Tuck School of Business at Dartmouth

Enterprise on the Go

How enterprises can leverage mobile apps

Glassmeyer/McNamee Center for Digital Strategies

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Contents

This Project examines how enterprises can leverage Mobile Apps

Project Background

- Traditionally, mobility meant anywhere anytime email / phone access
- Smartphones and specifically the apps on them have fundamentally changed this definition of mobility

Scope

This project examines

the key aspects that an enterprise must consider in leveraging mobile apps

Note: This project leverages work that was done as part of a Field Study in International Business project

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I. Project Scope

II. Consumerization of IT drives demand for apps

III. Enterprise App Considerations

IV. Case Study

Enterprises are fundamentally affected by the consumerization of IT

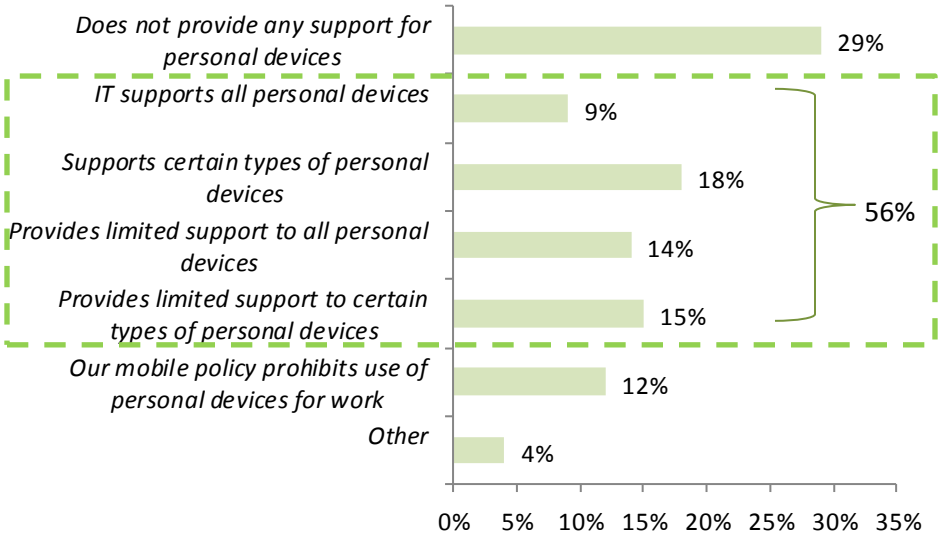
Consumerization of IT – the impact that personal computing technology has on enterprises – manifests itself in two critical ways:

1. Bring Your Own Device (BYOD) Movement

2. Transfer of innovation from personal computing environment to the enterprise environment

1 Enterprises have cautiously adapted to the BYOD era . . .

What is your firm's official IT policy for supporting personally owned mobile phones and smartphones?



Source: Forrsights Workforce Employee Survey, Q3 2010

"You can't stop BYOD . . . You can only prepare for it" – Vice President Information Technologies, Car Company

