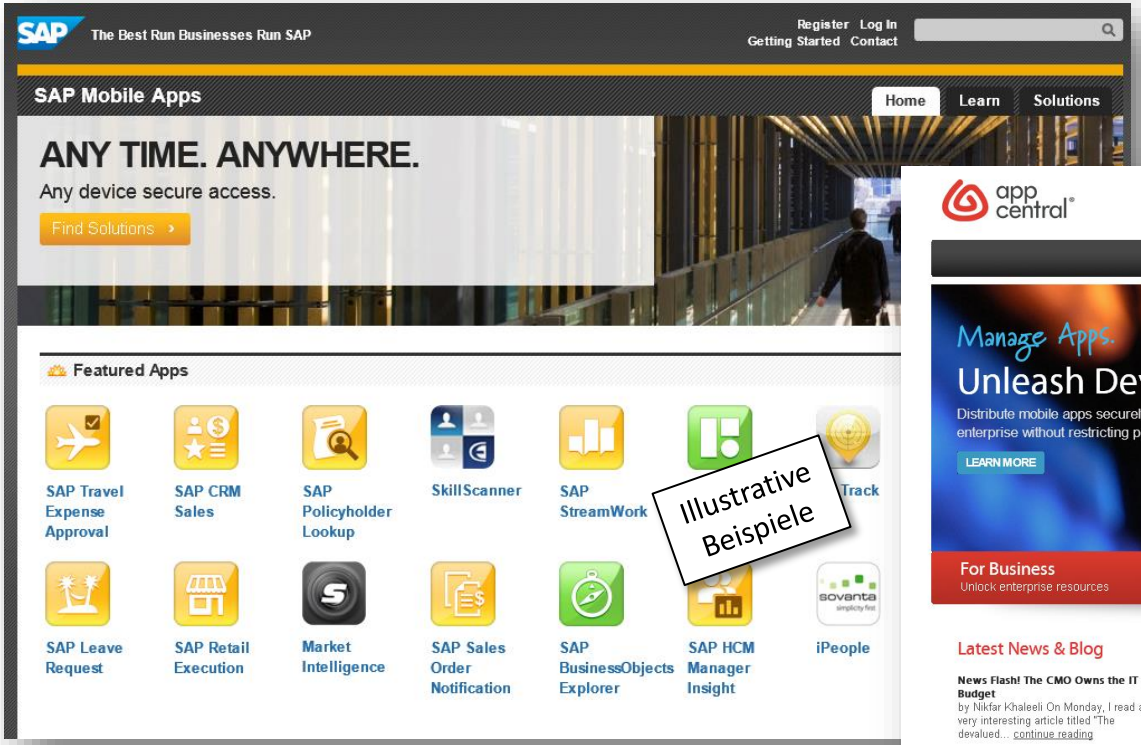
Muse, Interaxon
(Brain Sensing)

Fokus Today: Simple Apps for Smartphones

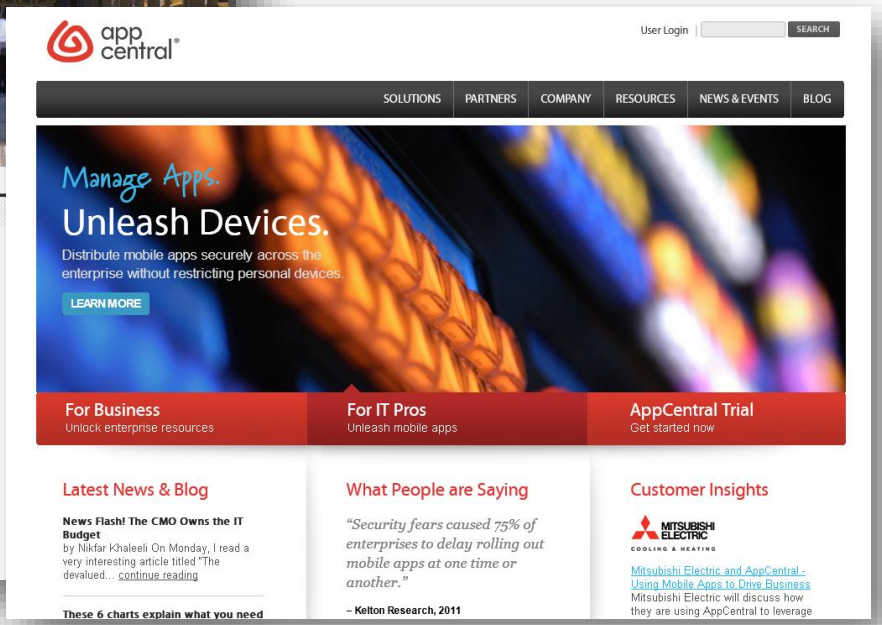
Quellen: https://www.thalmic.com/de/myo/, http://www.interaxon.ca/muse/

Consumerisation of IT

Driven by the success of mobile apps in the consumer segments those concepts are conquering the corporate context ("consumerisation of IT").



Source: http://ecohub.sap.com/store/mobility/



Source: http://www.appcentral.com/

Consumer vs. Business App Environments

Simplified

Dimensions	Consumer	Business
Time Horizon	Short term „Fire-and-Forget“/Updates	Long term Versioning/Releases
Value Add	Multidimensional (e.g. Enjoyment)	Measurable contribution to corporate success
Complexity	Rather low („Stand-alone“)	Rather high („Backend integration“)
Security	„Hygiene factor“ (except banking/payment)	Business critical („condicio sine qua non“)
Distribution	Epidemic/ Public App Stores	Rollout (planned)/ Enterprise App Store
Usage/ Distribution	Self-determined/ attract and retain customers	Predetermined/ create acceptance

Strategic Alignment and Dimensions of Mobile App Projects

For Discussion

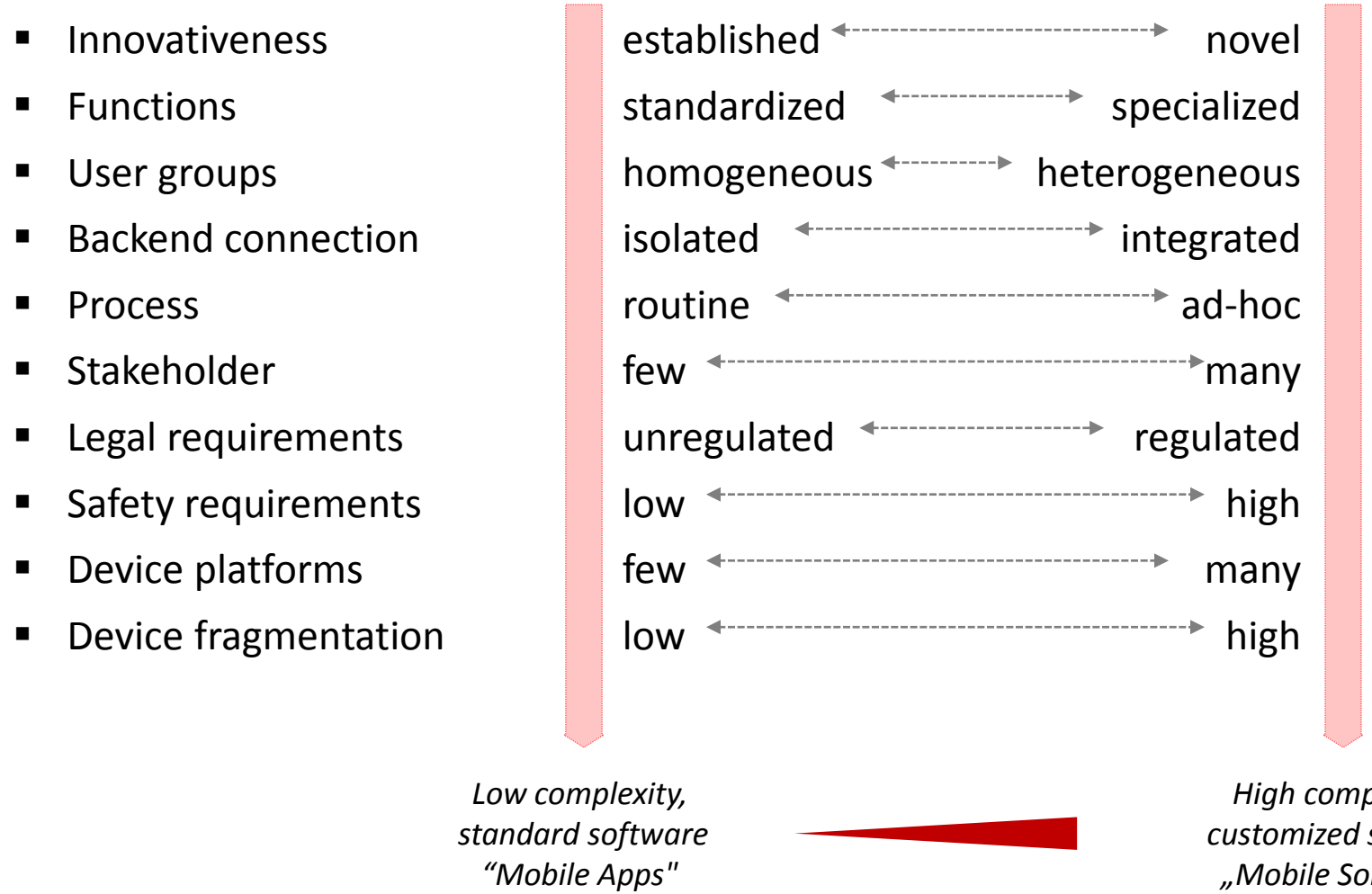
Strategic Alignment

- Reactive
  (Maintain user base/shift desktop to mobile)
- Expansive
  (Extension of user base/existing customer groups)
- Innovative
  (Development of new customer groups)
- Operationally
  (For example, cost savings)
- Competitive
  (e.g. "Copycat"/users of competitors to poach)
- Experimental
  ("Trial balloon", launch & learn approach)
- ...

