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Pricing Of Public Sector Information Study

Apps market snapshot (D)

Final Report

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1 Executive summary

The **market for mobile apps** has outgrown the information and communication technologies market over the past two years (2009-2010), and its growth will **accelerate** in the future **to reach \$ US 35 billion in 2015**. It is to be **one of the fastest growing segments** in the **information technology market**.

Apps present an interesting market opportunity because customers are more willing to pay for mobile apps than for web services. Sixty per cent of apps on European markets are developed by European developers. However, at present, the **average apps developer** makes only **\$ US 3 000 a year directly from apps sales**. There are **various experiments with alternative business models**: from freemium through to ad-based or subscription-based models. There are many start-ups that develop their apps mainly to generate visibility from venture capitalists. In the **short-term, no large profit** nor **employment impact is visible** (e.g., 80 per cent of paid Android apps were downloaded fewer than 100 times). It is, however, easy to foresee that the **picture will probably change dramatically** in no more than three years' time – which is what is attracting venture capitalists to the field.

Even if the most popular apps today are generally games, **PSI is used as the basis for a sizeable proportion of apps**, especially **weather, travel and transport** applications. Transport data in particular appear to be used as the single most important segment of the PSI-based apps market. Most success stories, such as the MetroParis and London Tube applications which have jointly generated 400,000 euros in revenues have used such transport data. While most PSI-based apps are free, developers expect there to be more **revenue opportunities** that emerge from apps that **integrate different data sources, more value added datasets and datasets which provide real-time data**.

The **key drivers of innovation** in the PSI-based apps market are **the availability of clear, similar re-use rules** and the **freedom to experiment with different business models** without **upfront costs**. The main barriers appear to lie in **competition** that comes from some **PSBs** that are creating their own free apps as well as **diverse pricing for different datasets**, an exceptionally **wide range of conditions for re-use** across the various European countries, and **unexpected changes in re-use conditions**.

2 Introduction

2.1 Overview

This document is the final report of the POPSIS study objective D. It provides a concise snapshot of the mobile application market (market, key players, potential, business models), and estimates the number of apps that are, broadly speaking, based on PSI. Further, it examines under which circumstances and conditions the availability of PSI may contribute to the development of new Apps.

This final report for the POPSIS study objective D is structured as follows:

This section 2 provides an overview and introduction to the present report.

Section 3 explains the methodological approach to POPSIS study objective D.

Section 4 presents the study results on the mobile application market.

Section 5 discusses mobile and web applications based on open data portals data.

Final conclusions are presented in section 6.

2.2 Thematic introduction

Apps development and the effect it has on services used by the public has been much appreciated by different members of the press. Anthony Browne in the London edition of the UK popular newspaper, the Evening Standard, writes:

"Hiring [the] bikes has been made easier by smartphone apps, which show in real time where the closest available bikes are, the best routes to cycle, and where there are spaces to deposit them. Smartphone apps such as these are becoming essential tools for Londoners. Others show where you can find Oyster card outlets, broadcast live images from traffic cameras so you can avoid jams, tell you the quickest way to travel by Tube, and the MRSA rate at your local hospital"¹.

He adds subsequently that:

"Transport for London couldn't have done this - it's a transport company, not an IT laboratory. The developers can do it faster, cheaper, and be far more innovative in giving consumers what they want. It is not just a win for the Government and the public but also for the economy - it is helping to create a thriving developer community."

According to the United Nations E-Government Survey 2010, the Apps for Democracy

¹ <http://www.thisislondon.co.uk/standard/article-23915041-how-london-leads-the-way-in-techno-wizardry.do>

contest (for the best applications built on data supplied by district governments) resulted, in thirty days and at a cost of \$US 50,000 in awards, in 47 applications that would have otherwise cost \$US 2.6 million if they had been developed internally by the District of Columbia. The question remains, as Peter Corbett puts it, “would the city have procured an iPhone application that shows you the nearest metro station and inbound and outgoing trains? They may never procure that.”² Nevertheless, government agencies do commission apps. “My TSA application developed by the US Transport Security Agency offers a database of permissible carry-on and checked baggage items. The app can be queried on specific forms of baggage, as bizarre as e.g., a toy light saber³ baggage item. The app’s answer to such a query is: “Sadly, the technology doesn’t currently exist to create a real light saber. However, you can pack a toy light saber in your carry-on or checked bag. May the Force be with you.”⁴. The app has been downloaded 200 thousand times already and cost the agency about \$US 80-100,000 to develop.

Although there were recently doubts raised about the usefulness of apps developed for government contests⁵ (i.e., that they are trivial, unprofitable and unexciting to the wider public), according to Marc Head⁶, there are more benefits than just apps creation. What is far more important is to unlock innovation, raise awareness among civil servants and developers as well as build a community around PSI data. Furthermore, looking at apps contest only in view of cost-savings or return on investments does not take into consideration citizens’ engagement in public services co-design and co-delivery.

Is it thus valid that mobile apps based on PSI lead to more efficient and innovative public services and cause the economy to flourish? Is business based on PSI-based apps contributing to job creation? Were apps contests a real catalyst for innovative solutions to public task delivery? Finally, coming back to the core issue at stake of this study, are PSI-based applications an important outcome of PSI charging models changes?

This part of the study is focused on analysis of this emerging phenomenon. It attempts to establish whether smartphones’ apps are simply another buzz word or create real change and are an important outcome of the PSI data availability. As a result, it is necessary to find evidence to answer the following questions:

- 1) What is the size of the mobile apps market?
 - Who are the key players?
 - What are their business models?
- 2) What share of the apps market is based on services using PSI?
- 3) What are the success factors and barriers to profitable use of PSI for building apps?

² <http://radar.oreilly.com/2010/05/government-innovation-from-the.html>

³ This is a fictional Star Wars weapon.

⁴ <http://fcw.com/articles/2011/04/11/feat-government-mobile-apps.aspx>

⁵ <http://fcw.com/articles/2010/06/07/buzz-army-apps-contest.aspx>

⁶ <http://govfresh.com/2010/06/a-%E2%80%98glass-half-full%E2%80%99-view-of-government-app-contests/>

3 Methodology

In order to answer the first question on the size of the mobile apps market (in terms of size, players, business models and future developments), the study team carried out a desk-based meta-analysis of existing consultancy data from companies such as Forrester, IDC and Gartner, as well as independent blogs. The desk research was aimed at gathering data on the *overall size of the market*, in terms of number of apps and economic value; the *main actors* involved: SMEs and individual developers, large vendors, established as compared to new players; and the *business models* used: direct revenues through selling apps; advertising; and general self-promotion gained by providing apps.

Furthermore, the study team tried to establish to which extent existing apps are based on PSI, in order to calculate a rough estimation of market size. We decided to assess both the number of applications and the number of downloads, which would give a rough indication of the usage of these apps. We therefore carried out a random sampling of 500 apps across the different apps market (Apple Apps Store, Android Market, Ovi Store, both commercial and free). In order to obtain a non-biased sample, we analysed both the “most downloaded” and the “most recent” apps in different categories such as:

- Travel and transport
- Money and finance, and
- Weather

The choice of these categories is deliberately consistent with the general approach of the study, in particular with objectives A B C, in order to enable potential cross-analysis of findings, where relevant.



Figure 1: Sampling of apps

Applications for tablets were also taken into account.

Based on the percentage of apps that are based on PSI, we were able to give an approximate estimation of the “weight” of PSI-based apps in the apps market in the categories that rely heavily on PSI data. We also looked at the country of origin of the software developer in order to assess the presence of EU players.

Subsequently, we assessed five competitions for building applications utilising public data in order to detect how many of the submission were smart phones apps. The list encompasses the most important initiatives from leading countries – US and the UK – and three examples from other EU countries, Belgium, Denmark and Finland.

- Apps for Democracy - appsfordemocracy.org (US)
- Rewired State - rewiredstate.org (UK)
- The Inca Awards - www.inca-award.eu (BE)
- Apps for Democracy Finland - www.mindtrek.org/2009/democracy_finland (FI)
- Nettskap 2.0 - (NO)

All apps from the second sampling were subsequently analyzed according to characteristics outlined in the table below:

Figure 2: Characteristics of contest apps analysis

1. The type of PSI used	<ul style="list-style-type: none"> • Company Information • Vehicle Registration • Physical Property • Intellectual ‘Property’ (patents, trademarks, etc.) • Meteorological Data • Geospatial Information • Hydrographic Information • Socioeconomic Statistics • Environmental Data • Official Gazettes (official notices) • Transport statistic (source: Pollock 2008)
2. The application field (based on the COFOG taxonomy⁷)	<ul style="list-style-type: none"> • 01 – General public services • 02 – Defence • 03 – Public order and safety • 04 – Economic affairs • 05 – Environmental protection • 06 – Housing and community amenities • 07 – Health • 08 – Recreation, culture and religion • 09 – Education • 10 – Social protection

Finally, to search for drivers and barriers for developing PSI-based mobile apps, as well as business models, revenue streams and employment growth, the study team has carried out five in-depth interviews with apps developers selected from the previous phase sample. In order to complement the objective A-C case studies, particular attention was devoted to the actual conditions for re-use of PSI such as pricing, IPR and accessibility.

⁷ COFOG (Classification of the Functions of Government) was developed in its current version in 1999 by the OECD and published by the United Nations Statistical Division as a standard classifying the purposes of government activities.

The following figure summarizes this approach and subsequent steps for objective D:

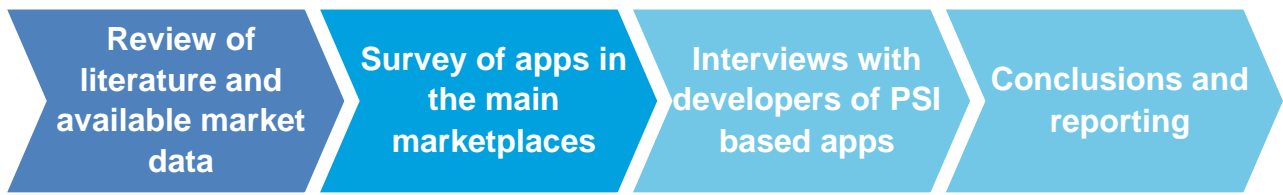


Figure 3: Approach to objective D

4 The Mobile application market

The iPhone App Store was launched in July 10, 2008 via an update to iTunes. Google's Android Market was opened a few months later, in October 2008. Almost a year later, in April 2009, another app store – BlackBerry App World – followed Apple and Google. Only a month later, in May 2009, Nokia's Ovi Store was set up. The last player – Microsoft – joined the market five months later in October 2009 with Windows Marketplace for Mobile.

The size of the apps market: putting revenues in perspective

Global revenue for the total mobile application stores' market increased by 160.2 % and reached \$US 2.2 billion in 2010 (compared to \$US 828 million in 2009)⁸. This means that in just two years this market has already reached half the size of a mature market, such as the consumer security software market. It is estimated at \$US 4,2 billion for 2010 and Software as a Service is estimated at \$US 2.7 billion⁹.

The Apple App Store recorded annual revenue of \$US 1.8 billion at the end of 2010, maintaining its lead position on the market (with a 82.7 per cent share, which is a decrease from its more dominant position of 92.8 per cent in 2009). The Android market increased its revenue by 861.5 percent in 2010. This suggests a 4.7 per cent share of global mobile application revenue in 2010 (an increase from 1.3 % in 2009) and puts it ahead of Ovi Store which had come third, after Apple and BlackBerry, in 2009¹⁰. As one can see, Apple and Android pioneered the market and maintain their lead positions. These positions as leaders are of course not only due to the date of the launch but stem from the high numbers of Apple iPhone sales (expected to reach 15.7% of the smartphone market in 2010¹¹) and the widespread presence of Android system on different smartphones types sales (expected to have 39.5% of the market in 2011¹²). In the first quarter of 2011, Apple sold 18.6 M of the new iPhone 4 model (and 4.7 million iPads). This was a 113% increase over the same period in 2010¹³.

⁸ <http://press.ihs.com/press-release/product-design-supply-chain/apple-maintains-dominance-mobile-application-store-market->

⁹ <http://www.eweek.com/c/a/Security/Security-Software-Market-to-Pass-165B-in-2010-Report-652216/>

¹⁰ <http://press.ihs.com/press-release/product-design-supply-chain/apple-maintains-dominance-mobile-application-store-market->

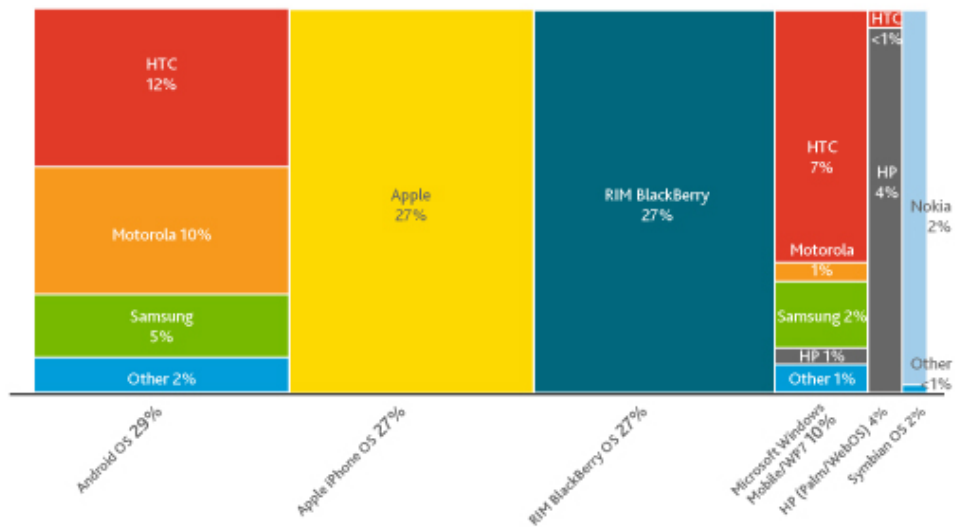
¹¹ <http://www.idc.com/getdoc.jsp?containerId=prUS22762811>

¹² 39.5%

¹³ http://www.computerworld.com/s/article/9216004/Apple_breaks_iPhone_sales_record_again

Manufacturer operating system share—smartphones

Nov '10 - Jan 11, postpaid mobile subscribers, n=14,701



Source: The Nielsen Company.

nielsen

Figure 4: Operating system share in smartphones in the US. Source: Nielsenwire

What is more, Apple's App Store was responsible for nine application downloads out of 10 in the marketplace in 2010¹⁴. Even if Android revenues are catching up, the availability of Android for different types of smartphones might have also worked to its disadvantage since developers have to cope with different hardware demands and incompatibilities. The results of the developers' survey by IDC and Appcelerator (2011) shows that "as Android is deployed on more devices, it's becoming harder to develop for it, because of a profusion of device specifications and a pool of newcomer app developers, many of whom were Web and desktop developers just two years ago"¹⁵. Therefore, even if the sales of Android devices exceeded all others, over the past six months, developers' interest in both Apple's iOS platform and Google's Android platform has remained unchanged¹⁶.

