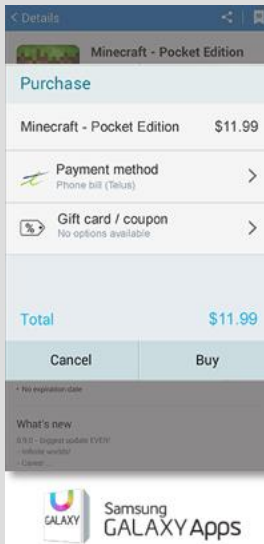


THE MOBILE APP STORE PAYMENTS MARKETPLACE: DIRECT CARRIER BILLING



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A rapidly growing opportunity

This report describes the global mobile app store payments marketplace, with a focus on direct carrier billing (“DCB”). DCB is the process by which mobile customers can buy digital content from app stores on their device, with the payment taken directly via their mobile bill. The key advantages over alternative payment methods are an improved payment experience for the end user, driving increased revenues for mobile operators and the app stores themselves.

We believe DCB represents a rapidly growing sub-sector of the mobile payments market, driven by the increasing numbers of apps available on the respective stores, increasing mobile penetration (especially in emerging markets) and increasing customer acceptance of the mobile bill as an attractive payment method.

The key findings of this report are:

- **The overall app download market was estimated at US\$27bn in 2014, with 83bn apps downloaded.** We estimate 7% of these were directly billed to mobile customers. This implies a global addressable market of \$1.3bn to the DCB providers in 2014.
- **Growth rates to remain robust:** We forecast the overall volume of app downloads to rise to 286bn by 2019. In value terms, we expect the overall market to reach US\$79bn annually by 2019, with the DCB segment contributing \$11.8bn, CAGRs of 24% and 56% respectively.
- **DCB has a number key advantages over traditional credit card billing.** For app stores these include higher conversion rates, access to customers across all demographic segments and a much wider addressable market. For networks, DCB offers participation in the payments revenue stream that they would otherwise be excluded from. It also helps lower churn, increase interaction with the pre-paid customer market and delivers higher customer satisfaction rates.
- **The historic desire of networks to interface directly with app stores is being replaced by an increased understanding of the value of sophisticated third-party DCB platforms.** These include speed to market, lower development costs and lower risk of project failure.
- **Four key players:** Bango Plc has a strong competitive position: We estimate Bango has over 40% market share of global DCB activations. It is the exclusive DCB provider to Amazon, Blackberry, Mozilla and Samsung. It has one competitor on the Microsoft store and a strong position on the the Google Play store.

We believe the DCB market will continue to experience material growth over the near-term, driven partly by ongoing growth in the volume of app store downloads, and also by an increasing understanding on the part of the app stores and the mobile operators of the value of DCB. Suppliers with the right platforms and product sets stand to be the major beneficiaries.

Market backdrop and dynamics

Introduction, and some brief terminology...

Mobile applications (“apps”) are software applications designed to run on devices such as mobile phones, tablets and other devices. The app development community is vast, and encompasses a broad range of organisations from the likes of EA, Disney and Sky to one-man developers working from home.

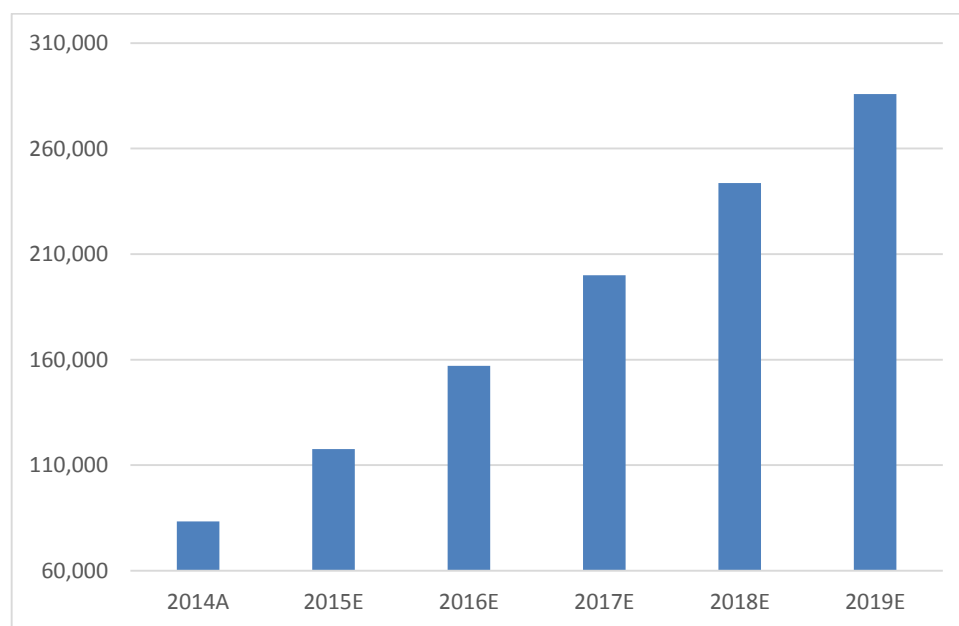
Apps are typically made available via app stores, often owned and operated by the providers of the mobile device operating system (e.g. Apple IOS store, Google Play store), but sometimes via the device manufacturer, (e.g. Samsung) or major content players (e.g. Amazon).