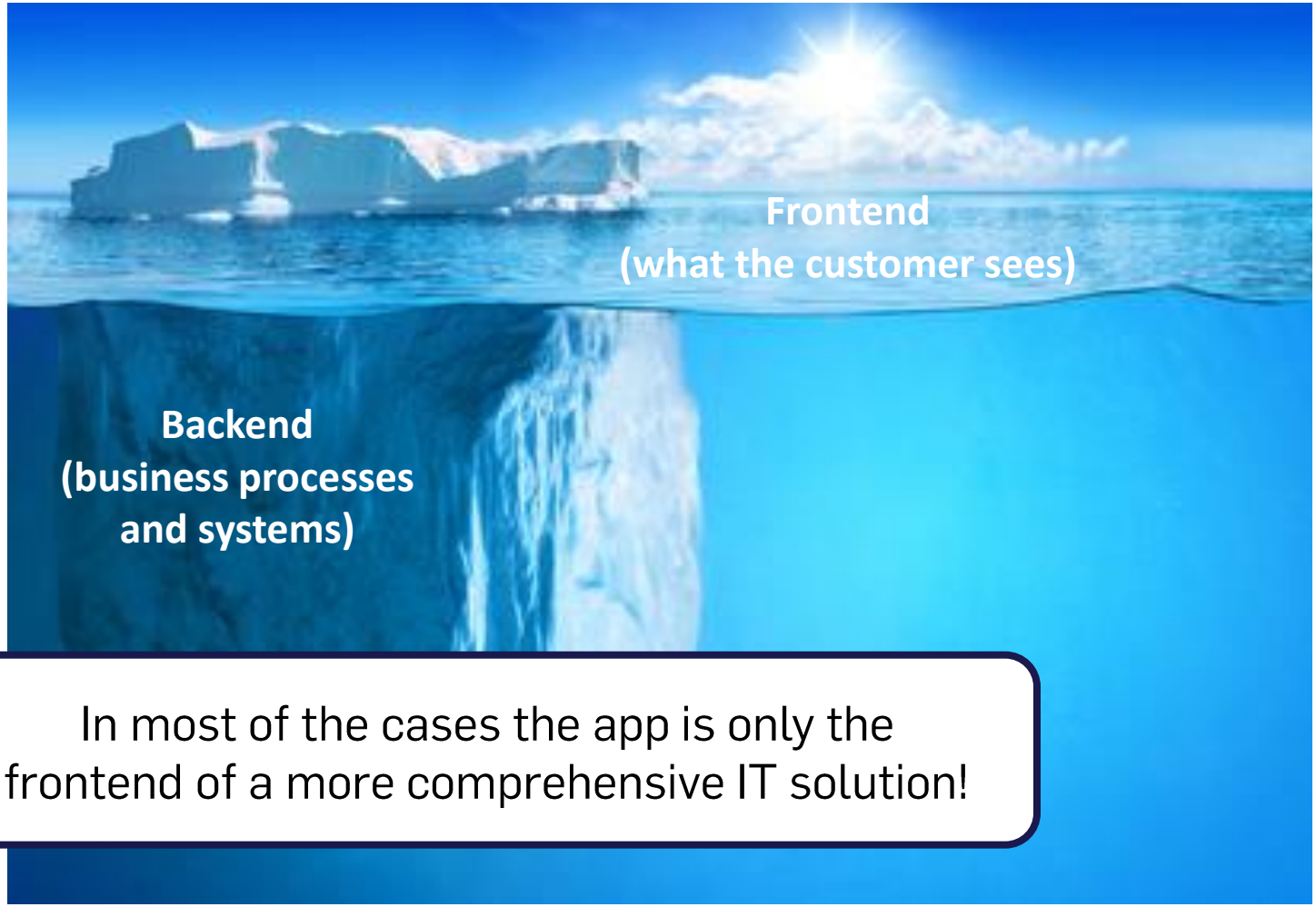
Project Dimensions

- Integration in overall strategy
- Project sponsorship
- Project organization
- Budgeting
- Technical Realization
- Back-end integration
- Security concept
- Design (CI / CD specifications)
- Outsourcing
- Marketing/distribution
- Success controlling (KPIs)
- ...

Complexity Drivers of Mobile App Projects



Mobile Apps: Backend vs. Frontend



In most of the cases the app is only the frontend of a more comprehensive IT solution!

Fokus Today: Simple Apps for Smartphones

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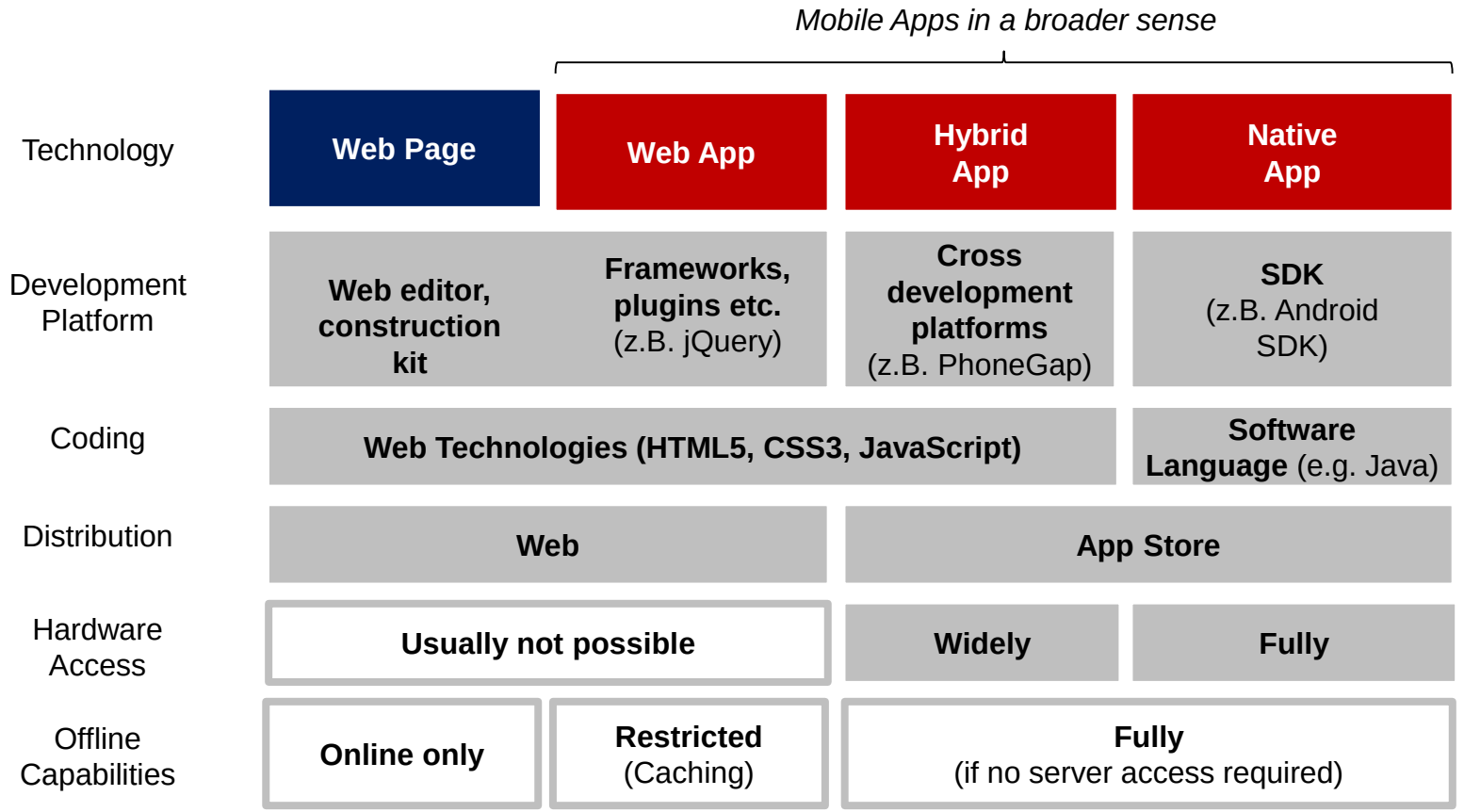
Types of Mobile Apps

Technically, a mobile app can be realized in very different ways.



Mobile Web Apps

Mobile web apps offer a similar look and feel as native applications, provide limited offline use and run encapsulated from the hardware in the browser.

- \+ Ease of development
- \+ Icon/shortcut possible
- \+ Easy to publish via a link
- \+ Operating system independent (run in "any" browser)
- \+ Always up to date

- – No sale on App Stores
- – Limited offline-capabilities (only caching code and content)
- – No access to handset functions such as camera (localization possible)
- – Poor/limited performance

Mobile Web Apps: jQueryMobile

https://jquerymobile.com/

ionic + ANGULARJS by Google

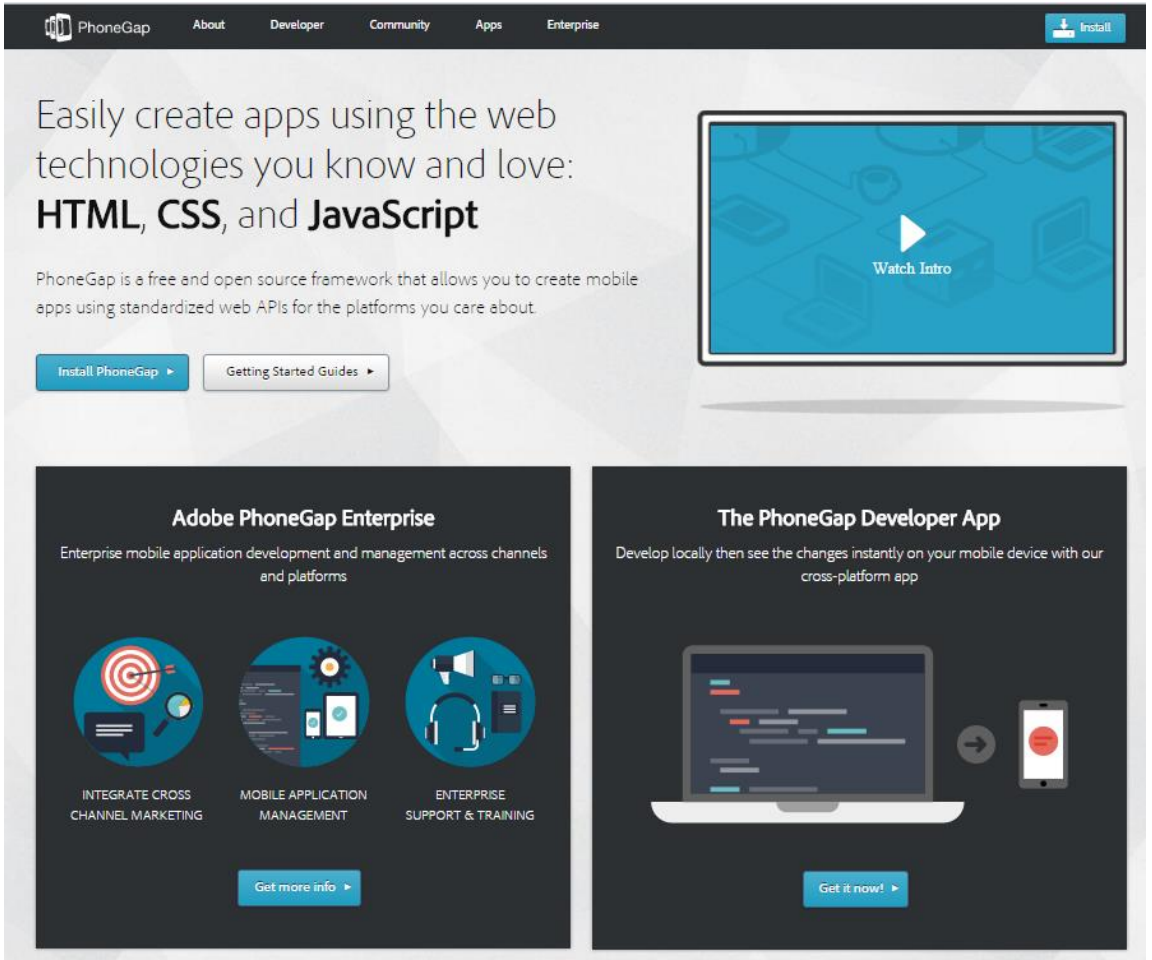
Hybrid Apps

Hybrid apps combine advantages of web apps and mobile apps allow access to terminal functions and promise a simple cross-platform portability.