¹⁴ <http://www.gartner.com/it/page.jsp?id=1529214>

¹⁵ <http://www.technologyreview.in/computing/37475/>

¹⁶ <http://www.technologyreview.com/computing/37475/page1/>

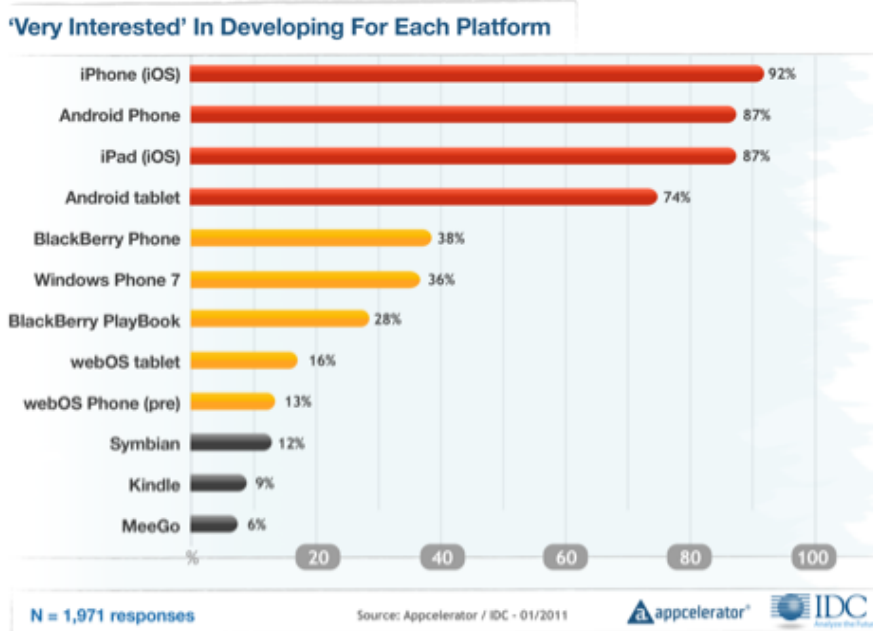


Figure 5: Developers' interest in different app platforms

Future outlook

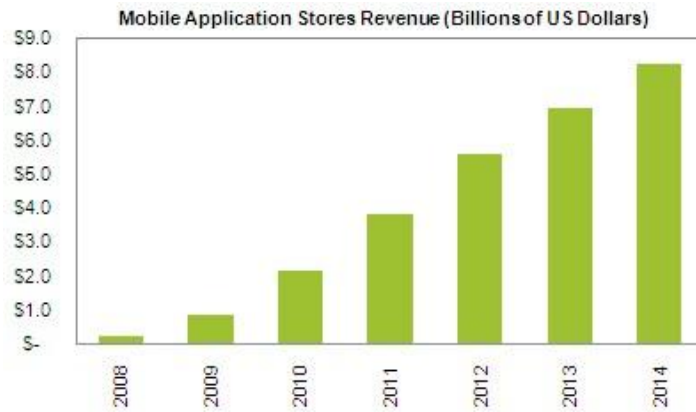
The fast pace of growth is expected to last: Gartner predicts an upsurge in revenues to \$US 15 billion in 2011. IDC estimates revenues to top 35 billion in 2014 or 38 billion according to Forrester. Tablets provide for \$US 8.1billion¹⁷. To put this in perspective, the global market for cloud computing services is estimated at four times this amount, at \$US 148 dollars, according to Gartner.

Figure 6: Apps stores revenues 2010 and estimations: 2011-2014

Timeframe	2010	2011 E	2014 E
Revenues – app stores for smartphones and tablets	\$2.2bln (IHS)	\$15 bln (Gartner)	\$35 bln (IDC) and \$38bln (Forrester)

While these numbers may differ, all sources agree that both downloads and revenue growth will accelerate.

¹⁷ <http://bits.blogs.nytimes.com/2011/02/28/mobile-app-revenue-to-reach-38-billion-by-2015-report-predicts/>



Source: IHS Screen Digest Research, May 2011

Figure 7: Mobile Application Sales Revenues

Even if North America remains the lead market, Markets and Markets report (2011) estimates that European mobile applications market is expected to become the largest market by 2015, at \$US 8.4 billion and to grow at a compound annual growth rate of 33.6 percent during 2010-2015¹⁸.

This growth is underpinned by strong trends. The subsidies offered by mobile operators will permit smartphones to become more affordable and therefore reach a wider public. This in turn will boost app downloads and store revenues¹⁹. According to IDC, the global smartphone sales will amount to more than 450 million smartphones in 2011 compared to the 303.4 million units in 2010 (which is almost a 50% increase). The smartphone market will also grow more than four times faster than the overall mobile phone market²⁰.

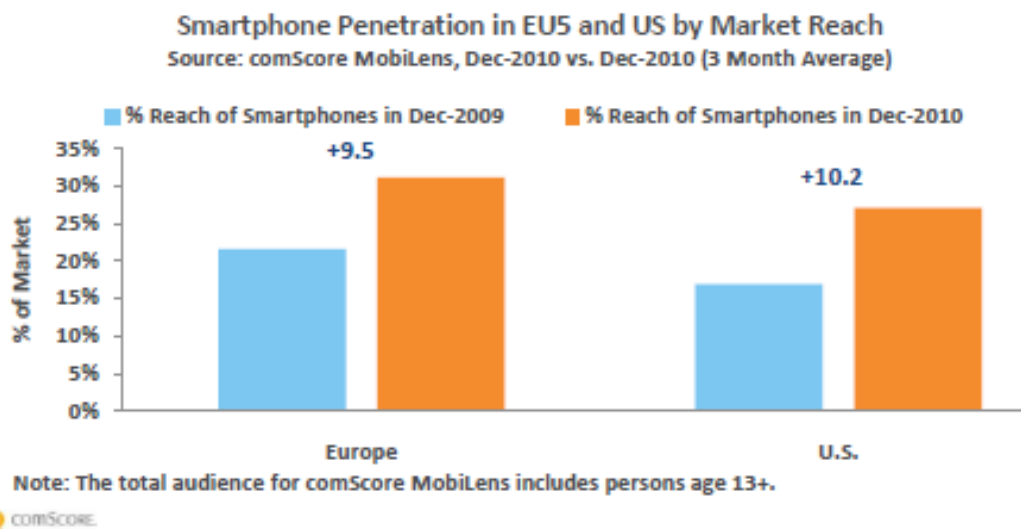


Figure 8: Smartphone penetration in Europe and US by Market Reach (source: ComScore)

¹⁸ <http://www.marketsandmarkets.com/Market-Reports/mobile-applications-228.html>

¹⁹ <http://bits.blogs.nytimes.com/2011/02/28/mobile-app-revenue-to-reach-38-billion-by-2015-report-predicts/>

²⁰ <http://www.idc.com/getdoc.jsp?containerId=prUS22762811>

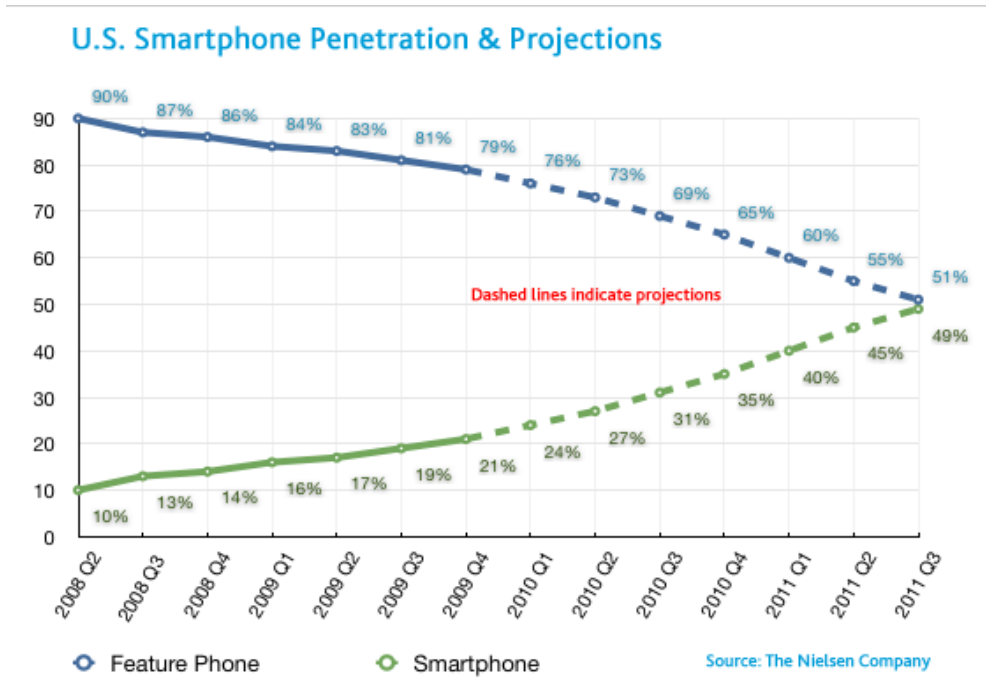


Figure 9: US smartphone and feature phone penetration and projection.
Source: The Nielsen Company

Furthermore mobile Internet access will continue to grow, because of cost reduction, increased provision of flat rate access and new access technologies such as 4G. According to Morgan Stanley, mobile Internet usage will surpass desktop usage by 2014.

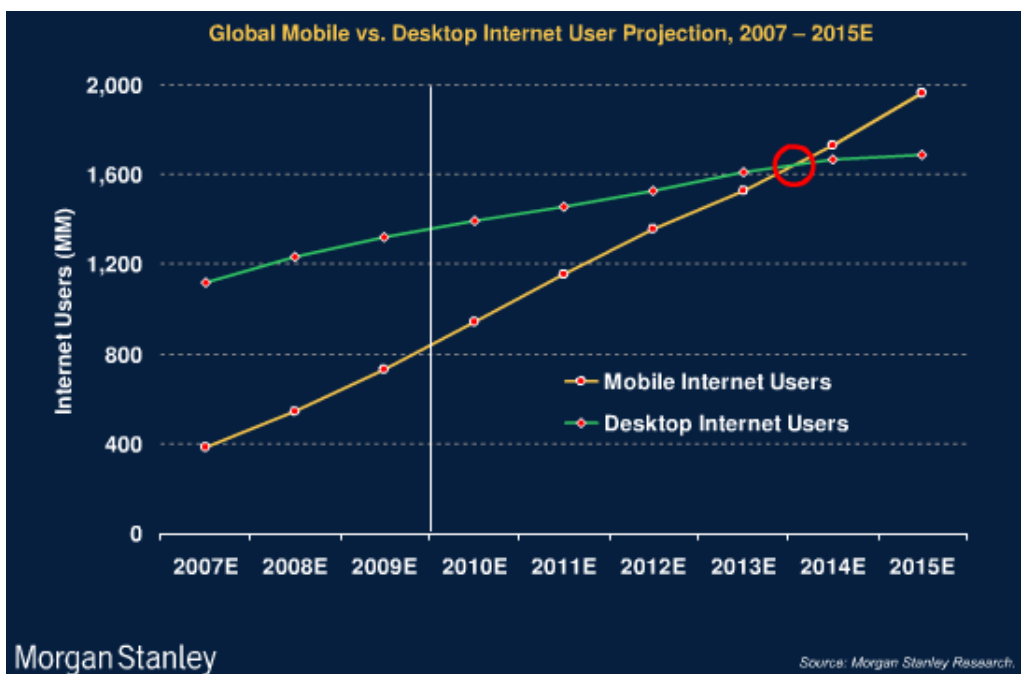


Figure 10: Global mobile vs Desktop Internet projections, 2007-2015²¹

²¹ <http://www.slideshare.net/malaparte/morgan-stanley-internet-trends-mary-meeker-20100412>

In other words, more people will have a smartphone, which will increasingly be connected to the Internet. Everyone will download more apps in the future, and this will lead to continuous exponential growth.