The market for apps in both volume and value terms has seen significant growth over recent years, with the positive trend expected to continue going forward.

Market growth and dynamics

Recent years have seen significant growth in the volume and value of app downloads. This is summarised in the following charts:

App store downloads market* (million units) 2014-2019E



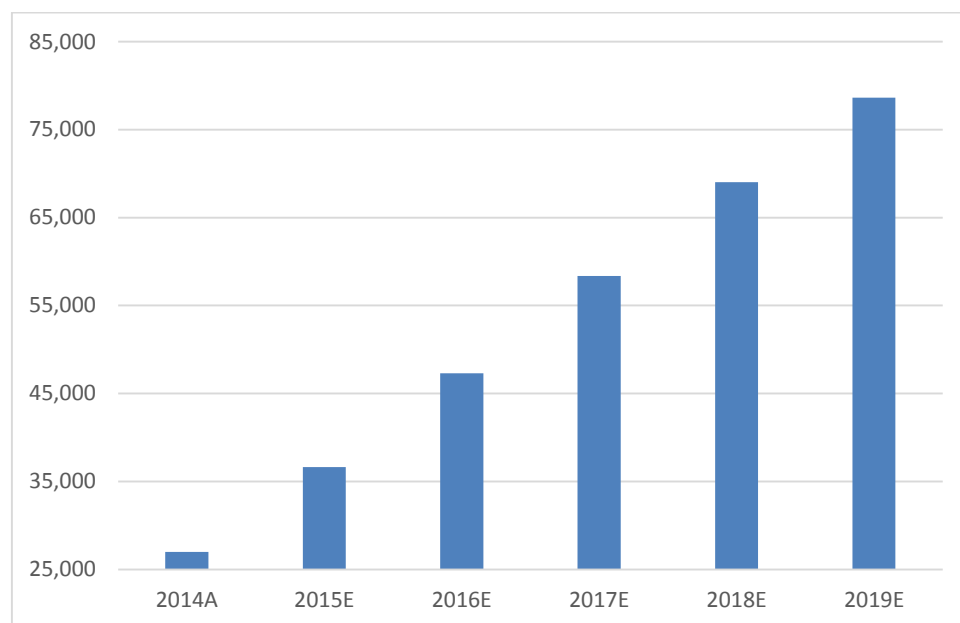
Source: Progressive Equity Research estimates

*** Analysis based upon the major global app stores (i.e. excludes Chinese players)**

Industry sources suggest the monetary value of the total app download market reached \$27bn in 2014. Going forward, anticipated growth in the number of downloads is expected to drive an uplift in the monetary value of the market.

Note, our analysis refers to the major global app stores including Apple, Google and Microsoft. The domestic Chinese players (Baidu, Qihoo and Tencent etc) are not included. Industry sources suggest the volume of downloads from the Chinese stores is material, however revenues generated from downloads less so given that free apps dominate the Chinese market place. Of the two major players, Apple store data does include revenue and downloads from China, but Google has largely exited the market.