- \+ Relatively simple development
- \+ Cross-platform portability
- \+ Sale on app stores possible
- \+ Comprehensive access to handset functions (depending on Framework)
- \+ Offline capability

- – High dependence on framework (e.g. for debugging, OS updates)
- – Limited performance
- – Porting requires typically more comprehensive interventions (e.g. GUI)
- – Dependencies on App Store, and OS vendors (e.g. app review)

Hybrid Apps: PhoneGap/PhoneGap Build (Cloud)



https://build.phonegap.com/, http://phonegap.com/

Native Apps

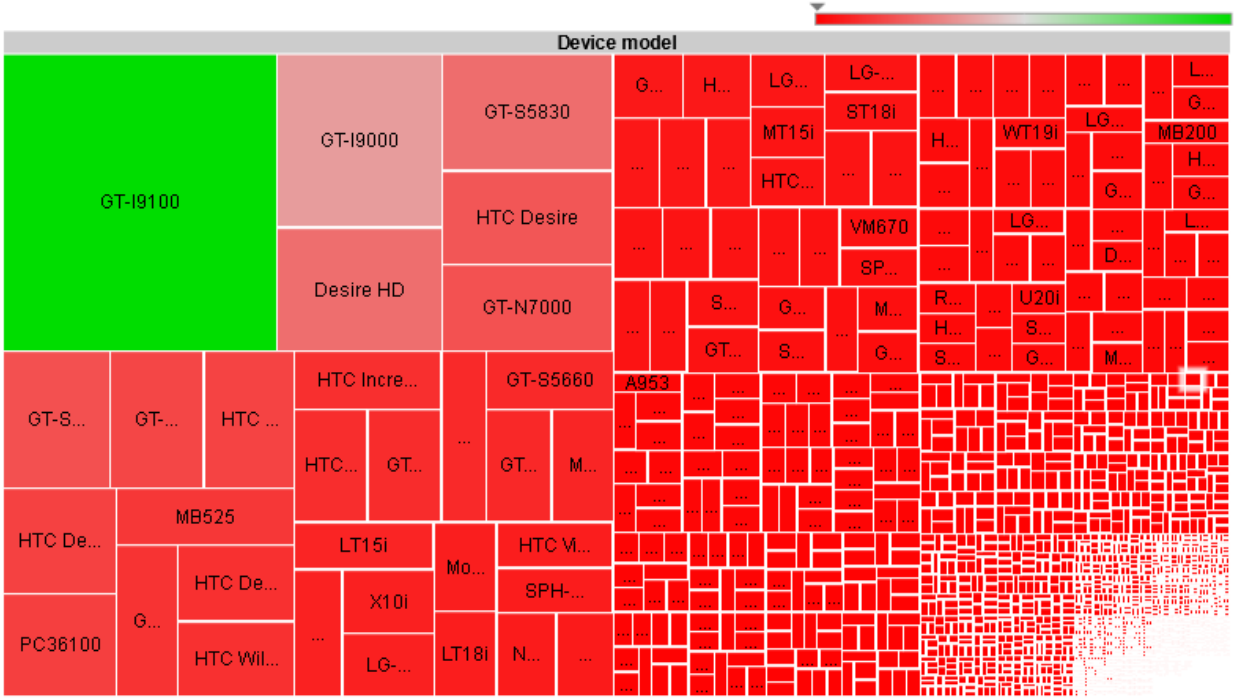
Native Apps (mobile apps in the narrower sense) are specifically programmed, compiled, and installed on the device for a specific operating system platform.

- \+ Comprehensive developer tools
- \+ Most comprehensive functionality
- \+ Comprehensive devices access
- \+ User experience can be optimized for a specific handset very well
- \+ Very good performance
- \+ Most comprehensive commerciality
- \+ Offline capability

- – Knowledge in specific programming language required
- – Separate development for each operating system platform required
- – Dependencies on App Store, and OS vendors (e.g. app review)
- – Device specific adaptation required (to fully exploit the potential)

Device Fragmentation (Android)

The large terminal fragmentation in Android devices is a problem which complicates the development of Android apps.



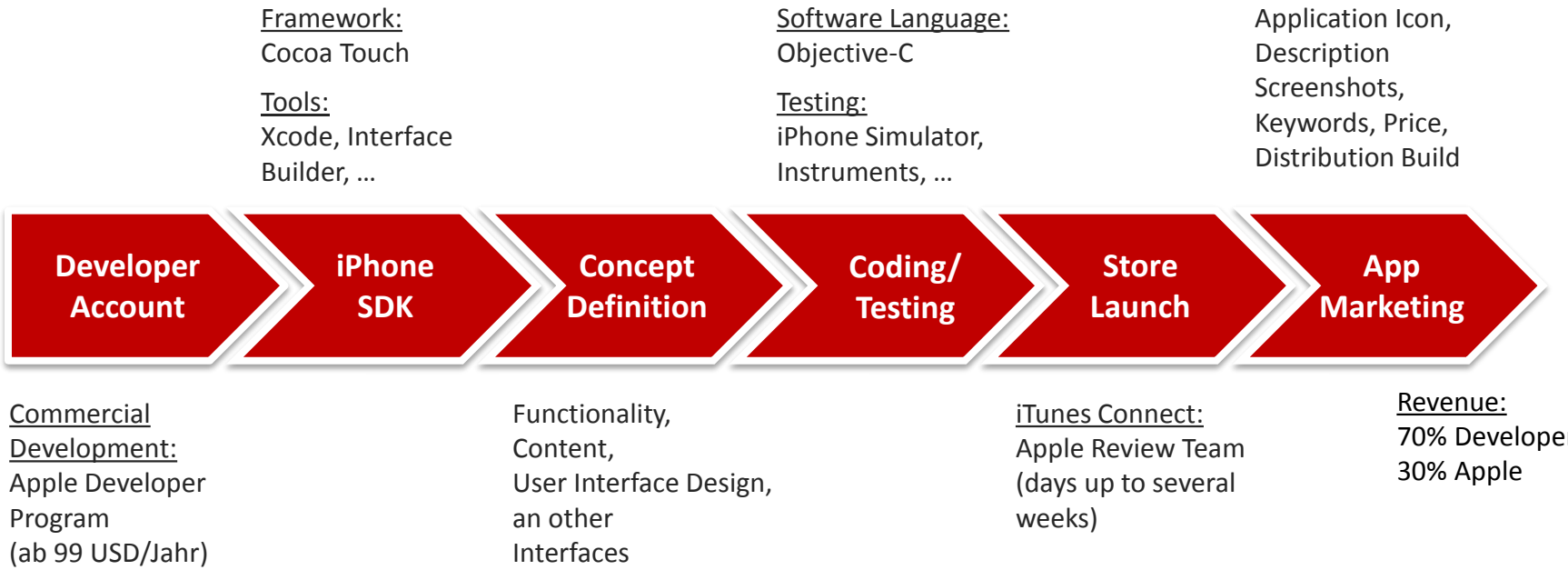
Device fragmentation based on the downloads for the software “OpenSignalMaps” (681,900 downloads in 6 month, 3.992 different handsets, 61.389 downloads by GT-i9100 [Galaxy SII]).

Source: http://opensignal.com/reports/fragmentation.php

App Development Process

Between the idea to the market launch of an app are various steps that slightly vary by the specific mobile platform.

Selected Steps of an iPhone App Development



Mobile App Development: Standardized Solutions

Standardized "modular systems“ and construction kits are the simplest solution offered for mobile app development.

Mobile App Development: IT Service Provides

Depending on the specific requirement criteria the app development can be provided by different IT service providers.

For Discussion

Criteria	Freelancer	(Digital-) Agency	IT System House	IT System Integrator
Project budget	Low	Medium	High	Very high
Complexity	Low	Medium	High	Very high
Life span	Short	Medium	Medium	Long
Design requirements	Medium	High	Medium	Low
Security requirements	Low	Medium	High	High
Business criticality	Low	Medium	High	High

Mobile App Development Costs: Categories

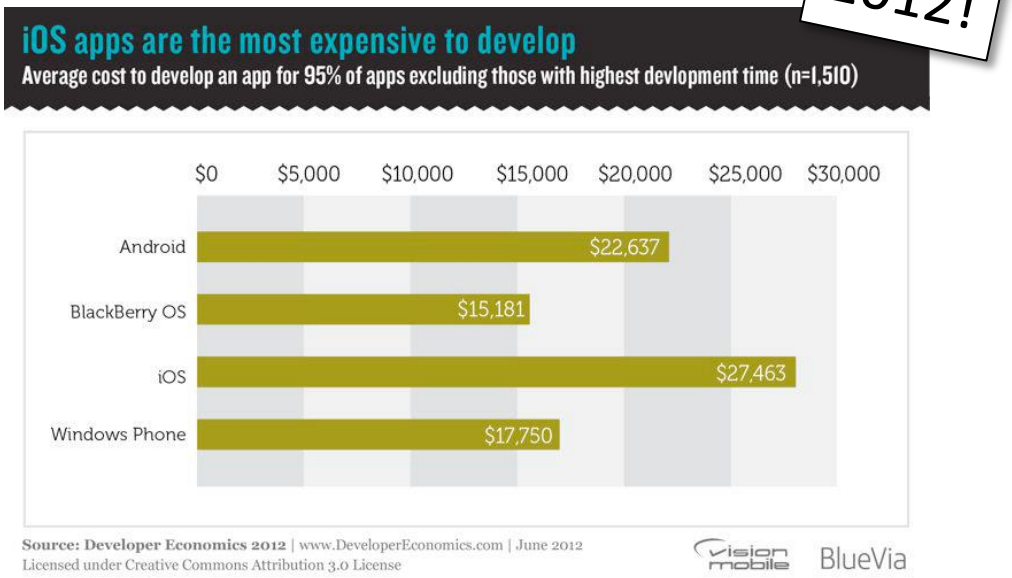
Development costs vary depending on the platform - programming and debugging account for about half the cost.