These soaring figures of smartphone use and applications download will also have impact on the PSI-based app market. The increasing demand for apps and real-time data will most probably prompt developers to search for new types of services offered via apps and turn to novel datasets. What is more, the trend of offering apps by PSBs might also increase due to the market growth.

Number of apps

According to IDC, there were more than 300.000 apps by the end of 2010 (only one year and a half after the first app store launch) with a very wide range of topics and usage²². However, it is difficult to provide exact numbers about the whole apps market as the figures are constantly changing, on 14 March, 2011, there were 362,200 apps available on Apple App Store²³. Distimo consultancy estimates the number of applications in the Android market to be around 150.000 apps at the end of 2010²⁴ (a recent study suggests the number of applications has risen to 250.000²⁵). The remaining marketplaces are much smaller. The Ovi Store offers only 25,000 apps, Blackberry App World has 20,000 apps and Windows Phone 7 Marketplace has less than 10,000 apps. Nevertheless, summing those numbers up, in the first quarter of 2011 one arrives at an estimate of more than 600.000, which is double the sum quoted by the IDC for the whole market at the end of 2010.

In addition one must also consider applications for iPad in the App Store, almost 60,000 apps are available so far (the majority of those applications were developed to serve both iPhone and iPad). IDC predicts that at the end of 2011, the number of apps will continue to grow with Apple App Store reaching 750,000 and Google's Android Market 550,000²⁶.

²² <http://www.idc.com/about/viewpressrelease.jsp?containerId=prUS22617910>

²³ <http://148apps.biz/app-store-metrics/?mpage=appcount>

²⁴ http://www.distimo.com/blog/2011_01_distimo-releases-full-year-2010-report/

²⁵ <http://www.androidpolice.com/2011/03/14/number-of-apps-in-android-market-rapidly-gaining-on-apples-app-store-but-android-tablets-arent-so-lucky/>

²⁶ <http://www.idc.com/research/viewdocsynopsis.jsp?containerId=225668>

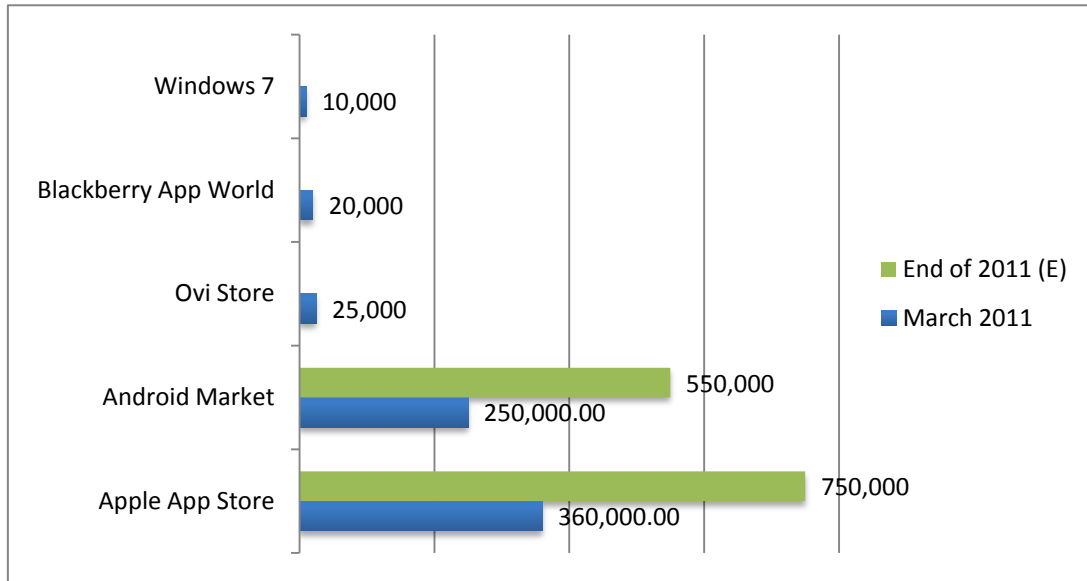


Figure 11: Number of applications in app stores in the beginning of 2011

As for applications for iPad in the App Store, almost 60,000 apps are available so far with a following trend²⁷:

	April 2010	June 2010	August 2010	November 2010	January 2011
iPad release		10,000 apps	20,000 apps	40,000 apps	60,000 apps

Table 1: iPad apps available in App store

To put this data in context, two months after the opening of Apple App Store, the number of iPhone and iPod Touch apps reached only 3,000 (whereas there were 20,000 iPad apps after two months of its launch). As we can therefore observe, the growth of iPad apps is much faster but the whole market grows at a faster pace than when the App Store launched and as mentioned previously, iPhone apps are easily transformed into serving iPad clients.

Downloads

The smartphone apps market has shown unprecedented download growth since its launch in 2008. In 2010, ABI estimates that 8 billion apps were downloaded. To put this in perspective, consider the other great e-commerce success story, the music download service by iTunes, which disrupted the music industry: the apps market growth is double the music market growth. It took Apple less than two years to reach its 4th billionth app download compared to nearly four years for the same number of songs to be downloaded²⁸.

As the market is far from maturity, the estimates for global downloads numbers for upcoming years are very different and vary depending on the consultancy issuing the forecast. Gartner has estimated the market for 2010 at 8.2 billion downloads on the whole,

²⁷ <http://www.macstories.net/news/how-many-iphone-apps-are-there-306554-and-60000-ipad-apps/>

²⁸ <http://irish.digitalsfolder.com/apple-itunes-sees-more-growth-in-traffic-than-in-the-download-music/>

while another consultancy – IDC – foresaw 10.9 billion downloads for the end of 2010. For 2011, Gartner foresees downloads numbers almost to double (17.7bln), whereas IDC projects them to top 25 billion. Finally, both consultancies foresee a big leap in downloads by 2014 – Gartner estimates 185 billion downloads and IDC 76.9 billion (see table below). Moreover, Gartner estimates “that Apple’s App Store will remain the single best-selling store across the forecast period (to 2014), although to a lesser extent, other stores will manage to gain momentum²⁹”.

Timeframe		2010	2011	2014
Apps downloads estimations	Gartner	8.2 billion	17.7 billion	185 billion
	IDC	10.9 billion	25 billion	76.9 billion

Table 2: Estimates of apps downloads 2011-2014

Also, according to Gartner, the predicted upsurge in downloads would be primarily driven through tablets with downloads on smartphones remaining stable³⁰.

In addition to share leadership, Android and iOS users have the most apps and use them the most

Average Number of Applications on the Phone by Operating System Past 30 Day App Downloaders

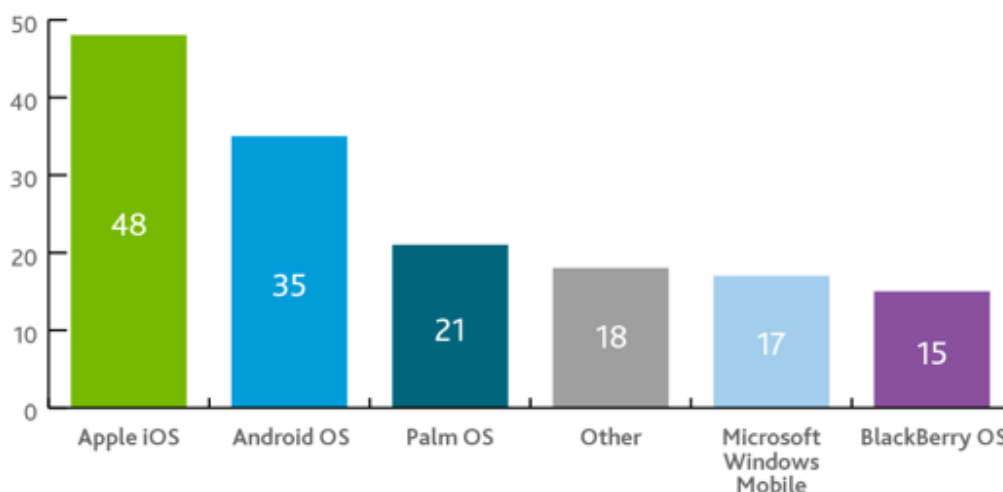


Figure 12: Average number of apps per operating system. Source: Nielsen Wire (April 2011)

Business models

The software market is experiencing a strong evolution in business models. It is no longer sustainable to rely on exorbitant license fees to create high margins, as availability of open

²⁹ <http://www.gartner.com/it/page.jsp?id=1529214>

³⁰ <http://www.gartner.com/it/page.jsp?id=1529214>

source and software-as-a-service solutions has provided increasing choice to final customers and changed their perceptions of value-for-money. Increasingly, software companies are experimenting with business models, mainly in the direction of offering value added services to increase their revenues.

Apps are deemed to provide new opportunities to monetize services that are normally free on the web, as consumers are more accustomed to pay for apps. However, different business models are being experimented with, such as ad-based apps and freemium business models. We first illustrate the revenue streams from direct selling of apps, and then we analyze additional business models.

Thirty percent of revenues from the App Store go directly to Apple, and 70% go to the seller of the app, Android Market gives the app developers the same 70% of the application price and the 30% is shared among carriers and payment processors³¹.

Most of the developers in Apple App Store and Android Market have only developed between one and five apps, including around 45-50% of those who have posted one app only. Only 8% of developers in the Android Market and 6% in the App Store have developed more than 10 apps (see table below). Unfortunately, there are no official statistics for the median revenue for app developer but a literature reviews suggests a figure of around \$ 700 for the US market for iPhone developers and the average is 3,050\$ a year³². This reflects a much more uneven distribution where very few successful apps, such as the famous game Angry Birds, were able to generate US\$70 million revenue while costing just 140,000 dollars to develop, whereas the majority of apps will not break even. Therefore, what we can assume from the small number of apps per developer, the median revenue and the fact that the prevalent business model is the unique price for the app download is that developing apps stays rather a side activity (which has been confirmed by interviews with developers), adding an additional revenue stream to the online platform for example (such as: <http://www.evernote.com/>, <http://www.weather.com/mobile/>) or a full-time job of an individual developer and do not create much of employment. As apps benefits from very low marginal costs, it is expected that their economic impact is lower than the employment they generate.

³¹ <http://www.android.com/us/developer-distribution-agreement.html>

³² <http://communities-dominate.blogs.com/brands/2010/06/full-analysis-of-iphone-economics-its-bad-news-and-then-it-gets-worse.html>

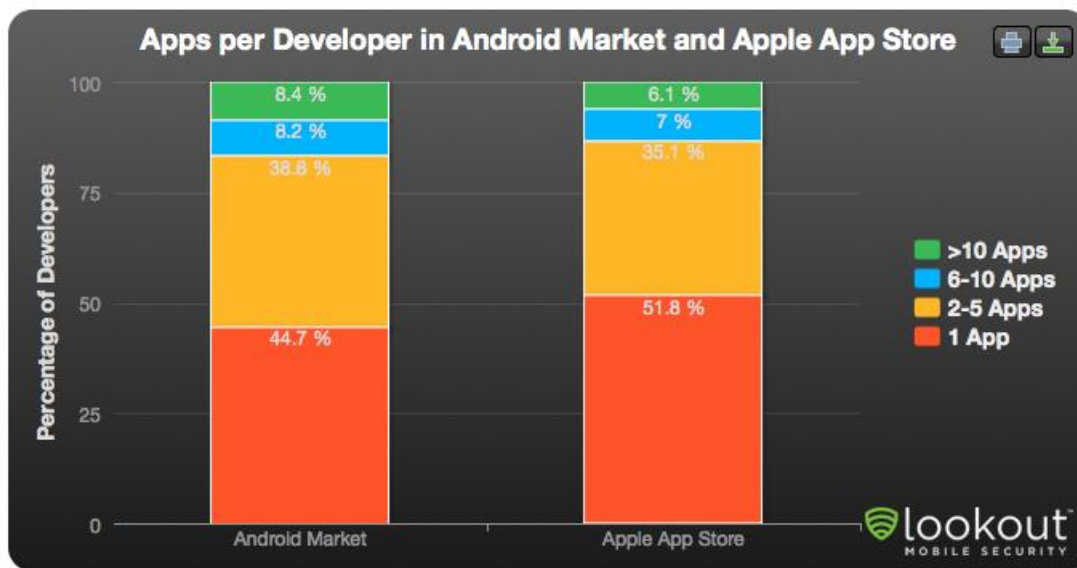


Figure 13: Percentage of apps per developer in Android Market and Apple App Store Source: App Genome Report

Nevertheless, the recent IDC and Appcelerator survey³³ (January 2011, covered 2,235 of over 100,000 developers who use Appcelerator’s Titanium application development platform), shows that the app developers are moving from the “exploration phase”, i.e. developing one or two simple apps – typically for iPhones – to a second “acceleration phase” where developers focus on free brand-affinity apps and many are planning to develop on average 6.5 apps this year on at least four different devices (e.g.: iPhone, iPad, Android Phone, Android Tablet).

Although downloads numbers are expected to soar, the revenue growth for developers will not match those estimations. This is due to the reduction in the average selling prices of mobile applications as well as the rapid growth of free apps downloads numbers. The price of mobile apps is expected to decrease from the current average of 2 dollars per app to 1.5 dollars in 2012³⁴. What is more, as we see, the average developer does not offer more than five apps on the market, therefore even if app stores revenues grow fast, it does not permit the developers to grow at the same rate. Ad-supported mobile applications and in-app purchases are also expected to grow rapidly³⁵. Finally, one should not oversee the fact that the app store market revenues are top-heavy. The most popular app - Angry Bird - hit 50 million downloads last year³⁶, i.e. it absorbed 0,5% of total app downloads in 2010, being one out of more than 300.000 apps offered on the market. All those trends may nudge developers to switch to look for other revenue streams rather than charging for downloads.