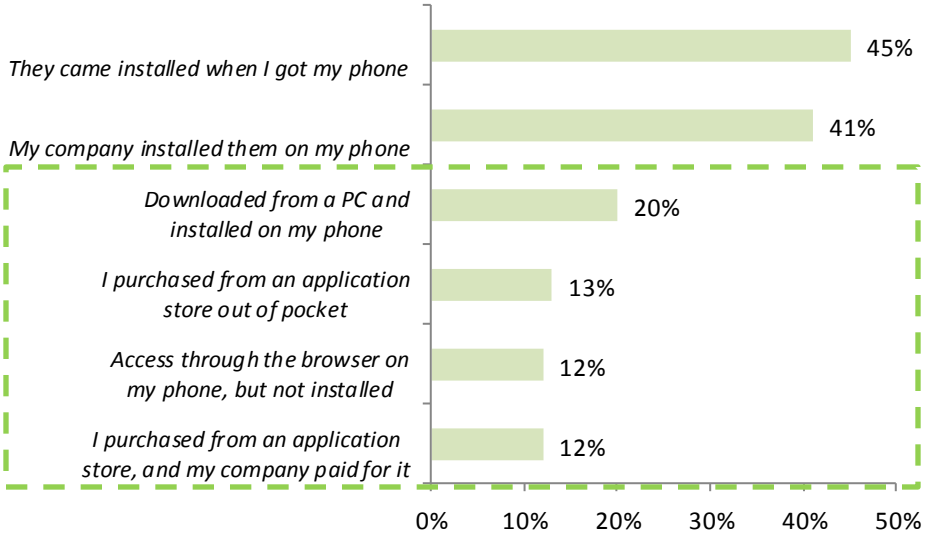
IT support for BYOD is cautious

- 50% of the companies interviewed (n=8) have a BYOD policy in place
- Key drivers for adopting BYOD include:
  - Higher productivity
  - Lower capex;
  - Lower maintenance costs; and
  - Shared administrative burden
- However security implications remain a concern

2 . . . Leading to lesser control and more innovation

"There's an app for that."

How did you get your work-related mobile applications on to your work smartphone?



Source: Forrsights Workforce Employee Survey, Q3 2010

"We found that users had configured email on their iPhones and iPads without us even publishing instructions on how to do so. . . " – IT Team member, Construction Company

Enterprises need to balance the potential for innovation while still retaining appropriate levels of control

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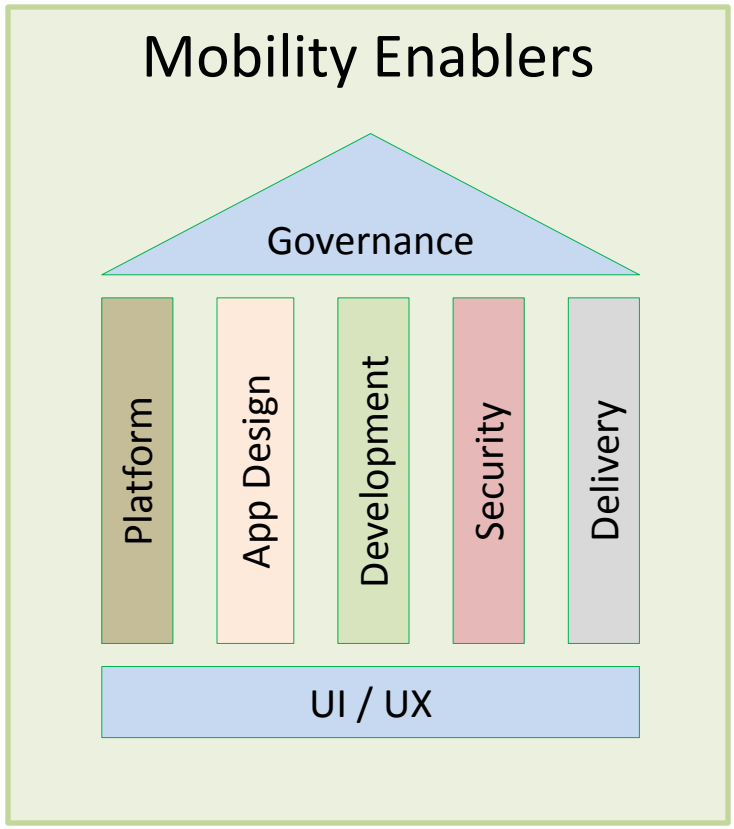
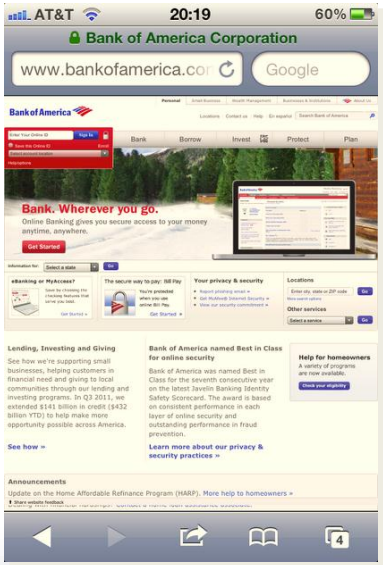
Enterprise IT can balance need for innovation and control by focusing on key enablers



- Focus on delivering best-in-class **UI / UX**
- Select **Platform** based on cost, user adoption and security considerations
- Decide **App Development** strategy based on skillsets
- **Secure** both devices and apps
- **Deliver** apps securely to target audience and track usage
- Define **Governance** measures to monitor the other enablers