Table: Mobile application development costs

Cost	Description
Tools	Computer cost, developer registration fees and tools licenses.
Development & Debugging	The bulk of app production costs (upwards of 55%).. Practically speaking, the cost of person-hours devoted to the project.
UX design	Storyboards, user interaction and graphic design typically make up 25% of total app cost.
Maintenance	Typically 10% of the initial app cost, on an annual basis
Marketing	We estimate that marketing costs average 10% of app production expenses. In practice, marketing costs differ based on the developer segment – Hobbyists and Explorers will use Facebook as the lowest hanging fruit, whereas Hunters will use more sophisticated and premium channels such as professional PR services and incentivised downloads.
Back-end	Back-end costs vary depending on the application's requirements – from lightweight (user management services on Appcelerator, Spire.io or Parse.com) to heavy (applications written from scratch on Amazon Web Services (AWS) or Google App Engine).

Source: VisionMobile

2012!



Source: http://www.visionmobile.com/product/developer-economics-2012/

Mobile App Development Costs: iBusiness Study

In Germany, average development costs of 7,800-49,000 EUR were identified – the cost vary based on the complexity of the app.

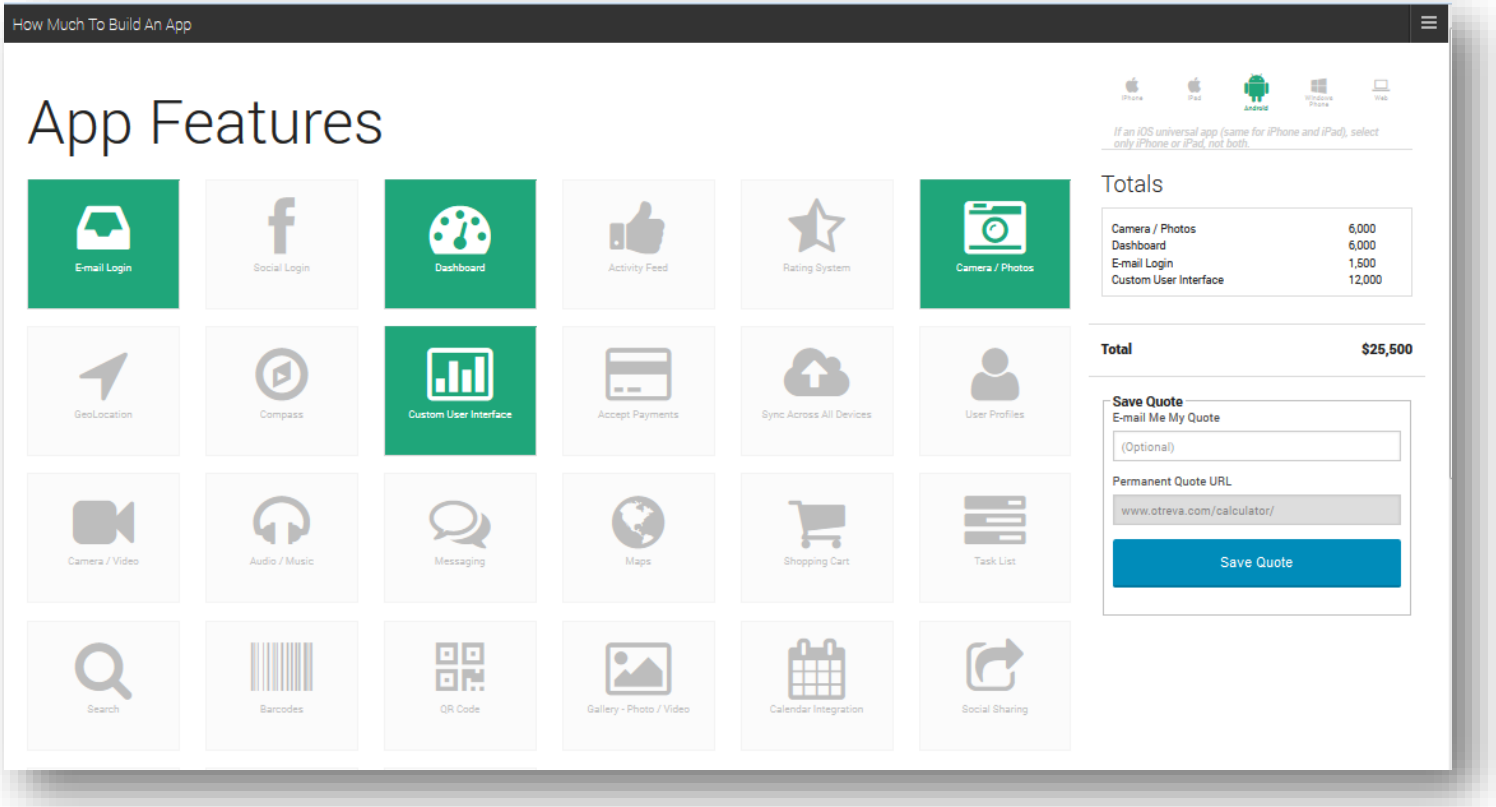
iBusiness study on app development costs in 2013

- Survey of agencies and design studios in Germany
- Average cost depends on the complexity:
  - Simple app: 7,754 EUR
  - Medium complexity ("Where-is-my-car-app"): 13,397 EUR
  - High complexity: 48,804 EUR
- A major cost driver: front end/back end development
- Additional costs for second platform: 58%
- Costs for iOS / Android now aligned
- Symbian apps cost 45% more - Windows Phone currently the most expensive

Source: http://business.chip.de/news/Mobile-Apps-Alleskoenner-kosten-50.000-Euro_64005338.html

Mobile App Development Costs: Costs Calculator

First indications of the expected costs for an app development can be derived from online calculators.



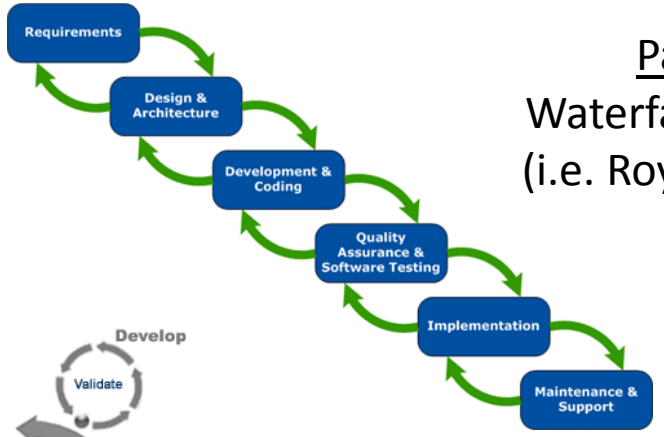
Example: Otreva App Cost Calculator

(Source: http://www.otreva.com/calculator/#)

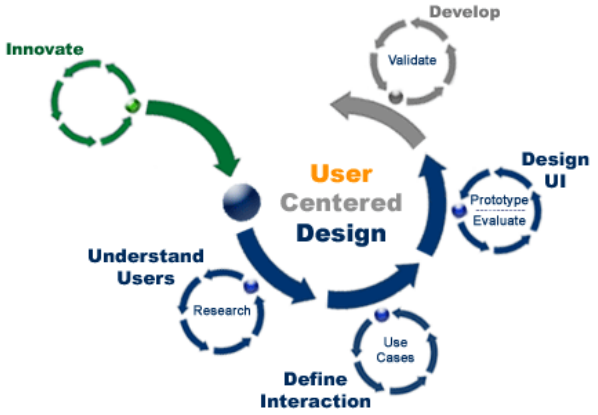
Development Approach

It is important that the app development follows an user-centered approach, i.e. is taking the earliest possible involvement of end-users.

<u>Past:</u>
Waterfall Model
(i.e. Royce 1970)



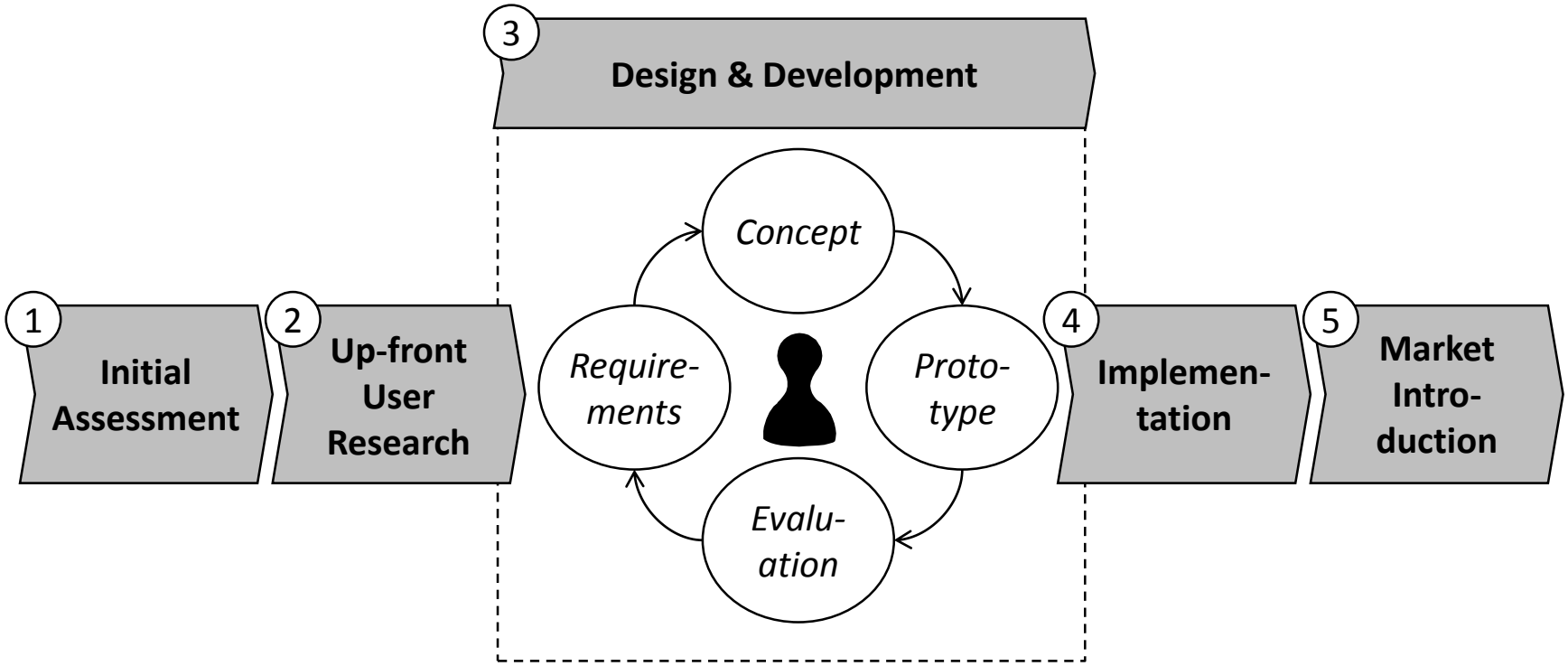
<u>Today:</u>
User-Centered Design
(i.e. ISO 9241, SAP)



Source of pictures: http://projectcommunityonline.com/wp-content/uploads/2012/06/developmentprocess1.gif, http://www.sapdesignguild.org/editions/edition10/ucd_overview.asp