As far as the relationship between paid and free apps is concerned, according to the App

³³ <http://www.appcelerator.com/company/survey-results/mobile-developer-report-january-2011/>

³⁴ <http://mashable.com/2010/03/17/mobile-app-market-17-5-billion/>

³⁵ <http://www.marketsandmarkets.com/Market-Reports/mobile-applications-228.html>

³⁶ http://articles.economictimes.indiatimes.com/2011-01-17/news/28424574_1_angry-birds-rovio-mobile-mn-downloads

Genome Report³⁷, the Android Market constituted 34% in February 2011 of the paid apps (compared to 22% in August 2010), whereas the proportion of paid apps in the Apple App Store was decreasing during the same period (it went down from 71% to 66%) but nevertheless still covers the largest proportion of paid applications.

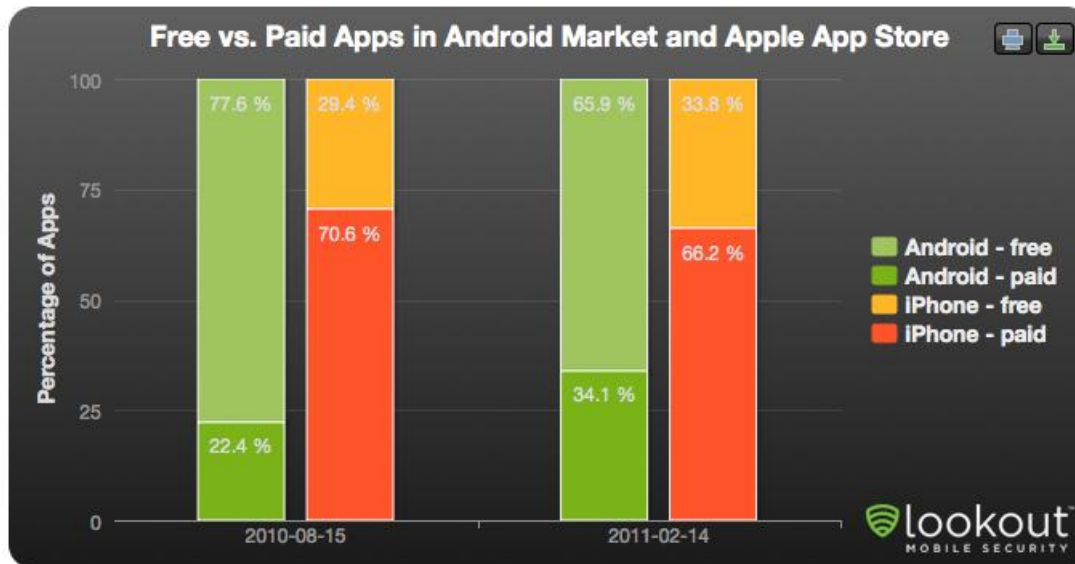


Figure 14: Free and paid apps in Android Market and Apple App store. Source: App Genome Report

As we see from the above figure, free downloads are currently slightly decreasing in the Android Market. However, according to Gartner, they still constitute 81% of total downloads and they will start to increase from 2012 through to 2014³⁸.

Meanwhile, the main driver of business growth is the “freemium” business model. It entails offering a standard application free and charging fees for premium features. According to IHS, freemium purchases will count for around half of all North American app revenues by 2014, up from 24 percent in 2010. Moreover, freemium’s share of the market will be even higher for games³⁹. Finally, Forrester foresees that mobile marketing will grow in 2011, and overcome the \$US 1 billion threshold. This will therefore encourage developers to release free apps, which generate revenue by combining embedded advertisements and special paid features.

According to the IDC and Appcelerator survey⁴⁰, developers are moving from selling a purely content-based application to apps that offer added-value based on deeper user engagement: thus, it drives additional and sustained usage over time. It means that developers are more and more interested in advertising and in-application purchasing as well as mobile commerce business models, which both permit continued revenues. It might

³⁷ <https://www.mylookout.com/appgenome/>

³⁸ <http://www.gartner.com/it/page.jsp?id=1529214>

³⁹ <http://press.ihs.com/press-release/product-design-supply-chain/apple-maintains-dominance-mobile-application-store-market->

⁴⁰ <http://www.appcelerator.com/company/survey-results/mobile-developer-report-january-2011/>

result in fewer completely free applications and at the same time less focus on apps whose financial business models start and end with the initial app purchase.

In summary, what is clear is that the mobile apps market is far more “monetizable” than web apps market. The final consumer has a higher propensity to pay for the service: it is a fast growing market characterized by a very uneven distribution of success, where only a small number of developers do very well.

At the same time, the volume of revenues generated by paid apps is in most cases limited. This is far from a mature market, and developers are still experimenting with different business models: for example, combining advertising with freemium.

This experimentation with business models is a crucial characteristic of the apps market. The most successful companies in the apps market are those that are able to learn faster than others, and identify the right approach to market. It requires creativity and innovation, but also a support system composed of an adequate financial means to sustain experimentation in time, and develop substantial marketing effort. To achieve this, it is necessary to remove as much as possible any upfront costs and remove barriers to entry and bottlenecks to innovation. The availability of free, open PSI can in this sense be considered as a key competitive asset of an innovation system insofar as it removes barriers to entry and reduces upfront costs to develop new services and experiment with business models.

Applications

According to 148 Apps biz blog⁴¹, the most popular applications on iTunes, after books (15%), are games (14%), entertainment (10%), education (8%) and lifestyle (7%) applications followed by utilities, travel and music (which are each 5%). It corroborates the upcoming trends in developing apps that focus on social apps (such as games, entertainment and music) and local apps (lifestyle and travel).

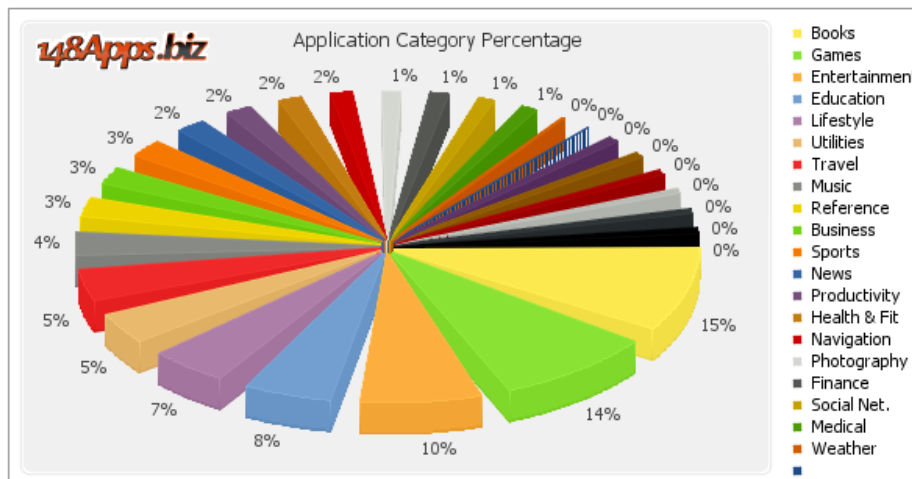


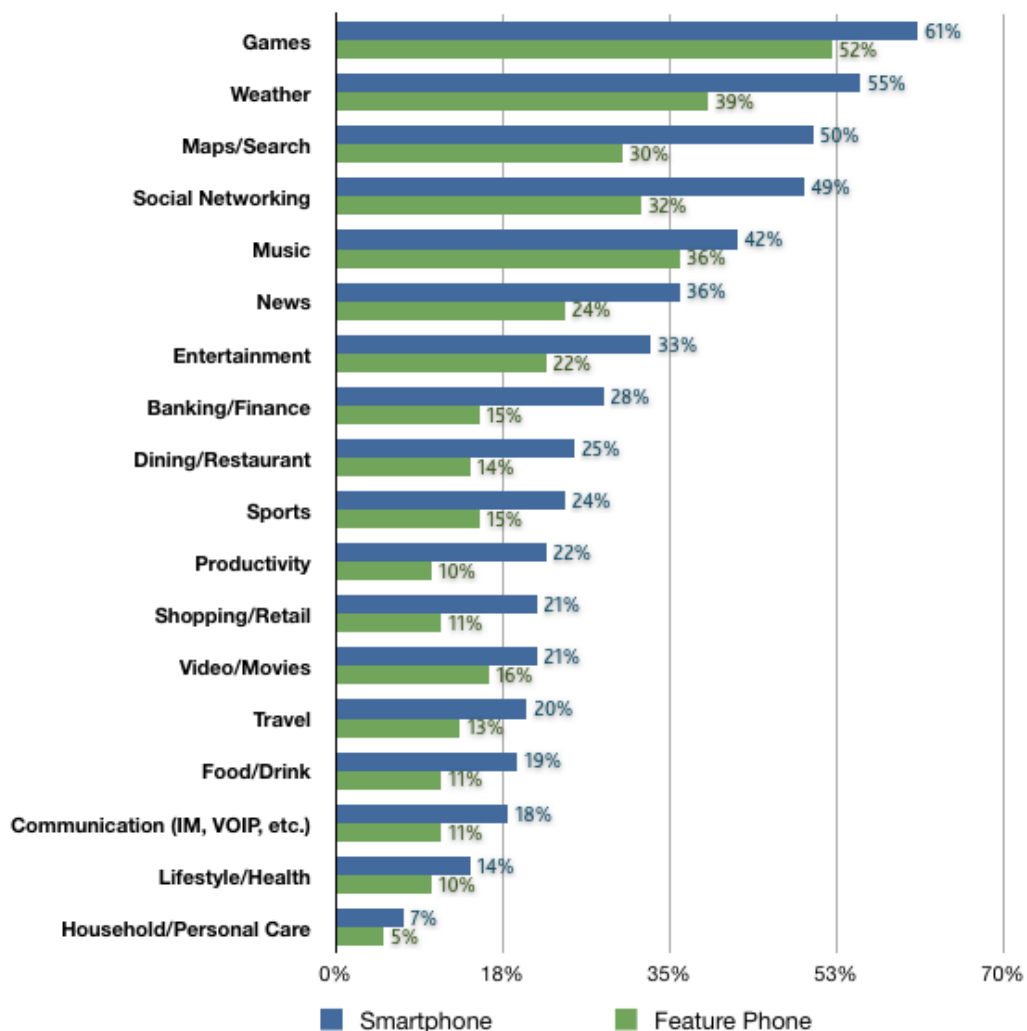
Figure 15: Application categories on App Store (Source: 148apps.biz)

⁴¹ <http://148apps.biz/app-store-metrics/?mpage=catcount>

To see how popular PSI data are among users, we used another set of data for all application stores provided by the Nielsen Wire Survey (June 2010). This survey questioned more than 4,200 people who had downloaded an application in the past 30 days. According to this survey (where users chose their app category), the most popular applications downloaded on smartphones are also games (65%) followed by news/weather (56%), maps/navigation/search (55%) and social networking (54%) apps. The survey suggests that Facebook, Google Maps and the Weather Channel are the most popular apps across all smartphones. Once again, the underlying trend in apps popularity seems to be more social, more local and real-time information. As we can thus see, the news and weather apps (56%) and maps/navigation/search (55%) occupy a prominent position in downloads choices with finance and travel constituting respectively 31% and 21% of the market (see the figure below).

Most Popular Categories of Apps

(Among those who report having downloaded an app in the last 30 days)



August 2010

Figure 16: Most popular applications. Source: Nielsen Wire Survey

The above figure suggests that PSI applications may have a big role in the total apps market as some of the most popular apps, such as the weather data (55%) and some of the maps/search apps (50%), are based on PSI databases. Google maps and the OpenStreetMap project are attracting a lot of interest from apps developers because the geo-location data provided by PSBs is often provided at a considerable cost. Still, these results show the potential of this type of data. We have also observed the considerable importance of finance/banking (28%) and travel apps (20%) that also rely on PSI data. This proves that the app business is not only based on games and social applications but can also be driven also by applications that use (even if partly) PSI data. In the next chapter of this report we will further analyze PSI-based apps.

The IDC and Appcelerator survey results also confirm the emerging trend of apps focusing on cloud services and integration of social and location services in 2011 (always connected, personal, and contextual).

Still, the most popular applications compile different sets of data and this trend, according to the survey mentioned below, would only strengthen over time. For example, [MyCityWay](#) app, presented as a case study in section 5.1, (winner of the first edition of NYC Apps contest, now a growing company), which is already available for 40 different cities, provides information on restaurants, points of public interest, public toilets, traffic, parking and public transport. The company started with Sonpreet Bhatia, Archana Patchirajan and Puneet Mehta, who were all former Wall Street executives who were unable to find a comprehensive and trustworthy local information hub. After receiving \$US 300,000 seed funding from New York's Entrepreneurial Fund, they got a further \$US 1 million from IA Ventures and FirstMark Capital⁴². Recently, BMW invested \$US 5 million in the company and the partnership⁴³.

The application has had more than a million downloads in its first year (2010) and expects to hit the 15 million-download mark next year following expansion in the US and worldwide⁴⁴ (to compare the most popular mobile app – Angry Bird game recorded 50 million downloads last year⁴⁵). The app is free and not generating revenues at this stage.

PSI-based applications

This section presents the results of the analysis of PSI-based apps market focusing on meteorological, travel and finance sector. First, we present the number of apps, followed by downloads' data and percentage of paid and non-paid applications. Finally, we show the country of origin of their developers. This quantitative analysis is subsequently complemented with sectoral qualitative analysis.