UI / UX is key to successfully leveraging mobility

Std. Website

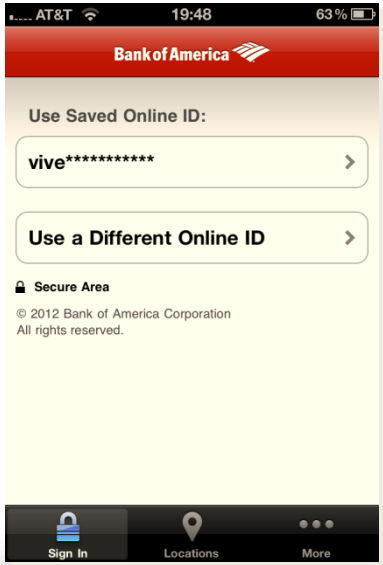


- Pinch to Zoom, same rendition as on laptop

Mobile Optimized/ Web App

- Optimized rendition, limited use of device functionalities

Native App



- Complete use of device functionalities

- Users ‘educated’ by their B2C / personal app experience
- UI / UX drives adoption, ratings and usage
- Criteria for enterprise app assessment and adoption remains the same

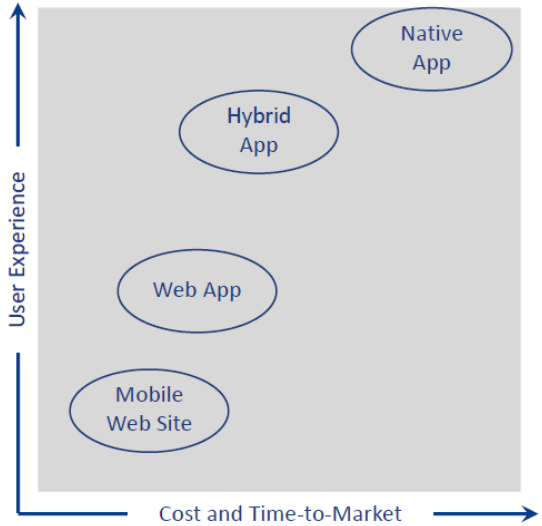
Enterprise Apps must satisfy UI / UX expectations

UI / UX, cost & connectivity considerations drive selection of native vs. web apps

Development efforts of native vs. hybrid vs. web apps

	Device Access	Speed	Development Cost	App Store	Approval Process
Native	Full	Very Fast	Expensive	Available	Mandatory
Hybrid	Full	Native Speed as Necessary	Reasonable	Available	Low Overhead
Web	Partial	Fast	Reasonable	Not Available	None

User experience vs. cost and time to market



Other considerations

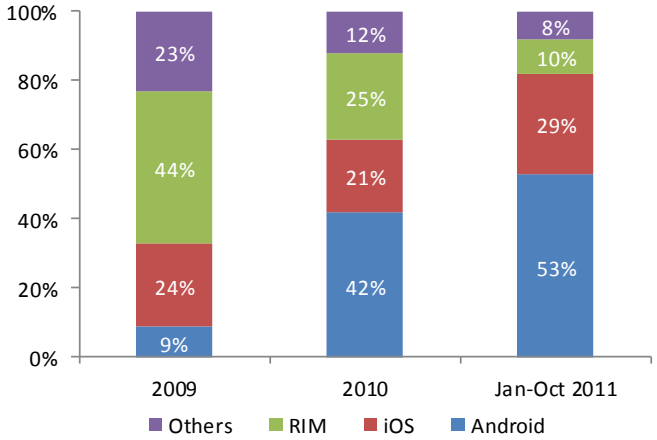
- Mobile workforce (especially sales) often do not have the level of connectivity required for web / hybrid apps
- Rich UI requirements are met easier thru native apps
- Web Apps would be preferable in cases where user requirements demand recent information

Native vs. web apps is not an either / or choice
Evaluation of multiple factors needed