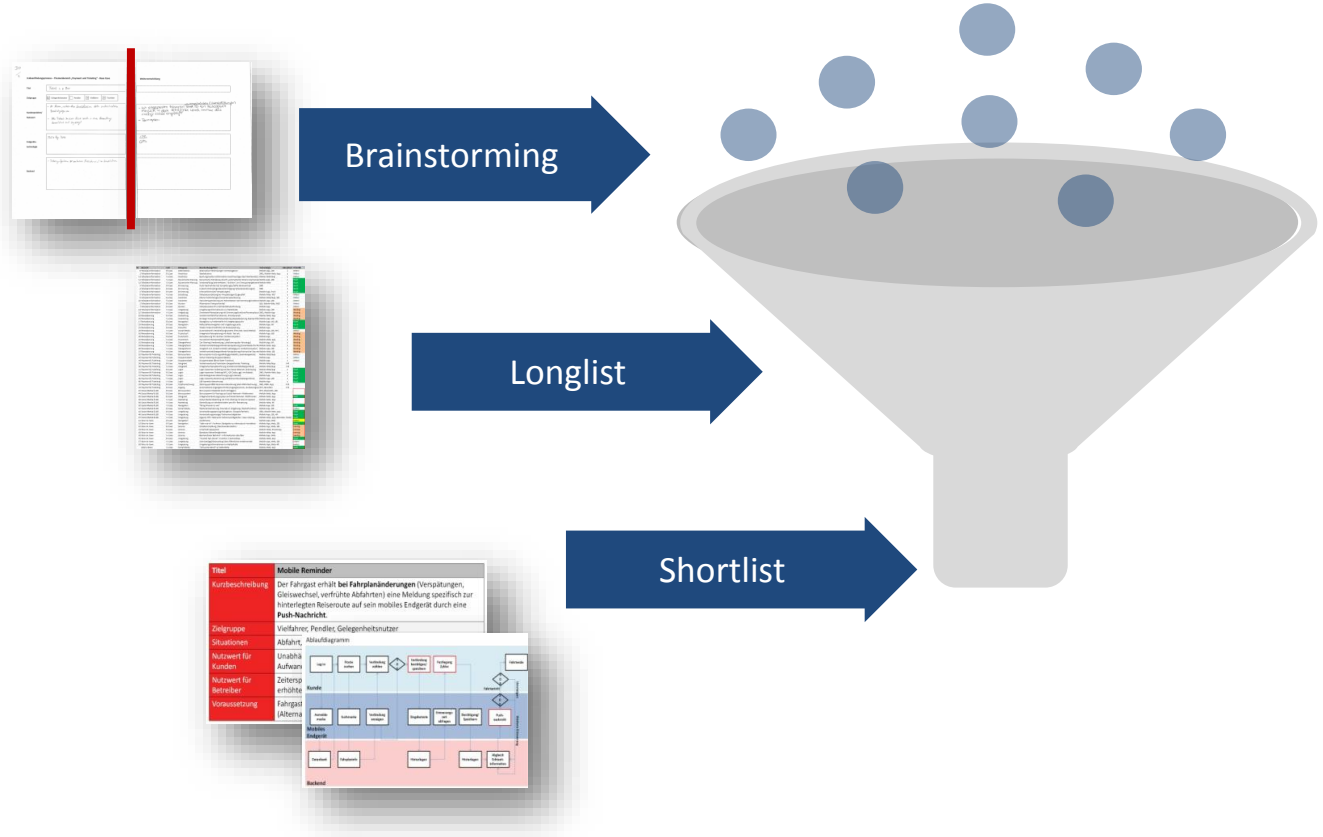
User Centered Design Approach

The design & development approach within UCD relies on prototypes to gather user feedback and stepwise improve the app concept.



Idea Generation

Idea generation has to be conducted before the development process can begin – features and functions can be defined using creativity techniques.



Source: Projekt HSRM/CSC

Competitive User Experience Analysis

Based on these ideas a competitive analysis from the user's perspective should follow ("Competitive User Experience").

Advantages of a “Competitive User Experience” Analysis

- ☞ Identification of best practices and user expectations (established functions and design elements)
- ☞ Avoid mistakes of others (problem areas of existing solutions)
- ☞ Better adaptation to user needs (Identification of opportunities and "niches")
- ☞ Inspiration/identification of emotional elements ("Emotional Design")

FIGURE 5.1 Two-by-two diagram for Foodspotting *(Courtesy of Alexa Andrzejewski)*

Source: Susanne Ginsburg, Designing the iPhone User Experience

Up-front User Research

In further steps customer requirements are to collect by up-front user research – this is not to be confused with a usability testing.

Up-front user research: Informs product requirements and design

"What should we design?"

Usability testing: After requirements defined and initial design established

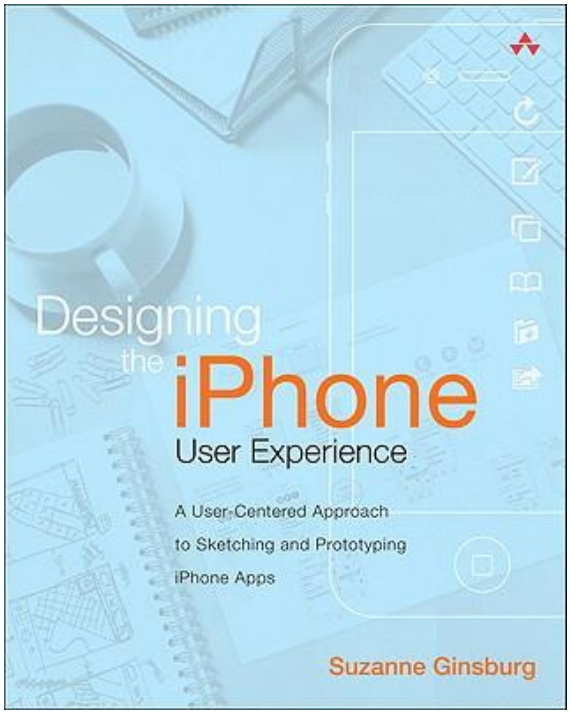
"Did we design it right?"

Source: Ginsburg 2010

Book Recommendation: Mobile App Design

Designing the iPhone User Experience: A User-Centered Approach to Sketching and Prototyping iPhone Apps
by Suzanne Ginsburg

Paperback: 336 pages
Publisher: Addison-Wesley Professional
1 Edition (August 22, 2010)
Language: English
ISBN-10: 0321699432



Methods for Up-front User Research

A variety of tools are available to conduct up-front user research and to document the findings of this process.

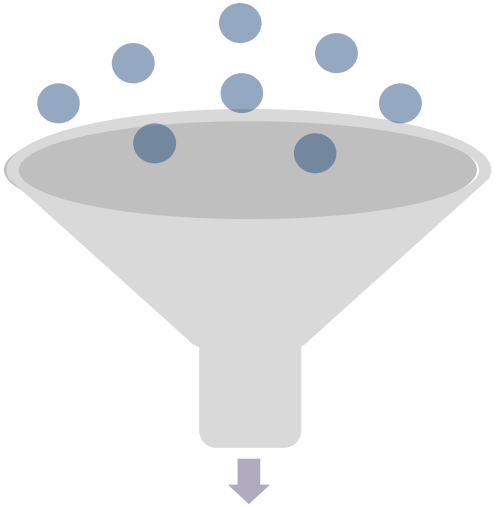
User Research Methods:
Shadowing (Context Analysis),
Field Interviews, Diary Studies

User Research Analysis & Documentation:
Personas, Szenarios, Use Cases,
User Journeys

Source of pictures: http://www.facit-digital.com, http://www.system-concepts.com, Suzanne Ginsburg 2010

Prototyping

The concept can then be tested based on prototypes to determine its suitability with users and to be further improved.



Prototyping Types

Based on the development phase low- and high fidelity prototypes are used.

Low-fidelity/Paper Prototypes
(e.g. Forms, Stencils)

High-fidelity/Click-Prototypes
(e.g. Axure)

Low-fidelity Prototypes/Wireframes
(e.g. Balsamiq)

Source of pictures: http://uxpin.com/mobile-kit-for-iphone.html, http://www.uistencils.com/products/iphone-stencil-kit, http://builds.balsamiq.com/b/mockups-web-demo/ , http://www.axure.com/learn/iphone-app/template

Video Prototypes

Mobile app concepts can be presented very clearly to users and decision makers in demo videos – or so called “video prototypes”.

Link to video example: http://www.csc.com/de/offerings/64514/70102-mobile_loesungen_im_oeffentlichen_personenverkehr

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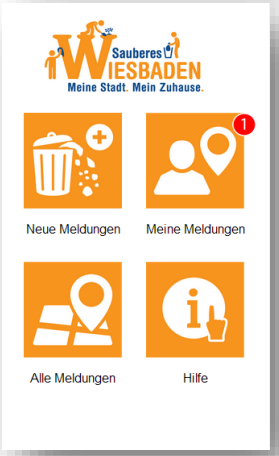
Methods for Up-front User Research