In order to assess the possibilities for a PSI-based apps market, we have chosen a sample of 500 apps in the three most popular application stores – Ovi Store, Android Market and Apple App Store. The three categories selected match the sectors surveyed in the objective A-C, i.e. meteo (meteorological PSBs), travel (geographical PSBs and cadastres) and finance

⁴² <http://gigaom.com/2010/11/19/mycityway-dives-into-data-comes-up-with-gold/>

⁴³ http://www.bmw-i.com/en_ww/mobility-services/

⁴⁴ <http://techcrunch.com/2010/10/23/the-goldmine-of-opportunities-in-gov-2-0/>

⁴⁵ http://articles.economictimes.indiatimes.com/2011-01-17/news/28424574_1_angry-birds-rovio-mobile-mn-downloads

apps (business registers). We assumed that these applications might make use of meteorological and hydrographic data, transport statistics, socioeconomic statistics and – although they were not classified by Rufus Pollock PSI study – national banks' information for currency exchange and stock exchange information. Still, we bear in mind that geo-location based service on apps are in majority based on alternative sources of geographic information (such as Google Maps or OpenStreetMap rather than from national PSBs) but we assume that from its popularity one can assume there is an important market possibility for the re-use of this type of PSI data.

Platform	Developer	Name	Category	Price	Country
Apple/Android	MeteoGroup	WeatherPro	weather	2,99/2,51 €	Germany
Apple/Ovi	My Switzerland	SnowReport My Switzerland	weather	free	Switzerland
Android	Accu Weather	AccuWeatherQuick	weather	free	US
Ovi Store	Paragon Software	Handy Weather	weather	5 €	US
Apple	Presselite	LondonTube	travel	0,79 €	UK
Apple	Deutsche Bahn	DB Navigator	travel	free	Germany
Android	Dmitriy V. Lozenko	Metro24	travel	1\$	Russia
Apple	Hendrik Holtman	eCurrency - Currency converter	travel	0,79 €	Germany
Apple	Paolo Grifantini	Currency Converter HD	finance	0,79 €	Italy
Apple	Patricia Meeremans	NetPayPlus	finance	free	Belgium
Android	Russel Wilson	Exchange Rates	finance	donate option	UK
Android	Semaphore Solutions Inc	eTomato Stock Master	finance	free	South Korea

Table 3: Examples of apps from the sample

The table below shows how many applications in total in the three above-mentioned categories each of the app stores have:

	Weather	Finance	Travel
Apple	1,162	3,437	6,000
Android	430	1,572	1,584
Ovi	48	96	492
Total	1,640	5,105	8,076

Table 4: Number of application per store in weather, finance and travel category (March 2011)

The observations to be drawn from these figures is that the Apple Store possesses twice as many applications as does the Android store. The Ovi Store has many fewer applications

than the other two. As a result of these numbers, the study team decided to diminish the Ovi sample slightly due to unbalanced number of applications in these stores. Moreover, the table shows that the travel apps are the most numerous, followed by financial applications and weather-based apps in third position. What is interesting, compared to the apps popularity ranking, is that – even if news/weather apps are listed in second position, far above travel (which is in 13th position) – there are far more travel apps than weather apps. This might be due to the compilation of news and weather in the same survey option: we cannot therefore clearly say if the news or weather apps are responsible for the high position of weather apps. Another explanation might be that the weather apps require the use of PSI data (which is very often not available free of charge). Less competition results in a lower number of this type of app, and a market failure to satisfy existing demand.

	Weather	Finance	Travel
Apple	60	60	60
Android	60	60	60
Ovi	45	50	50
Total	165	170	170
Grand total	505		

Table 5: Application sample distribution per category and per store

As a first analysis, we indentified the proportion of applications that were partially or totally based on PSI. The table below shows the percentage distribution of each in terms of the sample. Out of 500 apps in the sample, 40% were based on PSI data (full list of PSI-based apps from the sample in the annex). This result should be not treated as representative of the whole market.

	Weather	Finance	Travel	All
Apple	100%	12%	20%	40%
Android	100%	10%	12%	
Ovi	100%	0	2%	
Total	100%	8%	12%	

Table 6: PSI-based application percentage share of the sample

Firstly, weather apps and travel apps especially are built on PSI (100% of weather apps use some form of PSI data; travel apps do not use PSI predominantly). However, other popular mobile applications, such as social, shopping or entertainment apps, rarely use PSI data. Secondly, to see how popular the PSI-based apps are, we analysed the number of

downloads in the Android Market sample (as this is the only platform that provides information on the number of downloads from its website). Other stores rank the most downloaded applications but without providing detailed data. See the figure below.

Percentage in the sample	Number of downloads
2%	5.000.000 - 10.000.000
7%	1.000.000 - 5.000.000
2%	500.000-1.000.000
18%	100.000-500.000
7%	50.000-100.000
18%	10.000-50.000
9%	5.000-10.000
29%	1.000-5.000
9%	500-1.000

Table 7: Number of downloads in Android Market

As can be seen, 43% of the sample belongs to the medium popular apps category (i.e. has between 10,000 and 500,000 downloads). The high popular apps have between 5.000.000 and 1.000.000 downloads and the low popular tend to have between 5,000 and 1,000 downloads. The apps that were downloaded more than half a million times belong to the weather category (i.e. WeatherBug, Radar Now, and AccuWeather which are all developed by US providers) and simple everyday apps in the finance category (Currency Converter or Exchange Rates). What is more, all of these most popular apps are free. Needless to say, the least downloaded apps in the sample were those that came with a price tag. To compare, the most popular application on the Android Market – Powerful Music Player for Android – which is a paid app – has been downloaded 100,000- 500,000 times. The most popular free app, Google Maps has been downloaded between ten and 50 million times. This evidently confirms the intuitive assumption that, in general, free applications experience many more downloads than the paid ones.

To see how many of these applications were free or paid, we compared all three of the stores.

PAID	Travel	Finance	Weather
Apple	33%	43%	37%
Android	100%	33%	47%
Ovi	0%	100%	38%
Total	55%	43%	42%

FREE	Travel	Finance	Weather
Apple	67%	57%	63%
Android	0%	67%	53%
Ovi	100%	0%	63%
Total	45%	57%	58%

Table 8: Paid and free applications per category and per store

As can be seen in all categories, free applications constitute more or less half of the sample. This differs from the overall, already-mentioned data that shows that the Apple store possesses 33%, and the Android Market 70%, of applications to be downloaded free. (Most probably, since small developers use PSI data that is available for free, their applications are also free or – in most cases – are offered in the freemium option: as both free and paid versions coexist, the sample splits half-and-half. Taking both these results together, the number of free or paid apps in the store do not correlate with the number of downloads.) In summary, there is an opportunity to leverage PSI for the apps market, because some of the most requested apps are PSI-based. However the revenue opportunities stemming from these apps are limited, as the most downloaded apps are free and provide very limited functionalities such as more user-friendly access to weather data. Revenue could come from apps which build on PSI, if it were integrated with other data and offer value-added services were implemented on top.

Thirdly, to assess the presence of European players, we looked at the country of origin of the PSI mobile app developers. The results are presented in the chart below.

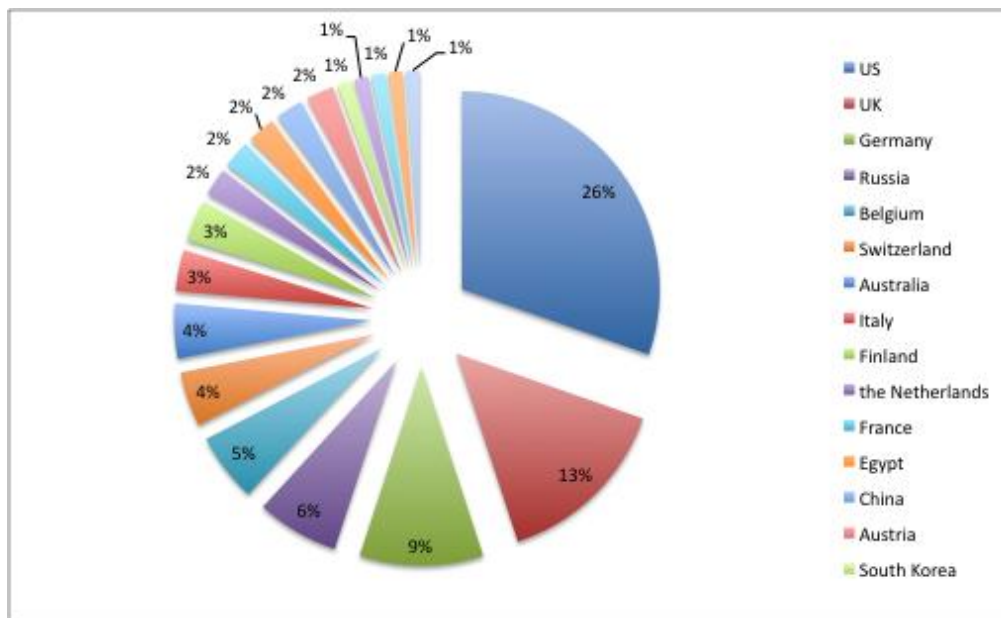


Figure 17: Country distribution in the sample

The apps developers' geographical distribution confirms the US lead in Europe (26% of apps) and the strong position of the UK (13% of apps). Other countries have less than 10% of the sample share. Among the countries with a strong visibility are Germany 9%, Russia 6%, Belgium 5%, and Switzerland and Australia with 4% each). Overall, about 60% of the apps in the sample are offered by European players.

Looking more closely at the sample, we can observe overall that applications are focused on a single data set, such as train or metro/underground timetables, meteorological forecasts, and currency exchange rates. Examples of these three types of apps include Currency Converter, Deutsche Bahn Navigator and Handy Weather.

There are also PSI-based data apps that offer a wide variety of data in the travel category (such as public transport timetables) which are linked with citizen-supplied data (for

example, restaurants' reviews, ratings of schools and other public services). For example, London Tube or Metro Paris add to the public transport timetables various additional points of interest. The Yelp app offers information, local information and reviews of local businesses.

Travel applications (which mostly use public transport timetables) are rarely provided by the actual data holders (railway companies such as SNCB in Belgium or Deutsche Bahn in Germany). Rather, they are provided by small companies that use the available data (which are either available as datasets) or have to "scrape" the data from the data holders' website – such as London Tube or Scheduler Poland. More information on this phenomenon is provided in the interviews with developers.

Weather applications are predominantly free: many applications are offered using the freemium model (i.e., a premium paid version and a free basic app). Premium versions give access to more detailed forecasts, more locations, geo-location and/or do not show advertisements. In Europe, since almost all data holders do not provide weather data free, many applications are either offered by B2B re-users who already have paid to have the data as they offer web-based and other paid services or by public data holders. Examples of the first approach include wetter.com, MeteoGroup, meteosolutions, ilmeteo.it or My Switzerland, Foreca, Windfinder, PreviMeteo. Examples of the second approach include the UK MetOffice or the Belgian IRM. In the US, the data are offered free by the National Oceanographic and Atmospheric Administration at <http://www.weather.gov/> website.

In the online public consultation on the PSI directive, one of the re-users⁴⁶ remarked that the free apps developed by independent developers either use primarily US data (and do not process European data, such as Swiss AeroWeather Pro at all, or use free weather API in its basic version available from <http://www.worldweatheronline.com/> (an example is Weather Right Now).

Geo-location (which form part of travel apps) and meteorological applications tend to cover more than one country, whereas public transport timetable apps use local data and rarely offer information on more than one city (e.g., London Tube focuses on England's capital and Metro Barcelona on the Spanish city).

Finally, the finance apps which predominantly offer currency exchange services are free, when they offer a basic service, and paid if they match it with more sophisticated data such as stock-exchange data and financial advice. There are built by small companies and individual developers.

⁴⁶ http://ec.europa.eu/information_society/policy/psi/index_en.htm

App contests

To see if the trend to develop mobile apps is also increasing in the open data community, the study team checked how many of the apps created during the five selected contests were mobile apps. The five contests chosen were Apps for Democracy – US, Rewired State – UK, Inca Awards – Belgium, Apps for Finland, and Nettskap – Norway). The result shows that 20% of the applications submitted were mobile apps (the rest were web applications). However, the most recent contests have received more mobile apps entries: for example, there was a slight increase between first and second edition of the Flemish Inca Awards. In addition, the US Apps for Democracy contest received almost 50% of the mobile apps entries: this is not a surprise given the US leader position on the mobile apps market.