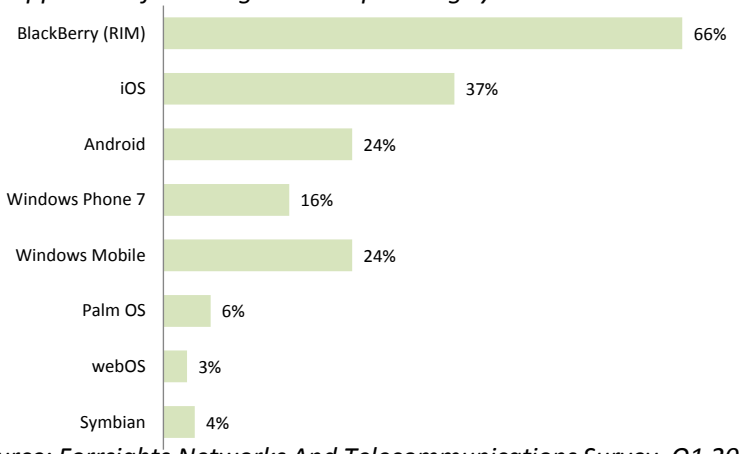
Source: http://www.worklight.com/assets/files/Native-Web-Hybrid-Mobile-App-Dev-Webinar.pdf

Enterprises are hedging their platform bets . . .

Android's market share of smartphone sales has rapidly increased over the past three years . . .

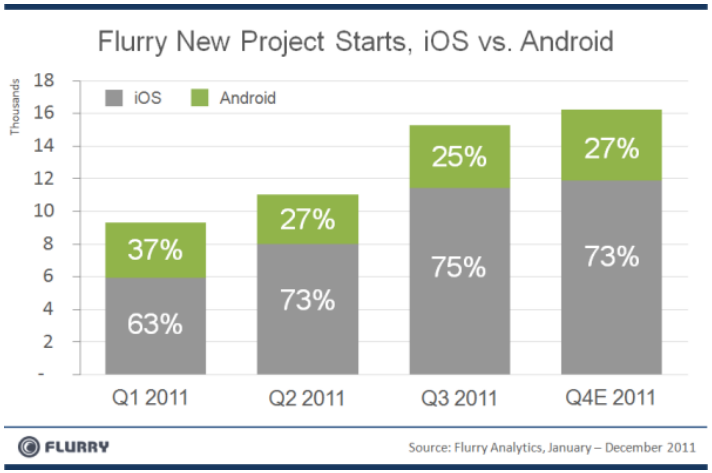


To what extent does your firm's IT department currently officially support the following mobile operating systems?



Source: Forrsights Networks And Telecommunications Survey, Q1 2011

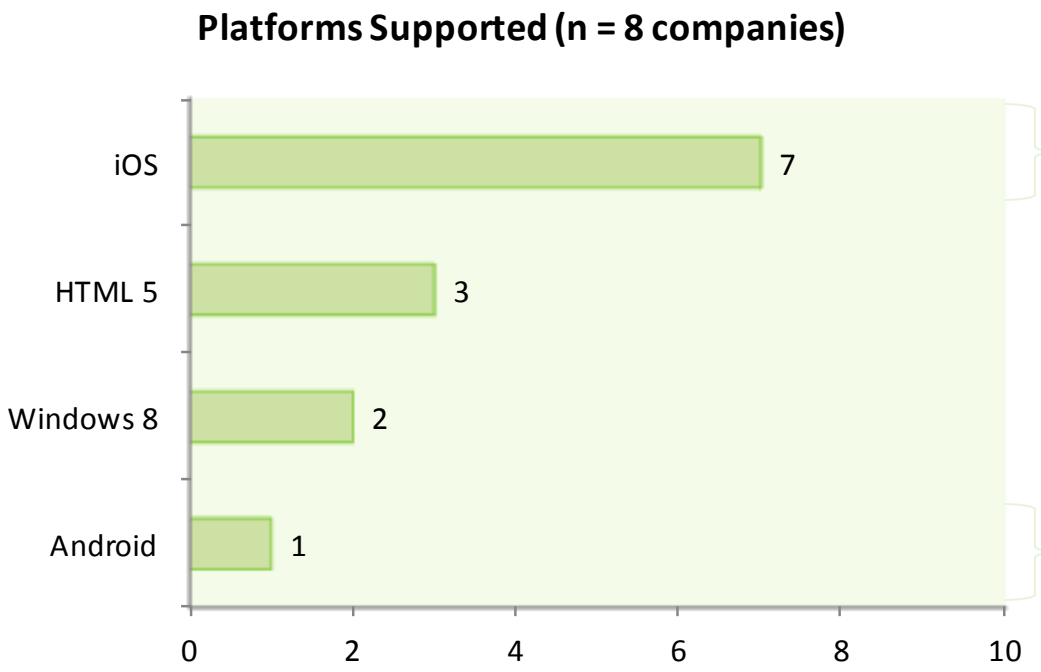
. . . However, developers have initiated more projects on iOS than on Android