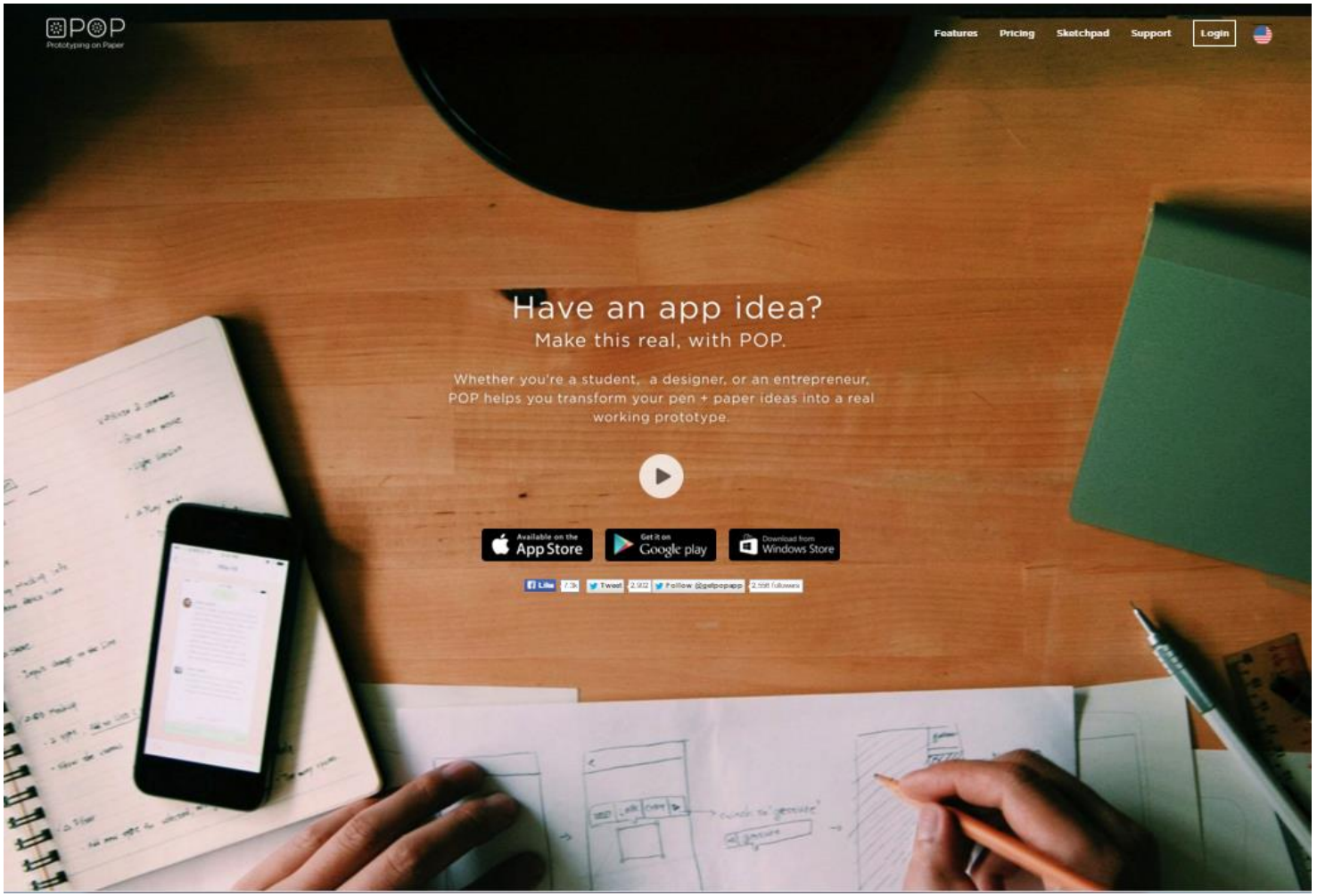
- **Low-fidelity Prototyping:**
  - (1) High level of abstraction from screen design
  - (2) No colors, pictures, fonts, etc.
  - (3) Use of wireframes, placeholders, etc.
  - (4) Paper based, software based, hybrid

- **High-fidelity Prototyping:**
  - (1) Design is very close to the end product
  - (2) Usage of colors, pictures, fonts, etc.
  - (3) Picture- (e.g., InVision) or code-based (e.g., Codiqa)
  - (4) Software based



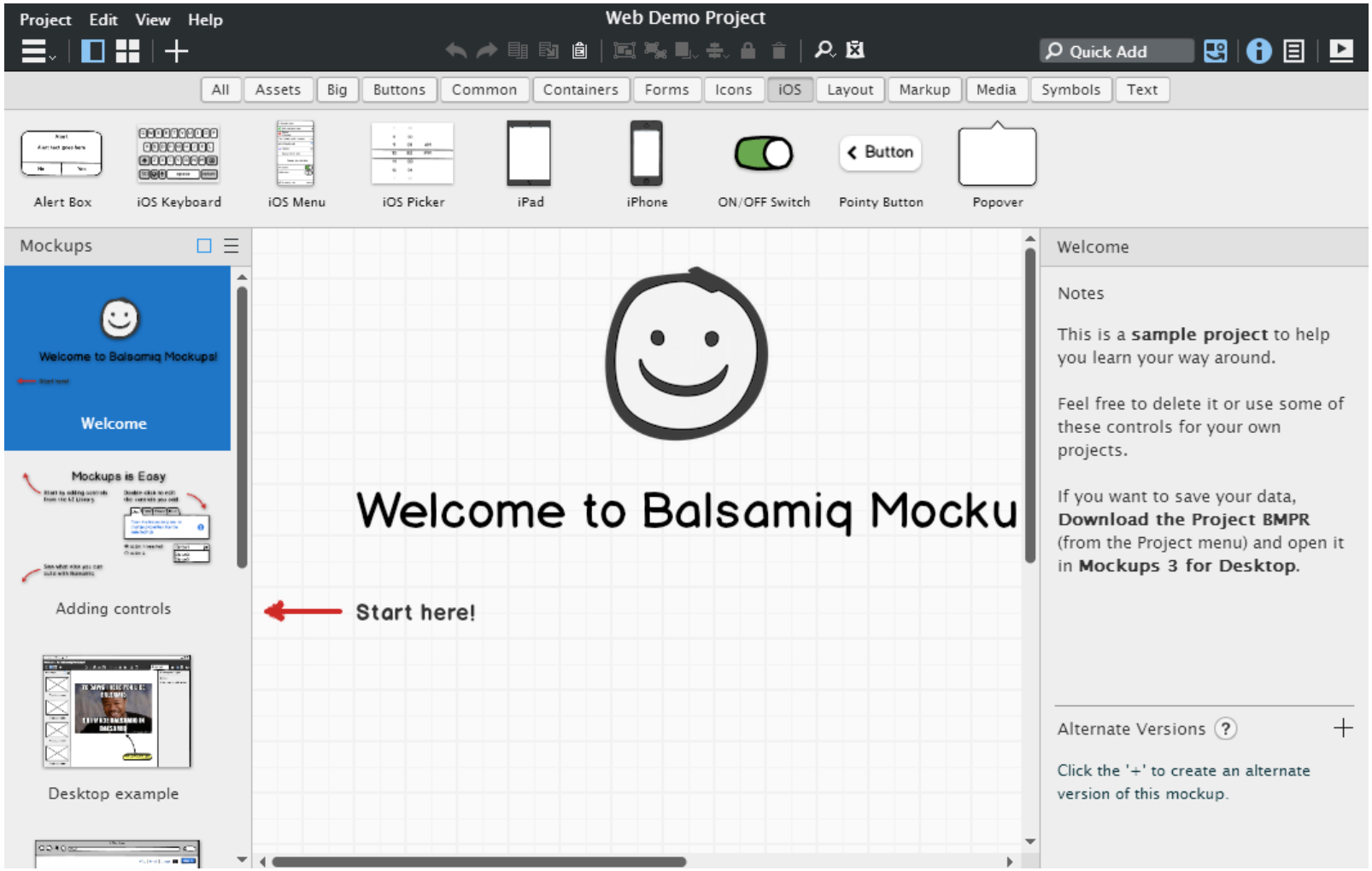
Quelle: Ginsburg (2010)

Prototyping Tools (Low-Fidelity, POP)



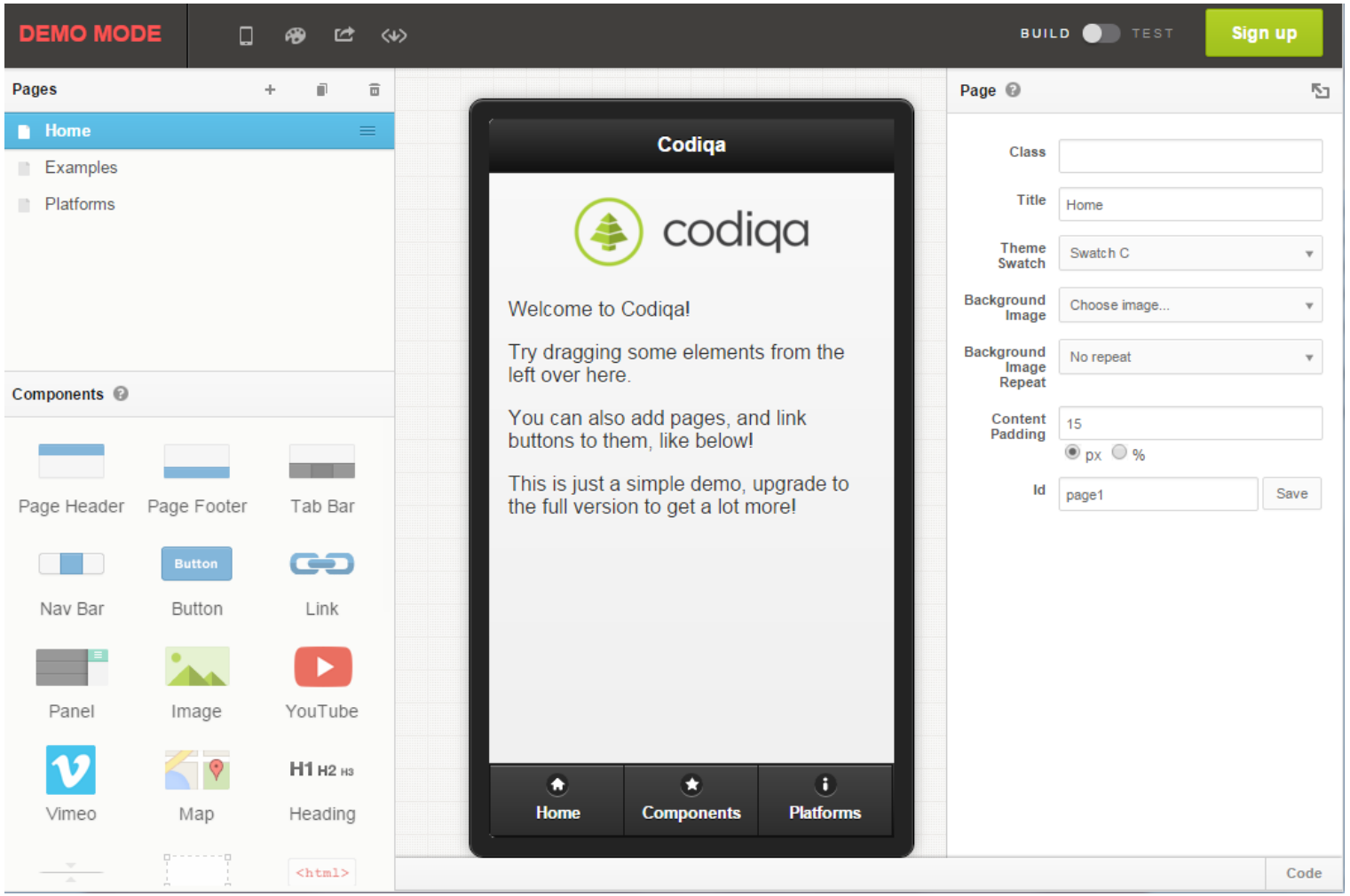
https://popapp.in/

Prototyping Tools (Low-Fidelity, Balsamiq)