Table 9: Apps contests

	Apps for Democracy	Rewired State (UK)	Inca Awards (BE)	Apps for Finland	Nettskap 2.0	Total
Number of entries	46	109	64	30	135	274
Number of mobile apps	21 (only for iPhone)	10	15	2	3 out of 17 winners	48
Percentage	45%	9%	23%	7%	17%	20%

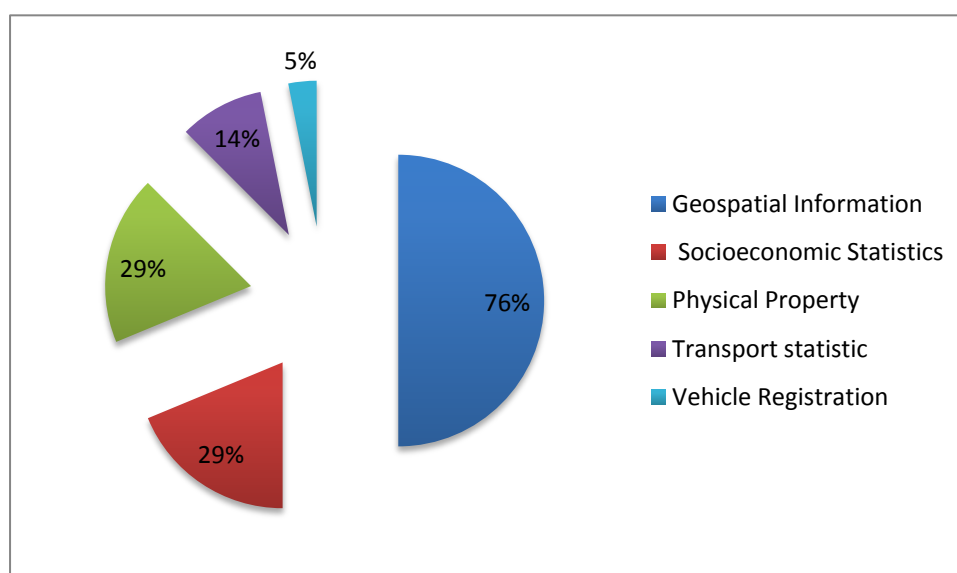


Figure 18: Type of PSI used by contest apps

Out of 11 types of PSI proposed by Pollock (2008)⁴⁷ only five types were found in the sample. Geospatial information predominated (76%). Socioeconomic statistics (crime data, for example) and physical property (both 29%) were also an important component of the sample alongside transport data (14%). Meteorological, hydrological and company information (such as business registers) were not used. One can therefore assume that, since weather apps are fairly well exploited on the business market, the entrants chose to focus on a different type of PSI.

First, as far as the different governmental services are concerned, the most popular mobile apps were built on top of the public transport services with the intention of facilitating travel (27%). Secondly, there were many apps linked to public order and safety, for example, which inform citizens of high crime areas (23%). Thirdly, 18% of the apps focused on housing and community amenities, informing users of council development plans or helping them to buy property in a convenient area.

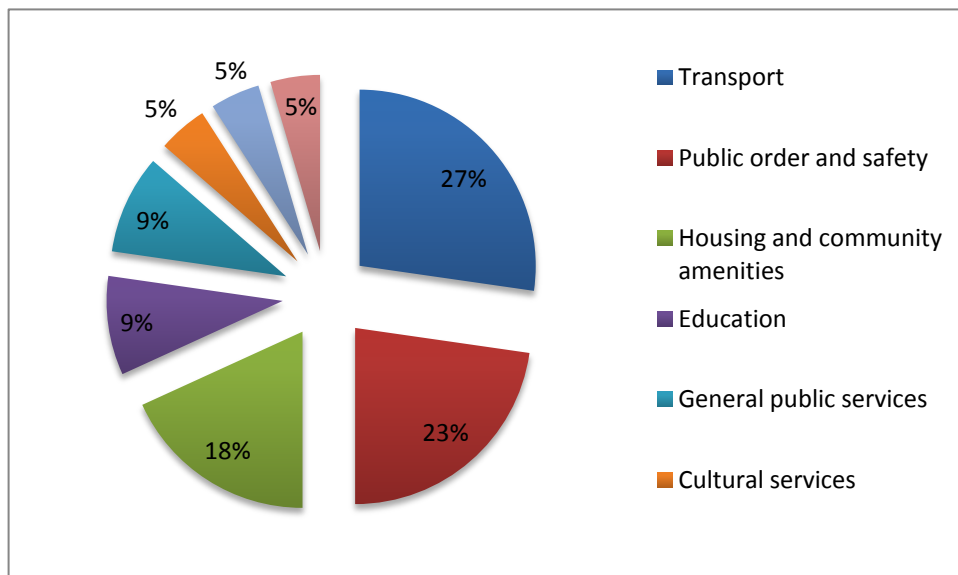
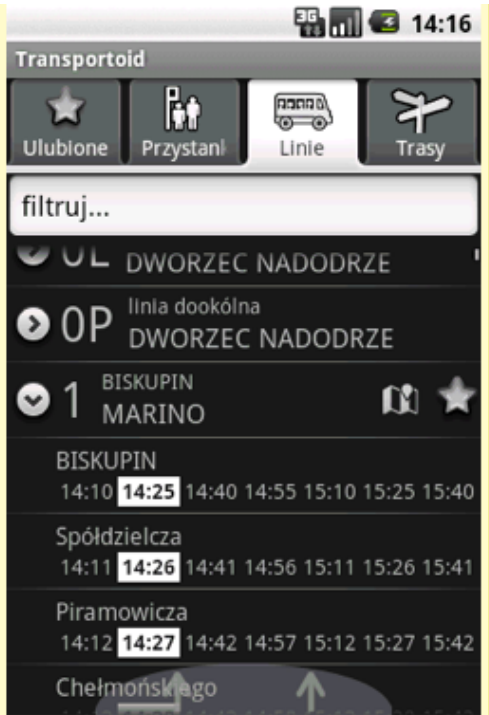


Figure 19: Type of government services apps refer to

⁴⁷ Company Information, Vehicle Registration, Physical Property, Intellectual ‘Property’ (patents, trademarks, etc.), Meteorological Data, Geospatial Information, Hydrographic Information, Socioeconomic Statistics, Environmental Data, Official Gazettes (official notices), Transport statistic (source: Pollock 2008)

Drivers, barriers and business models

The final part of this exercise was aimed at gathering a more qualitative view of the PSI-based app market. Five apps developers were selected. Four app developers from different sectors were chosen from the app stores sample, two were transport apps developer, one a weather app developer and one the developer of an application providing information on fuel prices⁴⁸. The fifth developer was a company which won one of the Nettskap 2.0 app contest awards.

Transportoid	Developer: Tomasz Zieliński FTL Software
Travel app	Poland
 <p>The screenshot shows the Transportoid app interface. At the top, there are navigation icons for 'Ulubione', 'Przystani', 'Linie', and 'Trasy'. Below this is a search bar labeled 'filtruj...'. The main content is a list of transport stops with their names and scheduled times. The first stop is 'DWORZEC NADODRZE' with a 'Linia dookólna' and a '0P' icon. The second stop is 'BISKUPIN MARINO' with a '1' icon. The third stop is 'BISKUPIN' with a '14:10' icon. The fourth stop is 'Spółdzielcza' with a '14:11' icon. The fifth stop is 'Piramowicza' with a '14:12' icon. The sixth stop is 'Chelmońskiego' with a '14:13' icon. The times listed are 14:25, 14:40, 14:55, 15:10, 15:25, 15:40 for Biskupin; 14:41, 14:56, 15:11, 15:26, 15:41 for Spółdzielcza; 14:42, 14:57, 15:12, 15:27, 15:42 for Piramowicza; and 14:43, 14:58, 15:13, 15:28, 15:43 for Chelmońskiego.</p>	<p>Short description</p> <p>Mobile app for Android which is the equivalent of an app for iPhone (Scheduler Poland) developed by another developer. It offers public transport schedules for around 40 cities in Poland. The app recently reached final stage of the Labstar⁴⁹ contest which gives start-ups access to venture capital and expert advice</p> <p>The developer also attempted unsuccessfully to obtain access to meteorological data in order to build a simple mobile weather widget. However, the data holder was not interested in giving free access to the data (in its view, giving access to data for free hampers its own business model).</p>
<p>Business model: free download but with possibility of in-app purchases which gives access to premium features (such as geo-localization of public transport stops and advanced searches), it necessitates a yearly fee of around 2.5€.</p>	
<p>Number of Downloads: 35,000 downloads up-to-date. 1,200 subscription holders via in-app payments (which gives a revenue of around 3,000€ per year)</p>	
<p>PSI used</p> <p>The application uses freely available public transport scheduling times and geo-localization of public transport stops (where possible).</p>	
<p>Drivers and barriers</p> <p><u>Apps market</u></p> <ul style="list-style-type: none"> As this free app requires necessary up-dates and fixes, the developer decided to base its business model on a monthly subscription fee to cover 	

⁴⁸ Not all respondents agreed to reveal the name of the app or the name of their company.

⁴⁹ <http://labstar.wp.pl>

those costs. According to the interviewee, the unique price for the app download model does not guarantee sufficient revenue to cover the costs of the app maintenance. Still, given the number of subscribers, the app brings a turnover of 3,000 € per year.


- What is more, the app will probably be further developed thanks to receipt of venture capital money and expert advice in mobile commerce (this provides the developer with resources to work on further advances and probably to change the business model).
- The app proved to be a formidable way to gain visibility vis-à-vis investors.

PSI availability

- Most of the Polish public transport carriers or public bodies in charge of public transport do not make raw datasets available (the exceptions are the municipalities of two major Polish cities, Wroclaw and Warsaw⁵⁰). Therefore, the developer is scraping together the data directly from the carriers' websites by using bots.
- The partial non-compliance of Polish public bodies with the PSI directive (due to the limited transposition of the directive) might be seen both as a driver and barrier for mobile apps developers⁵¹. The absence of rules and licenses allows for the re-use (given the data are available for free on public bodies' websites) but does not enable the development of real business models as the rules might be changed without any notice.
- Lack of PSI re-use possibilities and laws among the PSBs allows developers to freely use the PSI available (even if not in a very convenient form). Probably due to the immaturity of the market, none of the public transport data holders have developed a mobile app of their own. Nevertheless, according to the interviewee, most of the public carriers are either indifferent to or supportive of its initiative.
- Furthermore, the lack of raw data availability seriously hampers market growth. This is because these transport applications do not process the raw data available on PSBs' websites but are based on scraped html schedules or even on app clients' information: these clients help to add further cities to the app by digitalizing paper versions of transport schedules in smaller cities.

⁵⁰ Warsaw public transport company (ZTM) has recently introduced changes in its licensing policy that allows use of its data for non-commercial purposes only.

⁵¹ <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1524&type=HTML>

London Tube , Métro Paris	Company: Presselite, Antoine Morcos
Paris / London transport apps	France
 <p>The image shows two side-by-side screenshots. The left screenshot is a digital map of the London Underground (the Tube) with various lines and stations labeled, such as Warren Street, Regent's Park, Oxford Circus, Green Park, and Piccadilly Circus. The right screenshot is an augmented reality view of a Parisian street scene. It features virtual black signs with white text and colored circles, indicating metro lines and distances. One sign says 'Opéra 63m / 0.039miles' and another says 'Auber 331m / 0.218miles'. The background shows real-world buildings and people on bicycles.</p>	<p>Short description The iPhone and iPad <i>London Tube</i> app offers metro schedules and official subway maps. Selected as one of the top 10 best applications by telegraph.co.uk.</p> <p><i>Métro Paris</i> offers similar options. The app was the fifth most downloaded application in France since the launch of the App Store.</p> <p>The company has so far developed more than 50 apps (these are mostly transport apps in different cities replicating the model of the two apps described above and some weather widgets).</p>
<p>Business model: paid, 0,99\$ per app, buses schedules and geo-localized points of interest through augmented reality available through app-in purchases.</p>	
<p>Downloads: 400,000 downloads, London Tube – 250.000. It is difficult to estimate the revenues from these apps due to in-app purchases. However, those two apps only, even after deduction of 30% revenue for the app store, have given around 300,000€ of turnover over the last three years.</p>	
<p>PSI used</p> <ul style="list-style-type: none"> • Transport for London (TFL) public transport data available for free via London DataStore and paid license for using the metro map purchased from TFL. • Île-de-France RATP public transport data and metro: map through a paid license 	

Drivers and barriers:

Apps market

- Price for the app combined with in-app purchases enables the company to employ 2FTEs and subcontract a number of other activities. Apart from its most popular apps, the company developed a couple of dozen other apps (mainly transport and weather apps). The applications have so far yielded a stable revenue (30% of the revenue is used for development and application maintenance).

PSI availability

- The developer pointed to the differences in approach between English and French data holders, i.e. London TFL and Parisian RATP. The London data holder makes its data available for free via the London DataStore and sells the license for using the Metro Map for an acceptable price. On the other hand, according to the interviewee, since development of its own application, RATP has changed the price of its license prohibitively and now demands royalties from the app sales.
- In the company's view, the biggest barrier to the PSI-based app business is data holders who are trying to enter the market by developing their own applications and are changing the rules of their data re-use in order to privilege the market position of their own applications. In other words, the situation on the PSI market is far from stable: this lack of stability seriously hampers app developers' possibility to innovate.

App developing company
Weather app developed for a PSB
<p>Short description</p> <p>The company has developed already more than 100 mobile apps for different platforms (iPhone, iPad, Android). Most of the apps are the internal apps for business clients (in-house apps), news media (magazines) or culture sector apps (concerts).</p>
<p>Business model</p> <p>A very small share of the company's revenue are the result of mobile apps directly sold at app stores. Most of the revenue is yielded by developing apps for clients who sell them to end users or use them internally. The PSI-based application was developed for one of the European meteorological offices and is available for free in app stores.</p>
<p>Downloads: Three million downloads have occurred for all the apps developed and sold in app stores. The most downloaded application (a newspaper app) has already had 100,000 downloads.</p>
<p>Drivers and barriers:</p> <p><u>Apps market</u></p> <ul style="list-style-type: none"> For the company, its stable business model is based on the development of internal apps and not app stores sales, as the latter do not guarantee a regular profit. <p><u>PSI availability</u></p> <ul style="list-style-type: none"> The company does not have much experience with PSI data as it has only developed an app at the request of one of the data holders. Moreover, the company does not see a real business opportunity in app stores sales. <p><u>Rapid innovation</u></p> <p>The interviewee underlined the importance of time-to-market and app efficiency for the mobile app market. This opinion was confirmed by other developers surveyed by IDC and Appcellerator⁵² who underlined the importance of the speed of the development and update cycles in a market that is undergoing so much innovation in the three areas of operating systems, hardware and rising app production.</p>

⁵² <http://www.appcellerator.com/company/survey-results/mobile-developer-report-january-2011/>

Independent developer

Comparison of fuel prices

Short description

The application offers information on fuel prices and geo-localizes petrol stations. The developer exchanged its free application for a paid app at the moment when the PSI data became the subject of a governmental license. As the license is very expensive, the developer uses the license bought by a third-party in exchange for royalties.