- Enterprises are supporting multiple platforms
- However, the level of support across different platforms may vary

Sources:
1. http://blog.flurry.com/bid/79061/App-Developers-Bet-on-iOS-over-Android-this-Holiday-Season
2. http://www.engadget.com/2011/12/14/shocker-android-grew-us-market-share-after-q2-ios-was-static/

. . . and supporting platforms based on user adoption and security concerns



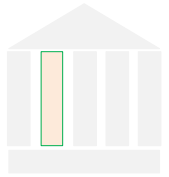
Our sales force is older . . .their adoption of iPads is very high . . .” – VP Global Director Technology Architecture & Innovation, Beverage Distribution Company

“I struggle to build anything on Android . . . It is a cesspool where anybody with $99 can distribute malware” – Global Head of Mobile Technology, Information Service Company

“We wouldn’t consider rolling out Android without MDM . . . It is too much of a Wild Wild West” –Director of Critical Infrastructure for IT, Cable Company

Enterprises are unable to ‘choose’ platforms based on careful and formal evaluation of platforms. In most cases, they are playing catch up based on user adoption and racing to define security policies and practices

Business needs and UI/UX considerations drive definition of app design



- Four of the eight companies we spoke to are developing single purpose atomized apps. However their rationale is driven more by business needs and UI / UX considerations than an application design concepts

Atomized
☑ Quicker development
☑ Easier maintenance
☒ Difficult change management
☒ Difficulty in managing distribution and deployment
☒ Not possible to share information between apps
☒ Requires multiple apps to be created to match required functionalities

"I want my apps to be instantly on, provide good UI and address specific functionalities" – Senior business application architect, Packaging

Integrated
☑ Complex functionalities
☑ Easier change management
☑ Easier deployment
☒ Sandboxing limitations
☒ Less agile development
☒ More regression testing
☒ Greater dependencies
☒ Complex UI / UX

"I can't envision a situation where there are three or four apps for my sales force" – VP Global Director Technology Architecture & Innovation, Beverage Distribution Company
"I see a trend towards integrated apps" – Vice President Information Technologies, Car Company

While UI / UX considerations and practical limitations may drive app design considerations in the current period, using published APIs can enable enterprises to retain flexibility to integrate apps in the future

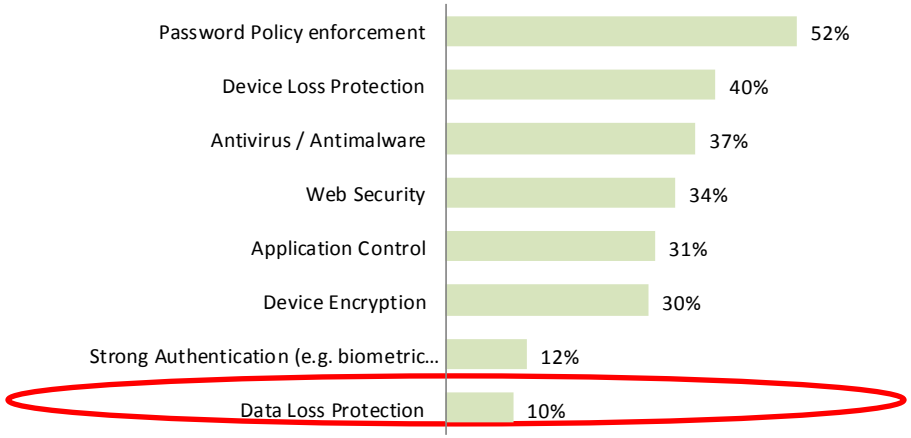
Enterprises adopt different app development strategies based on skillset availability