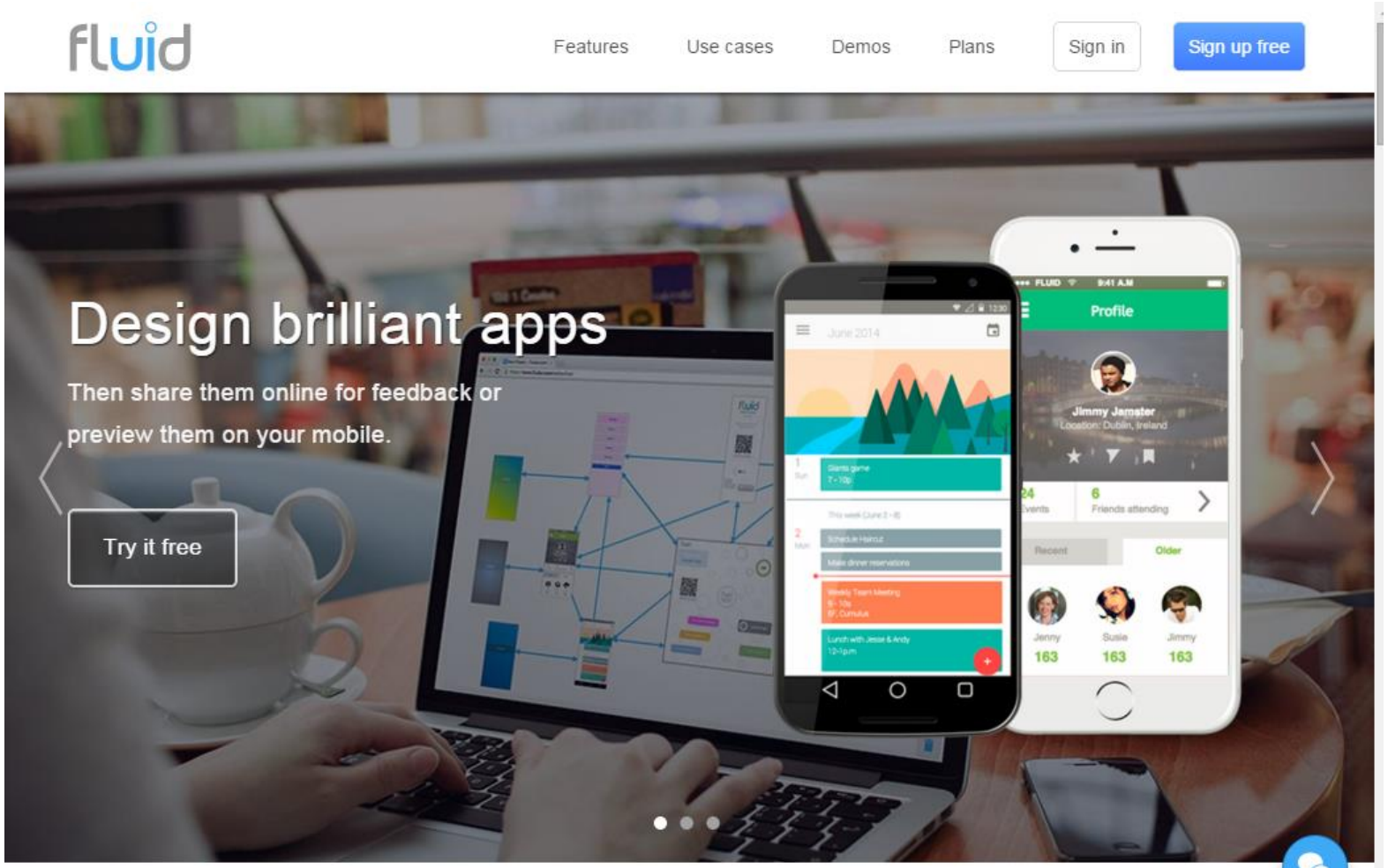
http://webdemo.balsamiq.com/

Prototyping Tools (High-Fidelity, Codiqa)



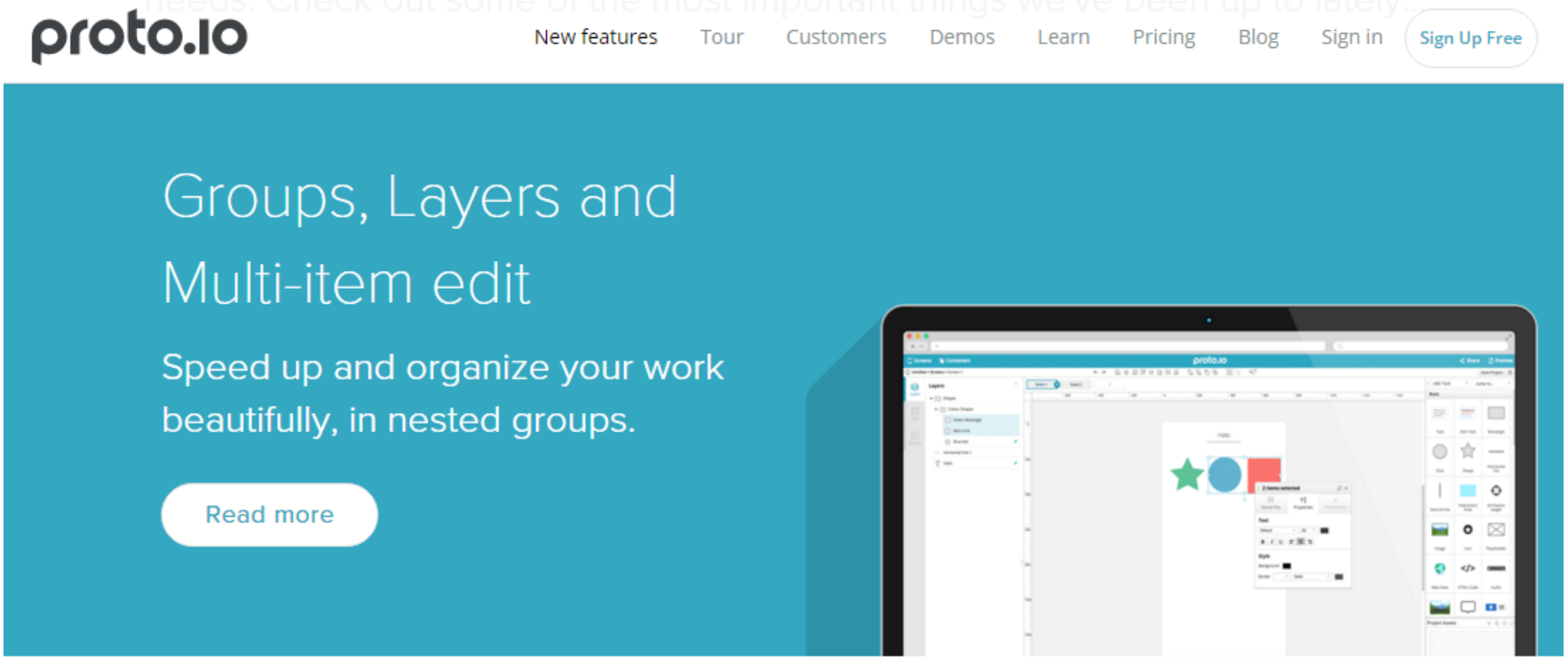
https://codiqa.com/demo

Prototyping Tools (High-Fidelity, Fluid)



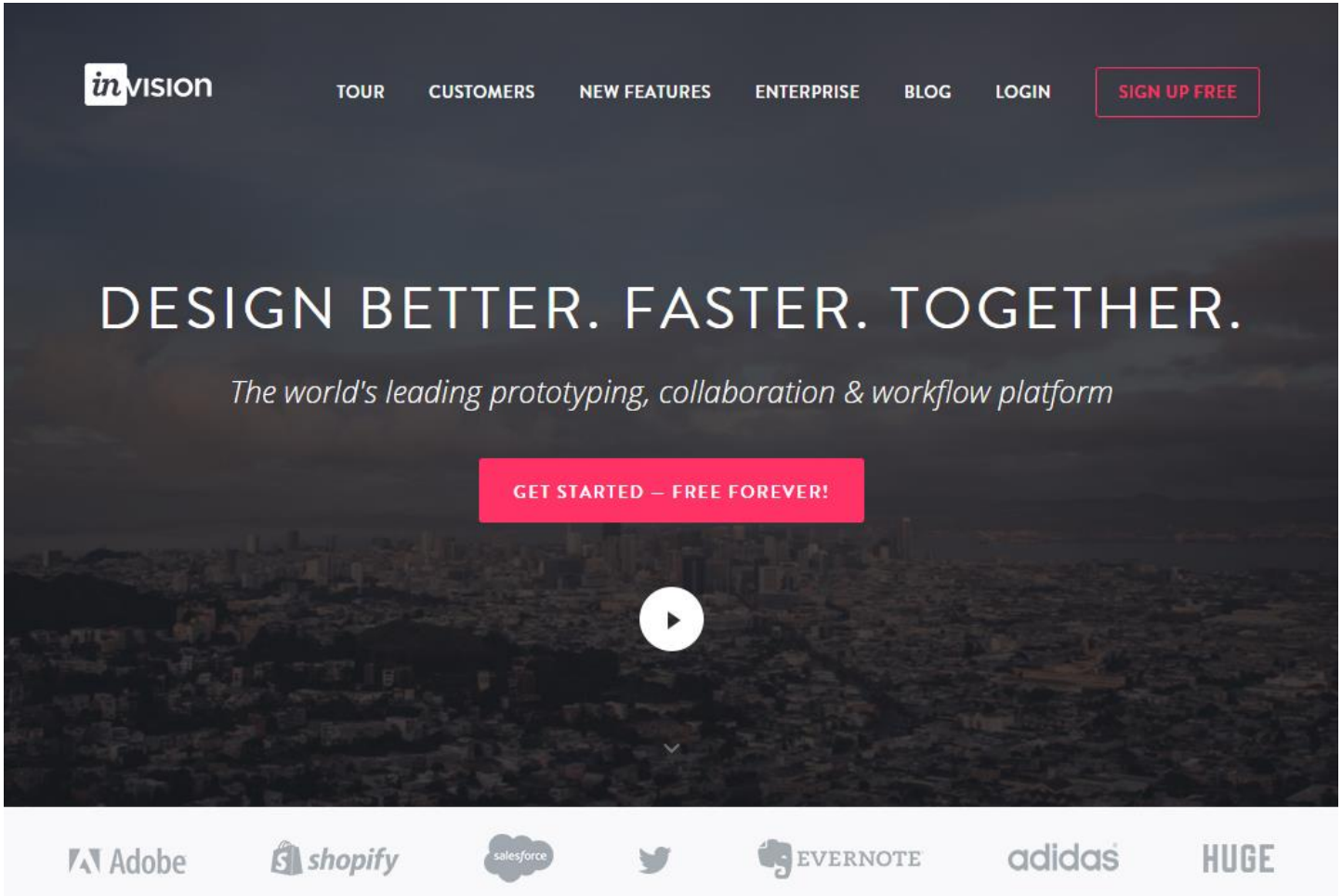
https://www.fluidui.com/

Prototyping Tools (Low-Fidelity, Proto.io)



https://proto.io

Prototyping Tools (Low-Fidelity, InVision)



http://www.invisionapp.com/

Agenda

1. Introduction
2. Designing & Developing Mobile Apps
3. Mobile App Prototyping
4. Mobile App Launch

Business Model

If a commercialization of the app is intended, the business model must be specified prior to its distribution.

