

Isn't there an App for that?

Smartphone Apps in (marine) resource management



- ✓ The spectrum of Smartphone Apps in (marine) resource management
- ✓ A guide for App Development
- ✓ Open Data Kit for data driven marine management in Fiji as example

EFFECTIVE MANAGEMENT



Collaborating with national and regional stakeholders to document effective approaches towards sustainable marine resource management and conservation

Managing marine resources heavily relies on data, while in many settings in Pacific Island countries there remains a lack thereof. Manual, paper based reporting systems are widely used, even though these are typically burdensome and resource intensive. When forms are re-entered into computers manually there can also be a high margin of error. Furthermore, data often remains locked away in spreadsheets and results are not measurable, visible or accessible.

In line with its objectives, the MACBIO project supports Fiji, Kiribati, Solomon Islands, Tonga and Vanuatu in effective approaches of site management. In this context MACBIO was requested in 2015 e.g. to support data collection on locally managed marine areas in Fiji – in particular with the design and development of open-source mobile solutions.

Beyond this, MACBIO aims at collaborating with national and regional stakeholders to develop long-term solutions and standards for the use of open-source mobile solutions in support of sustainable marine resource management and conservation.

**MARINE ECOSYSTEM
SERVICE VALUATION**

MARINE SPATIAL PLANNING

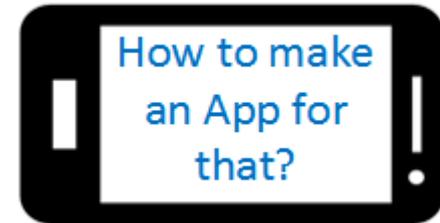
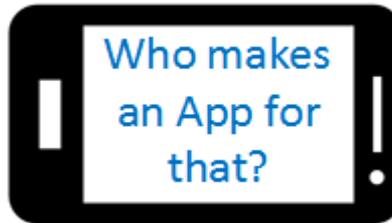
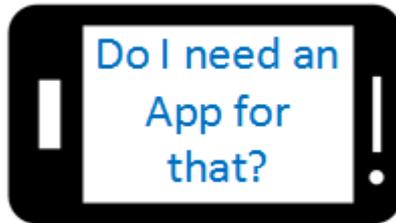
EFFECTIVE MANAGEMENT





Content

1. The spectrum of Smartphone Apps in (marine) resource management
 - ***Isn't there an App for that?***
2. A guide for App Development



3. Open Data Kit for data driven marine management in Fiji
 - ***Case study***



1. Isn't there an App for that?

The spectrum of Smartphone Apps
in (marine) resource management



Mobile app

- A **mobile app** is a software application designed to run on mobile devices such as smartphones and tablet computers.
- Most such devices are sold with several apps bundled as pre-installed software, such as a web browser, email client, calendar, mapping program, and an app for buying music or other media or more apps

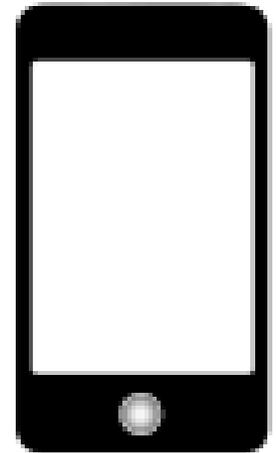


(Wikipedia 2016)