	Internal	Internal & External (resource based outsourcing)	External development based on guidelines and policies	Off-the-Shelf (OTS)
Number of companies (n=10)	3 (30%)	1 (10%)	5 (50%)	1 (10%)
Key Considerations	• Outsourcing did not work well • Security concerns	• Have internal resources; priority is to deploy them first	• No UI / UX experience • Multiple legacy platforms – do not have competencies to address all of them	• Does not see value in developing solutions when OTS solutions can fulfill need
Role of IT	• End to end	• Resource management • Policy development • Vendor relationship management • Product / app evaluation	• Policy development • Vendor relationship management • Product / app evaluation	• Product / app evaluation
Speed to Market				
Cost / App	$$$$	$$$	$$	$
Coverage of Needs				

BYOD environment requires a calibrated security policy

- While basic security measures are in place, advanced security measures are lagging app development

what are your firm's plans to adopt the following mobile security technologies



Base: 1,033 North American and European IT executives and technology decision-makers

Source: Forrsights Security Survey, Q3 2010

- Evolution of BYOD will result in greater conflict between an enterprise's desire to manage the entire device and the employee's ownership of the device
- Some countries' data protection / privacy laws prevent enterprises from exercising complete control over employee devices

Mobile security policy should be calibrated differently to match the BYOD environment

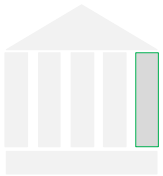
- Employee owned devices:
  - Sandbox enterprise apps and data, enabling security features selectively
  - Ensure that security policy is not in conflict with local laws
- Enterprise provided devices:
  - Where possible, exercise full control over device and data (remote wipe, device encryption, anti-virus / malware solutions)

Robust app level risk assessment should determine app security measures

Nature of the app determines the level of security required

Application	Risk	Implications
Non-transactional applications These apps do not have the ability to transact with an enterprise (e.g. place orders, change ERP / CRM databases etc..).	Reputation	Focus on ensuring that security policy / guidelines issued are followed in app programming and deployment. Such policies may include - Not accessing personal data on device - Non storage of credentials
Transactional applications These apps allow the customer / partner to interact with the enterprise – e.g. place orders with Hilti, change ERP / CRM databases, access inventory at a particular location etc..)	Reputation + Financial	In addition to following security measures above, possible security measures include: - Multi-level Authentication - Penetration testing - Restricted distribution mechanisms - Transaction limits

Private app stores are best placed to cater to an enterprise's needs; however they are evolving



1 Device Ownership

Enterprise-owned device
- Enterprise-owned and developed applications
- Third party, enterprise-owned applications
- Third party, employee-owned applications

Employee-owned device (BYOD)
- Enterprise-owned and developed applications
- Third-party applications

2 Enterprise Requirements

- Catalogue
- Multi-platform support
- Capability to distribute both internally developed and off-the-shelf applications
- Directory interfaces
- Device / employee required push
- Inventory apps on devices
- Promotion of suggested apps

3 App Stores

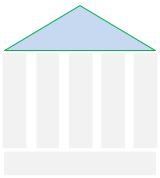
- Immature market, high growth expected
- Vendors are small, with small number of employees and customers
- Some level of consolidation of products / platforms expected
- Functionalities across products are rapidly being built in

4 Implications

Instability in the vendor market implies that an enterprise will have to be prepared with contingency plans

Consolidation of product features implies that an enterprise will have to closely monitor application development roadmap to take advantage of any opportunities

Governance should focus on both processes and metrics



	Platform	App Design	Development	Security	Delivery
Best Practices	Select app platform based on need assessment	Build APIs to enable integration of apps	Develop guidelines for choosing developers	Detail security policies for both apps and devices	Assess user feedback
Metrics	User base coverage	# of interactions required per functionality; Level of integration	Time / Cost to develop # of developers	Security Exceptions	App and feature usage statistics

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Case Study: Telco uses improves productivity by leveraging apps

Problem:
Front line managers of field staff spent 70% of their day in office. Goal: flip this to 30% by delivering a mobility solution

Approach & Lessons Learned:
- Windows Mobile 6.5 vs. iPhone: 87%+ users preferred iPhone
- Outsourcing development failed due to difficulties with interaction and iteration with overseas developers
- Created encrypted “work container” on phone using Good company MDM solution
- Smartphone solution: tablet fits “uncomfortably” between phone & laptop

Final Solution:
“oPhone” currently rolling out to 1400 line managers & 2500 engineers