Business model

Paid app (1.59€). So far, the developer has developed three very popular apps. Nevertheless, the revenue is not sufficient to start up a company (as the revenues are shared with the license holder) and the activity is treated as an add-on the developer's full-time job.

Downloads:

30-40,000 downloads (the interviewee estimates that due to the existence of pirate versions of the app, the number of applications actually installed on smartphones should in fact be doubled. The turnover is therefore around 35.000€ over the lifetime of the app (30% of the revenues goes to the app store).

Drivers and barriers

Apps market

- Given that the governmental license is subject to a yearly fee, one of the important barriers for the developer is the current business model based on the initial app purchase price. The yearly license contradicts the single payment principle of the majority of apps available on app stores as it requires a stable number of new clients to download the app in order to maintain the service and gain profit.

PSI availability

- The change of the particular government's fuel data policy has forced the developer to replace a free app with a paid version. The PSI-based commercial and free apps developers are dependent on the data holder's decisions and cannot plan their revenues and growth accordingly.
- What is more, in Europe, the geo-location data needed for most of the PSI-based maps are predominantly paid apps. In the interviewee's view, there is a need for a good alternative solution. Even if the Open Street Map (a free wiki map) is still in its development phase⁵³ (it offers similar

⁵³ <http://www.openstreetmap.org/>

possibilities to Google maps), it should be considered as a good alternative to locked-up PSI data.

<p style="text-align: center;">Computas David Norheim Chief Engineer Manager Open Data focus area</p>	<p style="text-align: center;">Norway</p>
<p>Short description</p> <p>This is an example of a consulting company that has so far developed apps for research purposes (without publishing them on any app store). The company does not consider developing apps as its core business. Computas was among the 17 winners of the Norwegian app contest - Nettskap 2.0. It entered a project to the contest that involves a web and mobile application (Borgerkanalen – Civil Canal) and received 25.000€ support to develop it. This Fix-my-street type app allows users to inform government agencies and municipalities of problems through a mobile application and also gives users access to news about current public events in the area. The service thus combines user-generated data and public open data. Moreover, the company is responsible for the development of the Norwegian Open Data Portal - data.norge.no. Computas employs 300 FTEs. For the last six years, it has been focusing on open data and linked open data projects.</p>	
<p>Barriers and drivers</p> <p><u>Apps market</u></p> <ul style="list-style-type: none"> • The current apps market business models make difficult to generate revenue. Until more important data sets (geo-location) are released, apps are not considered as an important revenue stream. • As the PSI data are offered for free, app users do not see why they should pay for the app itself. Therefore, in order to persuade the clients to pay for them, the apps should integrate more than one dataset and create added-value, e.g. by helping to make sound environment-friendly decisions. <p><u>PSI availability</u></p> <ul style="list-style-type: none"> • Most of the Norwegian public bodies release their data for free. An example is Yr.no (the Norwegian Meteorological Institute). However, there are some agencies that do still charge for data re-use, e.g. the Mapping Authority (Statens Kartverk) or Brønnøysund Registry Center. These different pricing models privilege some type of PSI-based applications and hamper the growth of others. • Even if the agencies are obliged to publish their data in raw formats unless they have substantial costs associated with it, only around 100 datasets are available so far. There is no political will due to the weak position of the Ministry that is in charge of PSI that does not impose stricter rules on data holders. Moreover, the civil servants who are dealing with re-use requests are afraid of losing their jobs once the data is released for free online. Finally, Norwegian political will is not coupled with additional budget to open up the data. • The main driver for the mobile app market based on PSI remains pressure from ICT associations, grassroots movements, data journalists and app developers. 	

Summary

The interviews with apps developers captured a profile of a variety of PSI-based apps, different business models and a range of company sizes.

Nevertheless, the analysis based on the five separate interviews indicates that the prevalent business model is a unique price for the app. One of the companies involved in the study, however, shows that stable revenues can be rather obtained as a result of developing apps for business customers rather than selling directly to end-users.

The cross-analysis of barriers and drivers voiced by the developers interviewed, shows that, as far as the apps market is concerned, the unique price per app download does not guarantee high revenues. Revenues vary from 3,000€ to around 50,000€ per year (which is still far more than the median app revenue of 700\$ mentioned earlier in this report). Therefore, some developers add in-app purchases, advertisements or offer additional services in exchange of a yearly fee to their offer. Still, revenue is highly conditional on the number of downloads due to the top-heavy characteristics of the app market.

The issue of PSI availability is linked to several barriers to PSI-based apps. First of all, since some of the PSI data is given for free, end-users are reluctant to pay for an app that just offers access to a single type of data. In accordance with the overall trends on the app market, PSI apps have to offer more than simply one type of PSI and they have to have created some form of added-value in order to persuade customers to pay for the service.

Moreover, apps that are based on paid PSI encounter serious problems. This is because the unique price per app model is in conflict with yearly license fees. The shelf-life of an app is also, by itself, limited. This is why developers will have to look for additional revenue streams in order to make a service profitable in the long run. The high licensing fees of some PSI make it difficult to create profitable apps, hence, developers choose an open alternative (as in the example of geo-location data such as the OpenStreetMap project⁵⁴).

Furthermore, according to the interviewees, the PSI app market is hampered by those data holders who decide to develop their own apps. This is for two reasons. First of all, the data holders are able to offer the apps for free or for a very low price. Second of all, they often decide to change the rules of PSI re-use in order to protect their own apps on the market.

In general, changing PSI re-use rules was quoted as one of the biggest barriers to the PSI-based app market growth (re-use companies could not develop stable business models since they rely so heavily on PSI pricing and its rules).

On the contrary, what drives the PSI-based app market, according to the developer interviewees, are the stable rules of PSI re-use and free access to raw data. These conditions are related to the efforts of ICT associations, grass-root open data movements, data-journalists and app developers themselves.

⁵⁴ <http://www.openstreetmap.org/>

5 Mobile and web applications based on open data portals data

This section presents a snapshot of mobile and web applications based on PSI data. These are a selection of the most successful examples of take-up, business-wise. Even if this evidence needs to be taken with a grain of salt, these applications are the results of numerous try-outs and set-backs. Therefore, their success has more than just anecdotal value as it shows that there are already some growing businesses based on PSI data and that some first market effects can be measured.

5.1 My City Way

One of the winners of the “Popular Choice” award during the first edition of NYC Apps contest, My City Way iPhone app was transformed into a successful company. The company started with Sonpreet Bhatia, Archana Patchirajan and Puneet Mehta, who were all former Wall Street executives who were unable to find a comprehensive and trustworthy local information hub. After receiving \$US 300,000 seed funding from New York’s Entrepreneurial Fund, they got a further \$US 1 million from IA Ventures and FirstMark Capital⁵⁵. Recently, BMW invested \$US 5 million in the company and the partnership⁵⁶.



Figure 20 My City Way NYC

The app is already available for 40 different cities, provides information on restaurants, points of public interest, public toilets, traffic, parking and public transport. The application

⁵⁵ <http://gigaom.com/2010/11/19/mycityway-dives-into-data-comes-up-with-gold/>

⁵⁶ http://www.bmw-i.com/en_ww/mobility-services/

has had more than a million downloads in its first year (2010) and expects to hit the 15 million-download mark next year⁵⁷ (to compare the most popular mobile app – Angry Bird game hit 50 million downloads in 2010 already⁵⁸). It contains many smaller applications featured on a platform, giving access to a plethora of local information and services. It is also links to many social networks (such as Facebook, Foursquare, Twitter).

The app is offered free across platforms, and its business model is based on partnerships with local business that offer services ranging from hotels booking to purchasing movie tickets. The revenues come from highly targeted local ads and revenue shares from hotel booking, movie tickets, tour booking, restaurant reservation and deals. The company employs already 10 people in USA and about 40 people in India⁵⁹.

This application proves that a good match of public data (public transport, restaurant sanitary and safety inspection reports, parking spaces), citizen data (restaurant reviews), links to social networks and various booking possibilities makes the applications much more attractive to end-users than a simple application that provides local public data. Moreover, the business model based on well-targeted local advertisements coupled with shares of tickets sales (services) can ensure a stable revenue. Finally, the venture capital permits the company to grow and experiment with services and business models.

5.2 London Tube & Métro Paris – European examples

iPhone and iPad London Tube apps created by Elitepress offer metro schedules and official subway maps. The London Tube was selected as one of the Top 10 best applications by Telegraph.co.uk. Métro Paris was the fifth most downloaded application in France since the launch of the App Store. Thanks to their success, the company replicated the same apps to cover other major European cities and to try to expand into the US.

The app costs \$US 0.99 per download. Moreover, through app-in purchases it offers buses, maps and schedules and geo-localized points of interests through augmented reality. Métro Paris has so far had 400,000 downloads and London Tube 250,000. It is difficult to estimate the revenues from these apps due to possibilities of in-app purchases. However, these two apps – only after deduction of 30% for the store – gives around € US 300,000€ of turnover during the last three years.

⁵⁷ <http://techcrunch.com/2010/10/23/the-goldmine-of-opportunities-in-gov-2-0/>

⁵⁸ http://articles.economictimes.indiatimes.com/2011-01-17/news/28424574_1_angry-birds-rovio-mobile-mn-downloads

⁵⁹ <http://www.yourstory.in/entrepreneurs/women-entrepreneurs/5600-archana-patchirajan-a-sonpreet-bhatia-mycityway-mobile-platform-for-urban-exploration-and-discovery>



Figure 21: Metro Paris app

In this case, the revenues are based not only on a unique price for downloads but also on additional services. The applications offer also new services, not necessarily based on public data – points of interests which add added-value to public data.

5.3 Bright Scope – digging through public data

The BrightScope web application (www.brightscope.com) provides retirement plan ratings and investment analytics using US government data on retirement plans. (401(k) plans). The founders of the company gathered the data by undertaking more than 50 Freedom of Information Act requests and amassing a large number of paper records. After a successful lobbying campaign they also received the data in digitized form⁶⁰. The application compares different retirement plans showing the costs and future revenues. Whereas the web app is free for individual users, the company charges companies a licensing fee for added-value services linked to data on 401k plans. The company gained \$US 100,000 in revenue in 2009 and it was expected to earn \$US 3 million in 2010 to achieve profitability. The revenues for 2011 are foreseen to hit the \$US 10 million mark⁶¹. Recently the portal also offered the Financial Advisors rating. At the 2010 Gov 2.0 Summit, one of the companies founders, Mike Alfred, claimed to have raised a capital of \$US 53 million and to have created 30 jobs.

⁶⁰ <http://radar.oreilly.com/2010/11/the-story-of-brightscope-data.html>

⁶¹ <http://wadhwa.com/2010/10/25/the-goldmine-of-opportunities-in-gov-2-0/>

Figure 22: BrightScope web app

The success of this application confirms the importance of the hidden value of the data and presence of market niches that are yet to be explored by open data developers.

5.4 Husetsweb

One of interesting and economically viable applications based on public sector information is the Danish Husetsweb (www.husetsweb.dk). It uses the Danish Building and Housing Register (BBR) data coupled with Totalcredit and Rockwool (provider of insulating materials) data on heating sources and potentials for improvements. It offers a user-friendly tool for homeowners to assess and optimize their energy consumption. The application prompted the creation of the Husets Web ApS company.

Figure 23: Husetsweb web app

Application generates profit by charging municipalities for use of the calculation tool website as part of local energy conservation campaigns. After receiving the prize of 100,000 DK in an app contest organized by Danish government, the founder received support from

Business Kolding, an NGO from the municipality of Kolding. According to the company director, "The solution is already in use and is also of great interest to municipalities, energy companies and the construction industry. The total potential for energy savings for Danish homeowners is sizeable – about DKK 4.2 billion annually – if everything is done in the right way. It will however take some years before such a potential has been realized by everyone⁶²..

The web application proves once more the hidden value of public data and the added-value of services that are matching different PSI and non-PSI sources to offer advice to users or customers.

5.5 Sustainability of app contests apps – a counterexample

The four examples presented above have shown very profitable and innovative services based partly or wholly on PSI data. Nevertheless, the overall open data applications take-up numbers also indicate important problems related to government data and apps' sustainability.

First of all, one cannot forget that games apps are responsible for majority of all app downloads (60% according to NielsenWire survey) and 80 percent of paid Android apps downloaded fewer than 100 times. Furthermore, most of the profitable PSI-based applications are using one and the same data type – transportation or weather data. Moreover, the apps based on PSI have to be overtly useful⁶³ for citizens in their daily life– they have to be more social, more local and real-time). What is even more important is that they are based on a business model that guarantees its sustainability. Otherwise, even if a service is awarded a prize in an app contest, the developers tend to discontinue it after a short while (a government technology web-based article from May 2011 presents four cases of award winning apps that were closed down or are no longer updated – Park It DC, iLive.at, TransiCast and Stumble Safely⁶⁴).