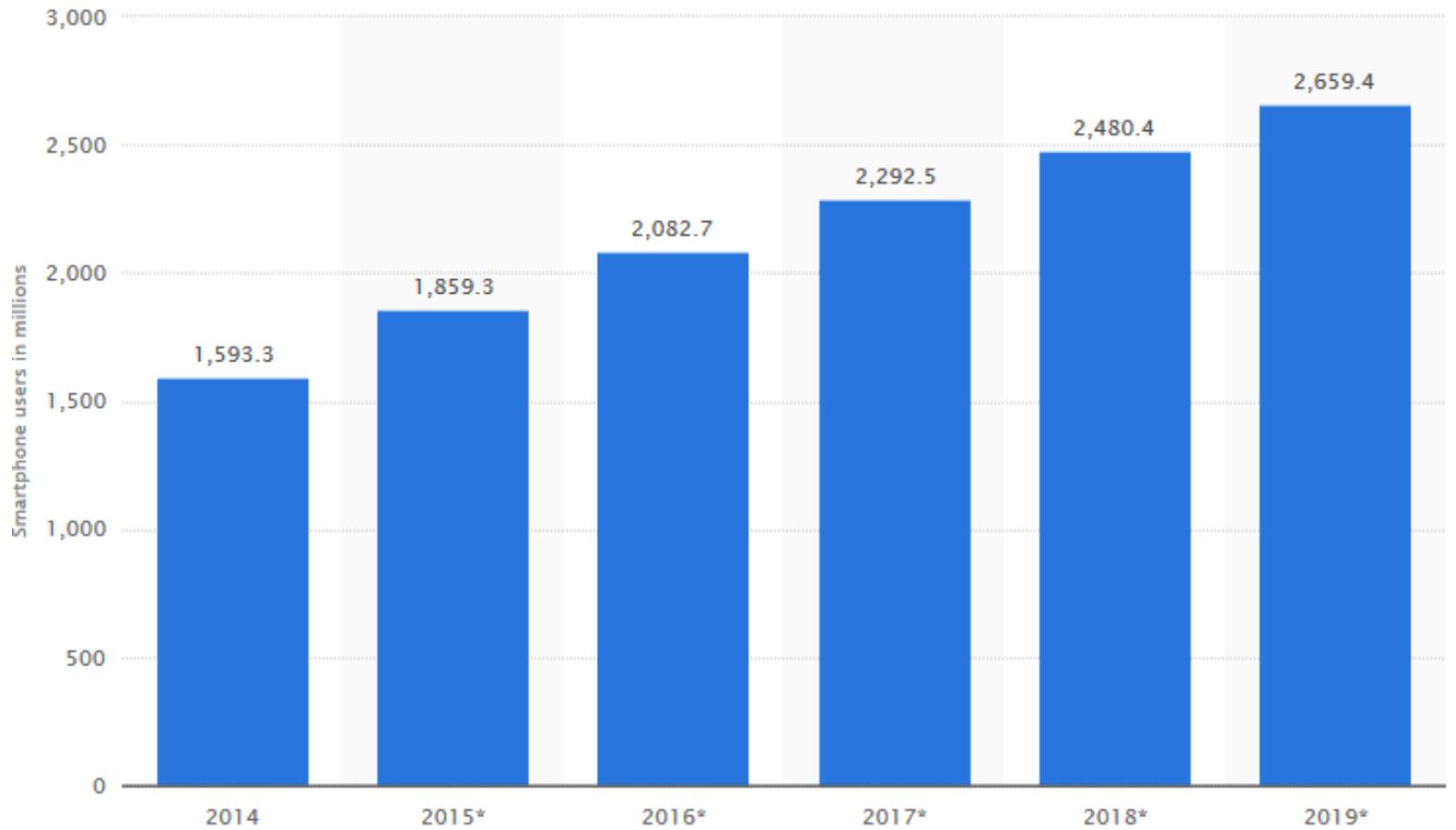


Smartphone

- **Smartphones** are portable, internet-enabled computers with a variety of sensors, providing us with a set of powerful research tools for collecting data.
- Smartphones provide the user with increased computational abilities, particularly internet access, global positioning systems (GPS), access to geographical information systems (GIS), microphones, accelerometers, and cameras with the capability not only to take high-resolution photographs, but also to read QR/barcodes and record video.
- These tools are accessible to an increasingly large number of people