Important Business Models for Mobile Apps

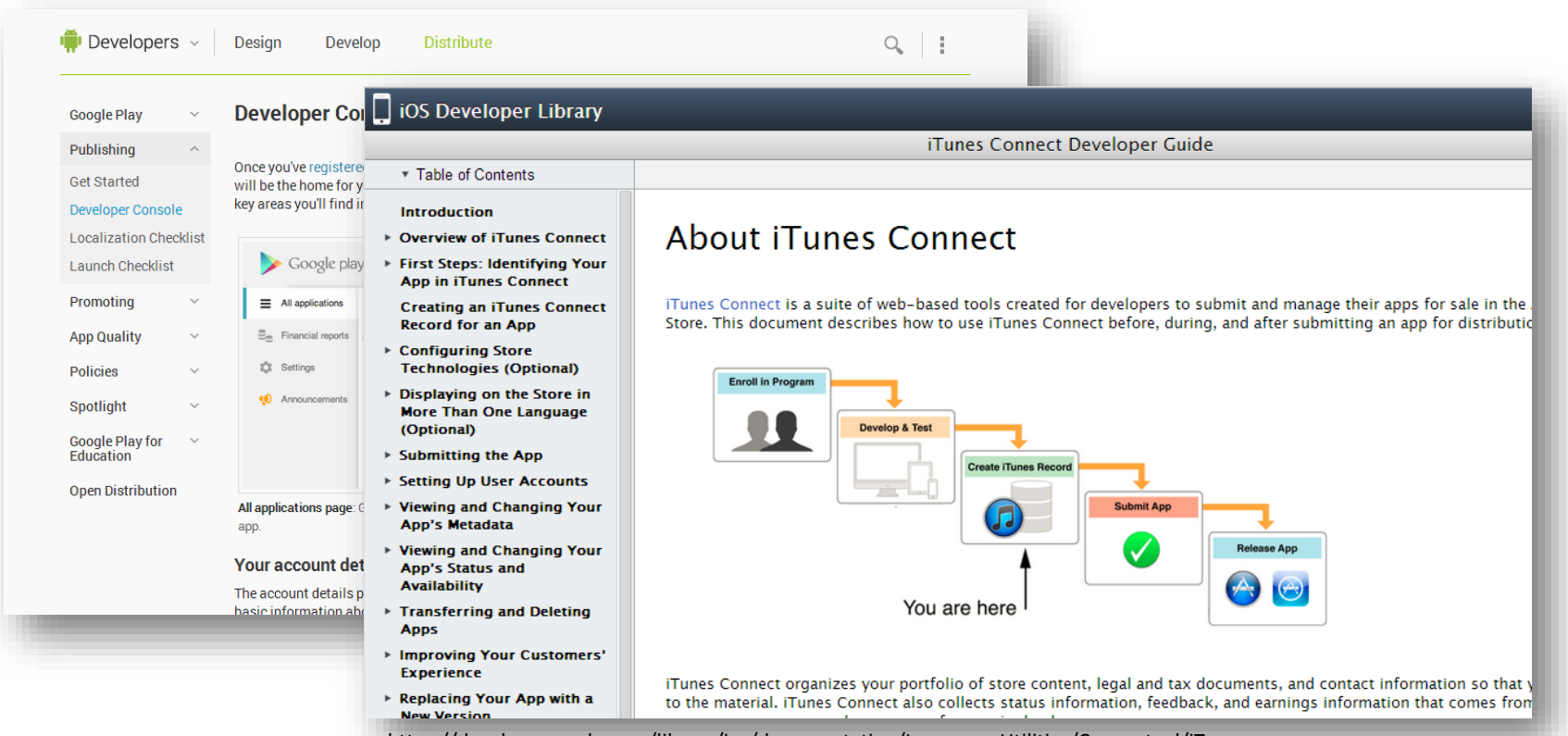
Business Model	Description and Characteristics
Paid App	Download the app for a purchase price
InApp-Purchase	Payment for additional features or content
Freemium	Free basic version and paid extensions
Virtuelle Goods	Paid "consumer goods" (e.g. currency for a mobile game)
Subscriptions	Time-recurring payments for use
Advertising	Integration of paid advertising

Mroz (2013): App-Marketing

Upload in the Store: Review Process

In order to be able to publish the app in the App Store of the platform the relevant requirements and design guidelines have to be considered carefully.

http://developer.android.com/distribute/googleplay/publish/console.html



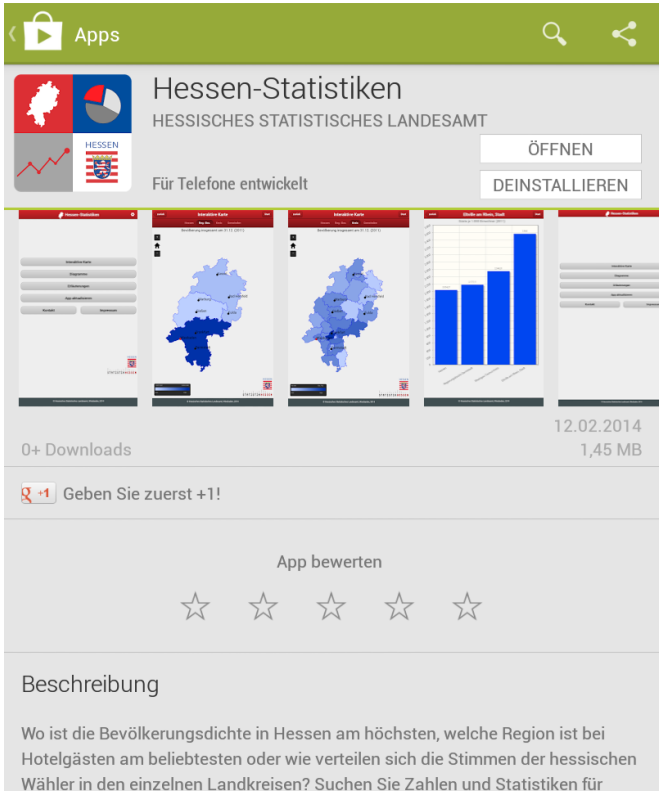
https://developer.apple.com/library/ios/documentation/LanguagesUtilities/Conceptual/iTunesConnect_Guide/Chapters/About.html#//apple_ref/doc/uid/TP40011225-CH1-SW1

Upload in the Store: Required Items and Content

For the distribution in the App Store different information needs to be provided depending on the platform.

Important Information for App Store Upload

- App name
- Choice of category
- Keywords for the app-description
- App Description
- Icon, Logo, Graphic Feature
- Screenshots
- Demo Video (optional)
- pricing model
- Administrative information
- App software (such as APK file on Android)
- …



Elements of a Mobile App Distribution Strategy

In addition to publication in the App Store a comprehensive distribution strategy need to be defined – even a good app does sell "automatic".

Important elements of a Mobile App Distribution/Marketing Strategy

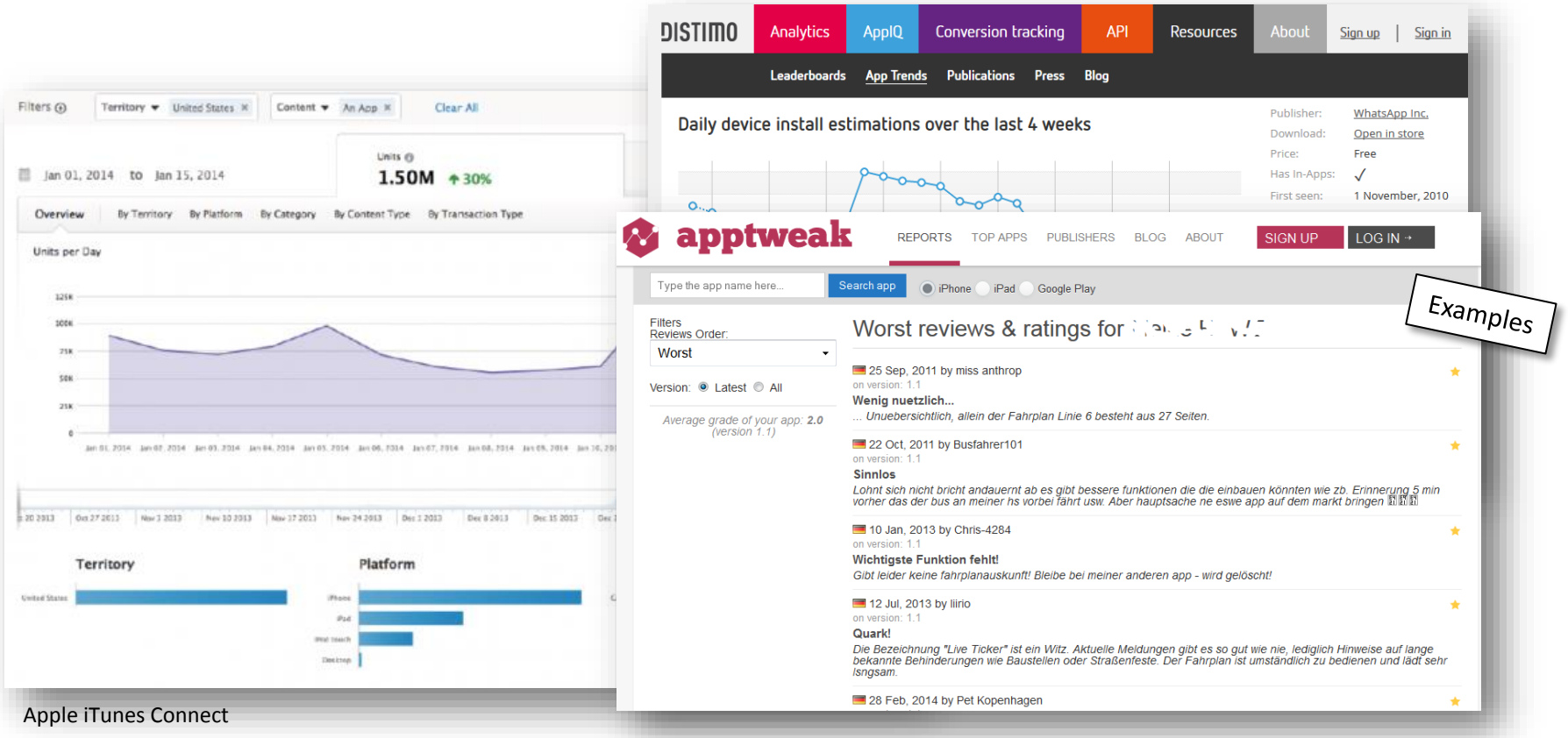
Element	Description an Characteristics
Timing Strategy	Scheduling of launch and updates
Pricing Policy	Price levels and price changes
Customer Relations	App website and dealing with reviews/feedback
Public Relations	Communication on public relations and social media
Cross Promotion	Advertisement on website, flyers, products, etc.

Mroz (2013): App-Marketing

Performance Measurement

Also important is a continuous performance measurement and monitoring of user feedback / reviews.

http://www.distimo.com



Apple iTunes Connect

https://www.apptweak.com