Yet, the review of the applications shows that transport data seem to be of a very high market value. Moreover, matching local data (including public transport, parking spaces and traffic data) with citizen- and business-provided data results in a higher added value of proposed service. Furthermore, the unique price for app can be complemented with in-app purchases or replaced by advertisements and shared revenues from additional services such as bookings, company's advice or public support. Finally, the success of applications using new sets of data (from our examples – retirement plans reports and house registers) confirms the existence of the hidden value of the data and the presence of market niches that are yet to be explored by open data developers. What is more, it underlines the need to release data that have not been evaluated as useful for re-use by the public administration.

⁶²www.ambathen.um.dk/da/menu/Klima/DagligArtikelOmKlimaOgMilj%C3%B8/SmallITfirmfromFunenwinsawardforenergycalculator.htm?printmode=True

⁶³ <http://www.governing.com/columns/tech-talk/Government-Apps-Move-from.html>

⁶⁴ <http://www.govtech.com/e-government/Apps-Contest-Winners-Need-Better-Government-Data.html?page=3>

Nevertheless, the sustainability of PSI-based apps remains a very important issue. To monetize PSI-based apps, the governments should open up more and different kinds of data in order to stimulate novel, innovative services, as is shown by the two examples of BrightScope and HusetsWeb. Still, it is also up to developers to point out where lies the hidden value of government data⁶⁵ and advocate to open up these data.

⁶⁵ <http://www.govtech.com/e-government/Apps-Contest-Winners-Need-Better-Government-Data.html?page=2>

6 Conclusions

6.1 App market – an overview – size, key players and business models

Impressive app stores leaders' success

The soaring growth in the number of apps, downloads and app stores revenues prove that the mobile app market is becoming stable and a mature business at least for market leaders - Apple and Android. The European mobile app market is expected to be in the lead by 2015 with a 30% share of the global market estimated at US\$ 32 to 35 billion⁶⁶. Android and Apple (with US\$ 100 million and US\$ 1.8 billion revenues in 2010 respectively) are and will remain the key players on the app store market. The leading positions of the two companies are based on the high numbers of Apple iPhone sales (expected to reach 15.7% of the smartphone market in 2011) and the widespread presence of the Android system on different smartphones types sales (it is expected to possess 39.5% of the market in 2011). Nevertheless, the widespread availability of the Android system makes it more difficult for developers to create apps across platforms. Therefore, even if the sales of Android devices were to exceed all others, over the past six months developers' interest in both the Apple's iOS platform and Google's Android platform has remained unchanged. Finally, both stores applied similar revenues repartition system. Thirty percent of revenues from the App Store go directly to Apple, and 70% go to the seller of the app, Android Market gives the app developers the same 70% of the application price and the 30% is shared among carriers and payment processors.

High app downloads numbers and app store revenues do not have much impact on employment growth in the sector

Nevertheless, the concentration of downloads amongst the most popular apps, the predominance of free apps in the top downloaded (81% of all downloads according to Gartner) as well as low number of applications per developer seem to prove that the business is not that interesting when it comes to mobile app developers. The price of mobile apps is expected also to decrease from the current average of two US dollars per app to 1.5 dollars in 2012⁶⁷. This does not inhibit the number of apps from increasing rapidly. However, interviews with app developers show that the job of app developer remains as a rather "add-on activity" or an additional revenue stream for companies. The case of a successful mobile company interviewed for the purposes of the study indicated that much more revenue might be gained by developing internal apps or selling apps to clients that already know their target audience.

In the case of PSI-based apps, the example of a Norwegian developer company supports this conclusion: it suggests that users are reluctant to pay for simple PSI apps. As a result, more research on innovative added-value services in this mobile app sector should be carried out. Thus, even powerful revenue and download figures do not have a real impact on employment growth in the software sector.

⁶⁶ <http://www.marketsandmarkets.com/Market-Reports/mobile-applications-228.html>

⁶⁷ <http://mashable.com/2010/03/17/mobile-app-market-17-5-billion/>

More social, more local and more real-time information

The recent overall market trends show that new apps will be more complex and will be based on different sorts of datasets and features. Moreover, consumers need real-time information that is delivered locally, hence the perceived popularity of apps which have geo-localization options (maps, navigations and search⁶⁸). The last important trend is the popularity of social apps that offer enhanced value based on a deeper user engagement that drives additional and sustained usage over time⁶⁹. This leaves more space for mobile commerce and paid add-ons.

6.2 Potential of the PSI-based apps and its share on the market

Big potential of PSI-based mobile app market

PSI applications may already possess a large share of the total apps market as weather data (55%) and some maps or search apps (50%) are based on PSI databases. However, Google maps and the OpenStreetMap project compete with a lot of success with geo-location data held by PSBs (most often the latter comes at considerable cost). Still, these results show the potential of this type of data. We have observed the considerable importance of finance/banking apps (28% of the sample) and travel apps (20%) that also rely on PSI data. This shows that the app business is based not only on games and social applications but can also be driven by applications using PSI data, even if partially.

Only few of the PSI data types are currently explored by apps

Out of the eleven types of PSI information proposed by Pollock (2008)⁷⁰, some are very rarely or never used (these include company information, intellectual property, and official gazettes). Other are often exploited (such as meteorological and hydrographic data or transport data). The apps offered on the market are predominantly built on meteorological and transport PSI data. These exploit only infrequently the PSI geospatial information that is in the possession of PSBs (instead, they use Open StreetMap or Google maps APIs). The former, such as weather data, are already available in public open repositories in Europe or the US.

Apps contests show the hidden value of less commercially explored PSI data

The apps built for apps contest far more often use socioeconomic statistics, environmental data or physical property (the last is very popular in Apps For Democracy contests). There is thus a difference between what is offered on the commercial markets and what the open data community puts forward when open data camps or app contests are held. This shows the rather different needs of consumers and the more citizen-focused ideas of apps contest.

Nevertheless, there are examples of apps written for apps contest that have achieved a real success. The [My City Way](#) app, winner of the first edition of NYC Apps contest, was developed in a growing company that is in a partnership with BMW. The app is already

⁶⁸ http://blog.nielsen.com/nielsenwire/online_mobile/games-dominate-americas-growing-appetite-for-mobile-apps/

⁶⁹ <http://www.appcelerator.com/company/survey-results/mobile-developer-report-january-2011/>

⁷⁰ Company Information, vehicle registration, physical property, intellectual property (patents, trademarks, etc.), meteorological data, geospatial information, hydrographic information, socioeconomic statistics, environmental data, official gazettes (official notices) and transport statistics.

available for 30 different cities, provides information on restaurants, points of public interest, public toilets, traffic, parking and public transport. The application had more than a million downloads in its first year of availability (2010) and it expects to hit the 15 million download mark in 2011. It is a good example of an application that is now popular and copied in the market (that provides matching citizen, business and public-data, and is real-time and local).

App contests reveal the hidden potential of PSI and may trigger more interest from the business sector. Far more than open data catalogues full of lists and tables, for citizens, they really do they show the potential uses of PSI.

Weather apps market are dominated by large re-users and data holders

The distinct popularity of weather applications has resulted in a cornucopia of available apps (1,640 apps in the three app stores under study). In Europe, however, almost all data holders do not provide weather data for free. Therefore, many applications are offered by re-users who have already paid to obtain this data. These re-users offer other web-based and paid services and therefore are able to pay for the data license and can offer its application for free in the basic version. Examples include wetter.com, MeteoGroup, meteosolutions, ilmeteo.it or My Switzerland, Foreca, Windfinder and PreviMeteo.

What is more, the data holders also provide some mobile applications. An example is the British Meteorological Office free application that was selected as one of top 500 apps in the Science and Weather category by the UK's Sunday Times⁷¹. The Belgian l'Institut Royal Météorologique also provides its app free of charge.

Small developers are therefore less prominent in this category as they do not have the capacity to pay for the data license. Albeit, there are other ways to build an app based on weather data for Europe. In the US, the data is offered free by the National Oceanographic and Atmospheric Administration website at <http://www.weather.gov/>. So, free apps developed by independent developers and small companies primarily use this data source and do not process European data (e.g. Swiss AeroWeather Pro) or use free weather API (in its basic version) available from <http://www.worldweatheronline.com/> (e.g. Weather Right Now).

This situation must have economic consequences, since it hampers the development of more complex and innovative weather apps. A Peter Weiss study from NOAA estimated, in 2002, that Europe invests 9.5bn€ in weather data and receives around €68 billion back in economic value (from more efficient farming and construction decisions, to better holiday planning). This is a seven-fold multiplier. The United States, with twice as much investment (€19 billion) manages to obtain a return of €750 billion, a 39-fold multiplier⁷².

⁷¹ <http://metofficeneews.wordpress.com/2011/02/20/met-office-iphone-app-makes-it-into-the-sunday-times-top-app-list/>

⁷² <http://www.ft.com/cms/s/2/cd58c216-8663-11d9-8075-00000e2511c8.html#axzz1L6bQ5ELn>,
http://www.epsiplus.net/psi_library/reports/borders_in_cyberspace,

6.3 Success factors and barriers to profitable use of PSI for building apps

To sum up, the data holders who still charge for PSI tend to develop apps and give them away for free. This can be seen in the case of meteorological data and some public transport data: the app developed by the Metro Paris app developer, for example, is now competing with the data holder's own app. This market approach stops or hampers development of commercial and non-commercial apps built by third parties.

On the contrary, making the data easily accessible, as it is the case of TFL London, for example, results in a variety of different apps that successfully compete on the market. As end-users are reluctant to pay for freely available information, app developers still offer them a choice between free and paid apps (the latter have some form of enhanced value). Therefore the benefits for end-users are higher in terms of paid apps.

Changes in the business model

The overall analysis identifies that the prevalent business model is still a unique price for the app. Evidence from one of the developer companies interviewed in the study indicates that stable revenues can rather be achieved by developing apps for business customers and not directly from end-users. The unique price for the app download does not guarantee steady revenues given the necessary updates, fixes and monthly costs. Even if the app developers under study make between €3,000 to around €50,000 per year, this is still far more than the median app revenue of \$ US 700 mentioned earlier in this report. Still, the revenue is highly conditional on the number of downloads due to the top-heavy characteristics of the app market.

As a result, a trend that is more and more visible on the market⁷³ is that the developers are looking for additional sources of revenues, such as advertisements and in-app purchases. The example of the Presselite company (which produces the Metro Paris and London Tube apps), interviewed during the study, shows that add-ons such as points of interest in augmented reality or additional bus schedules in the metro app might yield satisfactory monetary results.

Moreover, apps based on paid PSI encounter serious problems. This is because the unique price per app model is in conflict with yearly license fees. The shelf-life of apps is also somewhat restricted. This is why developers have to look for additional revenue streams in order to make such services profitable in the long run. The high licensing fees of some PSI make it difficult to create profitable apps. Hence, developers choose an open alternative (as is the example of geo-location data such as the OpenStreetMap project⁷⁴).

Changing rules of the PSI market

The changing rules on the PSI market, due to new licensing fees or commercial use agreements, has a serious impact on the apps market. Three of the interviewees experienced changes introduced by data holders that forced them either to change the app's business model (i.e. introduce a paid version of the app as was the case of the fuel prices app) or cut their app revenues significantly (which affected Presselite). The Polish

⁷³ <http://www.marketsandmarkets.com/Market-Reports/mobile-applications-228.html>

⁷⁴ <http://www.openstreetmap.org/>

example (Transportoid app) is slightly different due to a lack of re-use regulations in Poland. However, it still resulted in pushing the developer to pursue alternative approaches in order to acquire the necessary, basic, underlying data. In general, changing rules in PSI re-use were quoted as one of the biggest barriers to PSI-based app market growth by the interviewees. The companies were unable to develop stable business models as they rely heavily on PSI pricing and PSI pricing rules.

Difference in PSI pricing across sectors

The interview with the Norwegian developer is a reminder that the difference in pricing models between sectors enhance the growth of some types of PSI-based applications and hamper the growth of others. Hence, there is a lack of apps based on business registers and cadastral data in Europe. This results in the situation that the majority of apps are based on Open Street Maps or Google Maps APIs. As the licenses for PSI-based geospatial data are very expensive, they are much higher than the prospective revenues from selling apps that could make use of this data, even in the case of most popular mobile applications. Therefore, even though the data are already in the possession of governments, the Open Street Map attracts many volunteers who are willing to build an alternative solution to the situation of PSI data lock-in.

If data are free why pay for an app?

Since some of the PSI data are given away for free, users are reluctant to pay for an app that only offers access to one type of data. In accordance with the overall trends on the app market, the PSI apps have to offer more than a single form of PSI and need to create added-value to persuade their customers to pay for the service.

Data holders entering the app market

The PSI app market is often distorted by those data holders which decide to develop their own apps. First of all, they are able to offer them for free or for a very low price. Second, they often decide to change the rules of the PSI re-use in order to protect their apps.

Need for stable PSI reuse rules and easy and free access to raw data

On the contrary, what drives the PSI-based app market, according to the developer interviewees, are the stable rules of PSI re-use and free access to raw data. These conditions are related to the efforts of ICT associations, grassroots open data movements, data-journalists and app developers.

Rapid innovation

One of the drivers of the app market is the ability to innovate rapidly. Rising app production combined with a high level of innovation in both operating systems and hardware requires a very short time-to-market and an increasing efficiency in apps. This opinion articulated by one of the companies interviewed, and confirmed by other developers surveyed by IDC and Appcellerator,⁷⁵ seems to suggest that the companies need to react very fast to the changing market situation. The case of the Polish developer of a traffic app, interviewed by the study team, shows that app developers need venture capital to be able to experiment more fully and to develop their potential.

⁷⁵ <http://www.appcellerator.com/company/survey-results/mobile-developer-report-january-2011/>