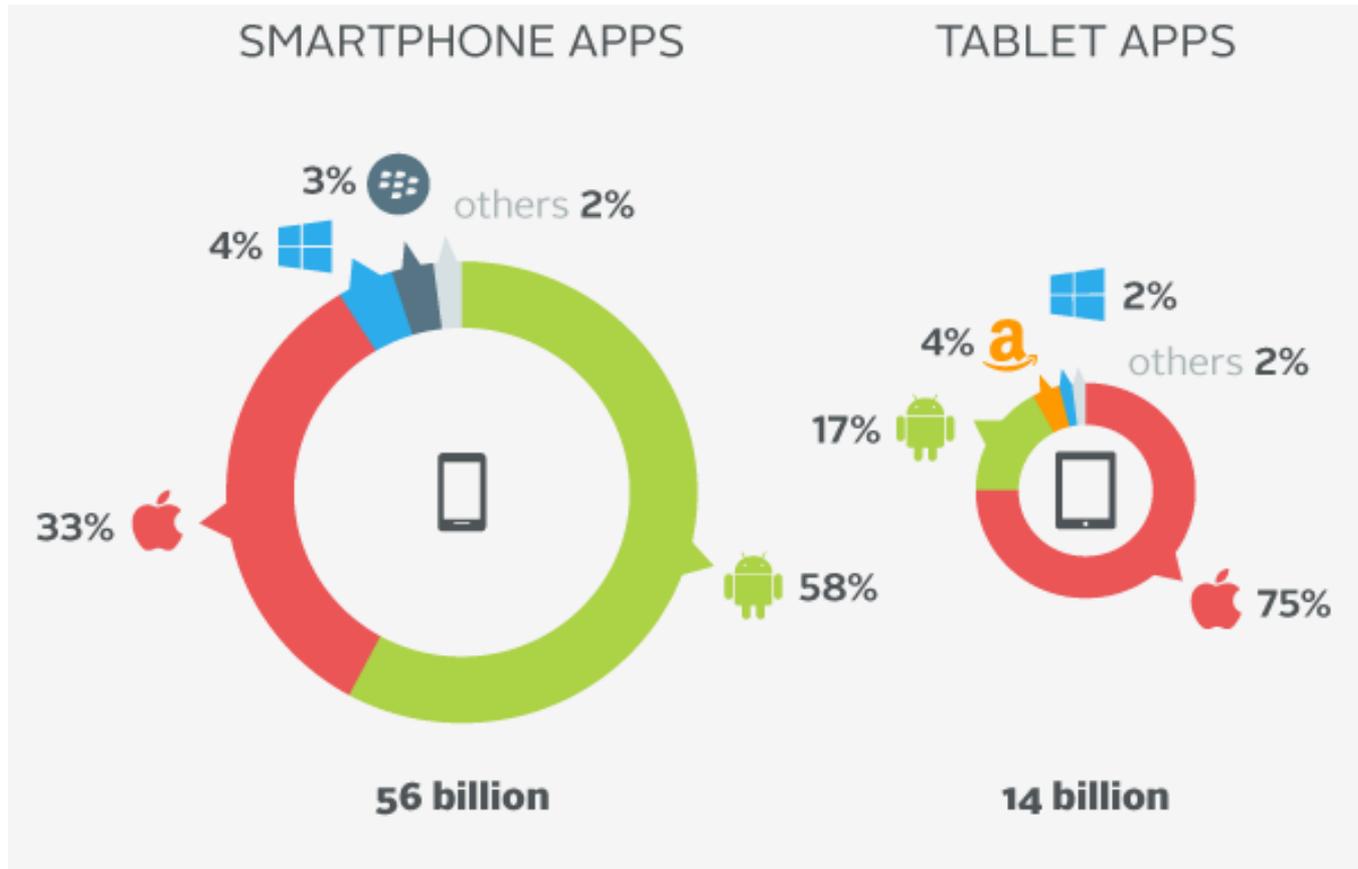


(Teacher et al. 2013)



© Statista 2016

Smartphone users in millions (statistica 2016)



Smartphone and tablet app downloads in 2013 (Shoutem.com 2013)

Smartphone and App Usage

What you do with your smartphone? 

81% browse the Internet, 77% search, 68% use an app, and 48% watch videos on their smartphone.

Browsing
81%



Search
77%



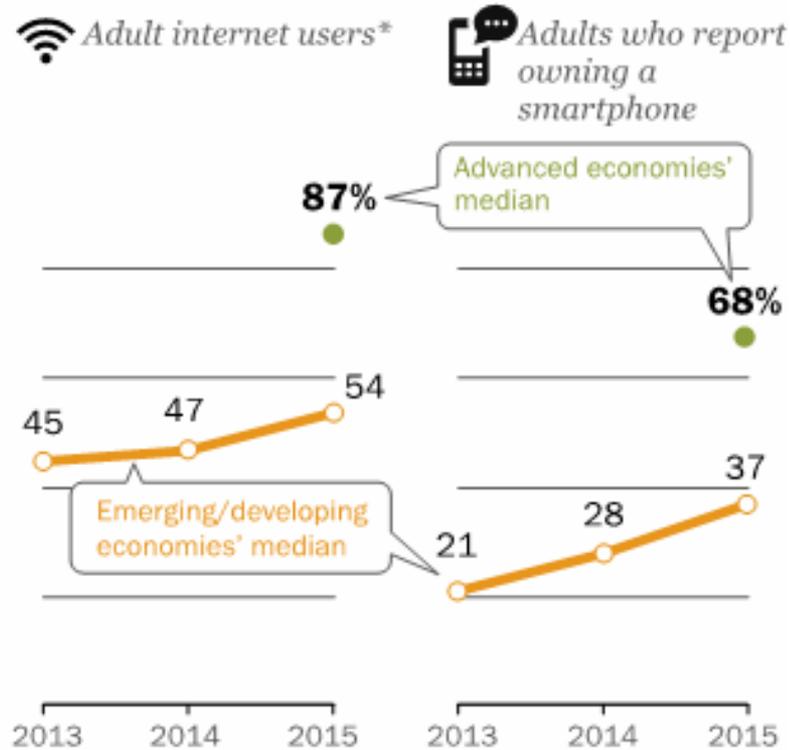
Use an app
68%



Videos
48%



Technology usage rates increasing in emerging economies, but still lag behind rich countries



(Poushter 2016)

Smartphones are more common in Europe, U.S., less so in developing countries

Percent of adults who report owning a smartphone



Note: Percentages based on total sample.

(Poushter 2016)



Our world is increasingly digitally connected

- This changes the way we communicate, work and live, and brings about fundamental social change
- The combination of computational power, sensors, and wide-scale user uptake means that the internet, smartphones and in particular apps provide an unprecedented opportunity
- Opportunities for development, prosperity, quality of life and sustainability worldwide, be it access to information, education, health and safety or data collection, management and participation in political processes – even in the remotest areas



- Therefore, Smartphone Apps as on crucial aspect of Information and Communication Technology (ICT) is increasingly used to achieve sustainability, development and conservation.
- Also GIZ “supports the increased use of ICT in developing and emerging countries and deploys ICT in many of its projects to enhance their effectiveness.
- Since 2000, GIZ has implemented more than 150 projects with an ICT focus, including around 40 in collaboration with the private sector” (GIZ 2016).



- Despite the large number of apps available, an analysis on the meta level of effectiveness of apps as well as practical guidance how these apps are developed and used is very limited
- To close this gap, this resource tries to offer orientation in the jungle of apps, their development and application, as well as
- To exemplify successful app use in (marine) resource management
- In this context Open Data Kit will be introduced and explained, as well as its use for data driven marine management in Fiji.



Further Reading:

POUSHTER, J. 2016. Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economies. Pew Res. Cent. Glob. Attitudes Proj. Available at: <http://www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/>



App examples from marine resources management

- The following list gives an orientation of different app types
 - Providing examples from marine management (cf. OpenChannels 2015a) and other sectors.
 - Providing examples from the Pacific region



Information access, education and awareness

- In general, apps are ideally suited for providing both stakeholders/communities and professionals with easier and more rapid access to data and information, particularly from field locations





Information access, education and awareness

Enabling visualization of potential **changes** in a location or community and promoting **proactive thinking** about management, conservation, mitigation, and adaptation

- [SLAMM View 2.0 Mobile](#), which enables interested parties to view and compare sea level rise scenarios and inundation maps on their mobile devices

Providing information to help users or communities **avoid harmful activities**

- [Whale Alert](#), which warns mariners when they enter areas of high risk of collision with critically endangered North Atlantic right whales.

Improving **consumer choices** by providing information about the sustainability and health implications of food options

- [Good Fish Guide App for the United Kingdom](#)



Information access, education and awareness

Increasing **awareness and understanding** of ecosystems and natural resources by providing information

- [Marine World Heritage](#), which helps users learn about the 45 World Heritage marine sites
- [California Tidepools](#), which allows users to search a database of photos, common and scientific names, and other information about California tidepool life
- [Ka'ena Point Guide](#), which shows historical sites, ecological characteristics, and trail information for Ka'ena Point in Hawai'i
- [Expedition White Shark](#), which provides general information about great white sharks and lets users track satellite-tagged great whites
- [Sea Turtle App](#), which provides general information about endangered sea turtles and lets users track their worldwide migration.
- [PacfishID](#) Learn to recognize fishes and invertebrates from Pacific Island countries and territories with this application



(Citizen Science Central 2016)

Citizen science

- Citizen or stakeholder science apps provide the public with guidance in studying a subject and furthermore to contribute data (e.g., participate in species inventories, reporting pollution etc.)
- Specific information on the subject is provided in interactive formats, such as identification guides.
- Additionally own observations can be recorded, georeferenced, and sent to relevant management bodies in a structured manner that facilitates their use.
- This crowdsourcing allows traditional scientific data collection to be supplemented with customary knowledge and observations from community members



(Citizen Science Central 2016)

Citizen science

Mobile field guides for identifying species:

- [Fishes: East Pacific](#) provides 3,600+ images of 1,397 species of neotropical shore-fishes
- [Fishes: Greater Caribbean](#) provides 5,500+ images of 1,599 species of neotropical shore-fishes
- [SeaPhoto](#) provides access to 1,300+ images of 550+ species of marine life of the Monterey Bay National Marine Sanctuary
- [Phyto](#) helps users identify phytoplankton species.
- [Coastal Walkabout](#) automatically takes note of the time and location (GPS) of wildlife sightings before uploading that data in real time to the Coastal Walkabout website (Gaia Resources 2015)



Analysis and visualization

- Mobile Geographic Information Systems (GIS) and mapping apps allow users to access institutional GIS's, run analyses, and view and explore a huge array of maps, imagery, and features from the field, which can improve field work and extend the time available for conducting work.

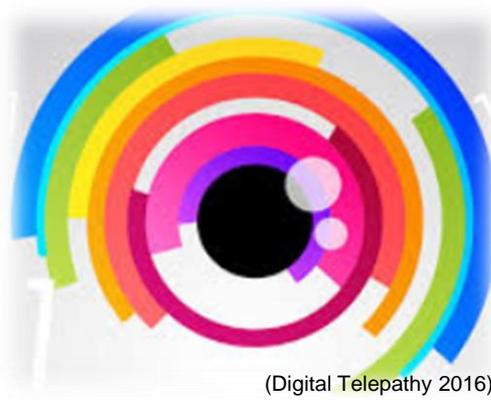


(Digital Telepathy 2016)



Analysis and visualization

- [iGIS](#) leading GIS app for iOS
- [ArcGIS App](#) for Smartphones and Tablets
- [Google Earth for mobiles](#)
- [Google My Maps](#) Creating and sharing of custom maps

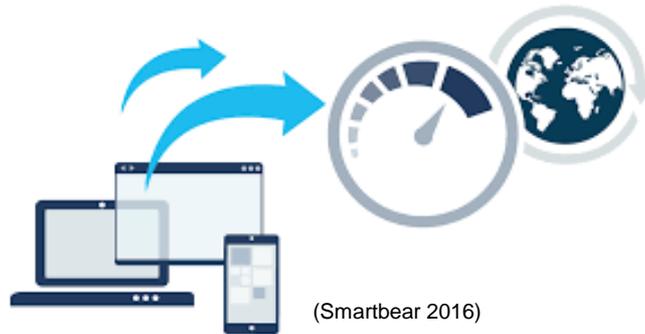


(Digital Telepathy 2016)



Monitoring and enforcement

- Apps can help increase monitoring and enforcement effort by allowing stakeholders to
 - report problems (e.g., sightings of invasive species or pollution) and
 - infractions (e.g., fishing inside a no-take area).





Monitoring and enforcement

- [Marine Debris Tracker](#), which allows users to report trash on coastlines and in waterways. The data can be uploaded for beach clean-ups
- [E-Logbook](#), is tablet app, which facilitates the captain's submission of fishing and operational activities after every fishing trip, Indonesia (Agustina 2015)
- [Happi Fish](#) is a mobile application to report fish landings in the Solomon Islands (Point 97 2014a)
- [Marine Traffic](#) Live Ships Map. Search the MarineTraffic ships database of more than 550000 active and decommissioned vessels.
- [MCS Fishing Vessel App](#), – SPC The Monitoring, Control and Surveillance app is an electronic aid for compliance officers to conduct in-port and at-sea boardings and inspections of fishing vessels. It has other features relating to vessel monitoring and searchable MCS reference data (Fiji One 2016).



Field data collection

- Apps can provide forms to speed field data collection,
- geo-reference photos and other observations,
- serve as memory and input-output devices for environmental sensors,
- read identification tags,
- rapidly transmit data from the field to centralized databases/analytical tools, and
- in turn rapidly receive data from centralized databases/analytic tools to guide next steps for field data collection (e.g., start a new transect).



Field data collection

[Open Data Kit](#) is a free and open-source set of tools which help organizations author, field, and manage mobile data collection solutions

[Akvo FLOW](#) pay-for solution for smartphone-based field surveys

- National inventory of water points, Vanuatu, supported by UNICEF (AKVO 2014a)
- Post Cyclone Pam rapid assessment, Vanuatu (AKVO 2015b)

Survey Solutions

- Survey Solutions is a Computer-Assisted Personal Interview technology developed by the World Bank; [Getting started tutorial video](#)



Field data collection

[Cyber tracker](#) is a free data capture software installed in smartphones and tablets used worldwide to record environmental observations.

- USAID through the Biodiversity and Watersheds Improved for Stronger Economy and Ecosystem Resilience ([B+WISER](#)) has enhanced the user interface and navigation of the CyberTracker application for biodiversity and threats monitoring in the Philippines.
- [Lami Waste-to-Art Workshop & Suva Harbour Coastal Clean-up](#) (IUCN Oceania Regional Office 2016, p.6) used a digital data card through [Google Forms](#), to make litter monitoring accessible for people with smart phones
- [Tails App](#)
 - The app is an innovative mobile or tablet application designed for use by small-scale fishers to collect “catch” information, recording the quantity of fish they catch and the different species; [download](#).