Global app download market by value* (US\$m) 2014-2019E



Source: Progressive Equity Research estimates

* Refers to the major global app stores

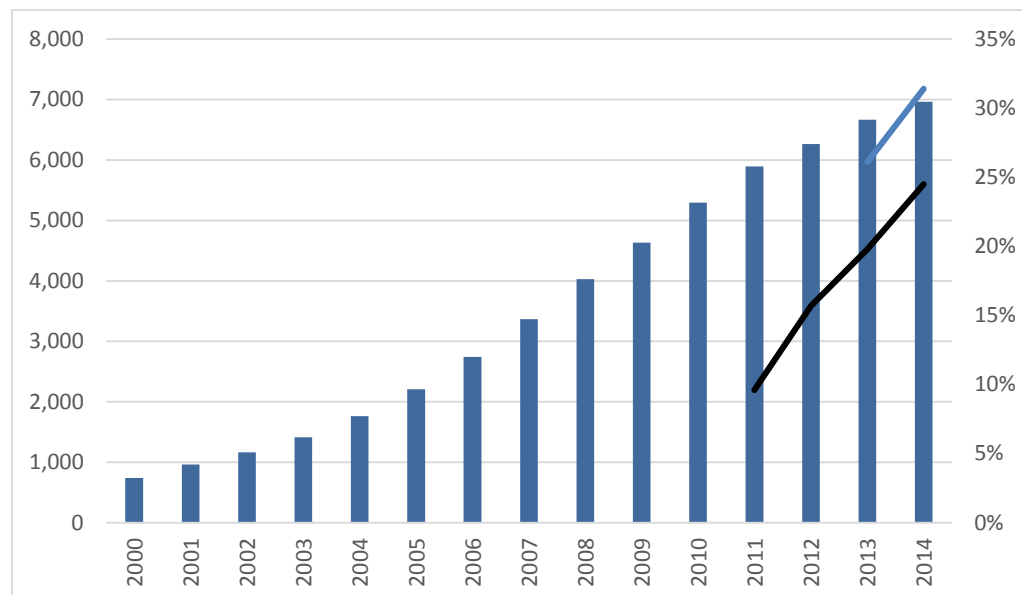
In summary, the overall app download market was estimated at \$27bn in 2014, with 83bn apps downloaded. Furthermore, growth rates are expected to remain robust. As both charts demonstrate, the overall market by volume and value has shown impressive growth over the recent past, with positive growth expected over the medium term.

We believe growth has been, and will continue to be, driven by increased penetration levels of three key products:

- Mobile phones
- Smartphones, and
- Tablets

The market growth is summarised in the chart below:

Global Mobile subscriber growth (bn LHS), smartphone and tablet penetration (RHS)



Source: ITU data, Statista.com, e-market.com

We believe growth in these three device types is creating a virtuous circle with the app stores. As penetration increases, the potential size of the app download market increases. This further incentivises developers to develop new apps which in turn acts as a spur (admittedly one of several) for increased device penetration.

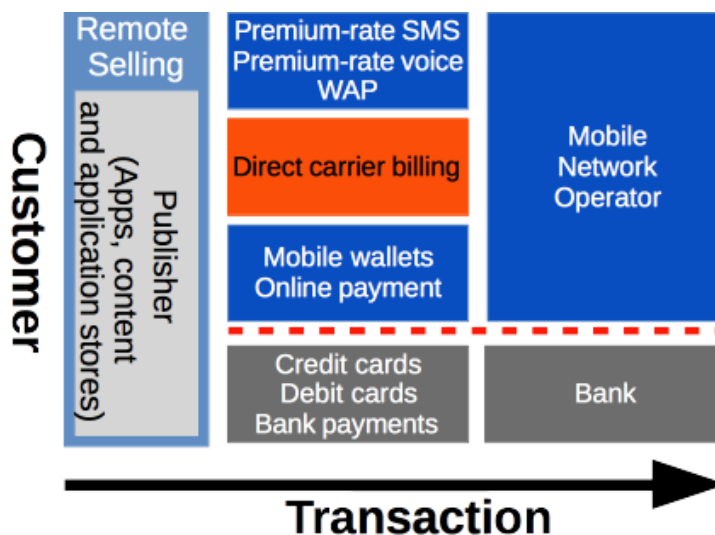
Apple and Google dominate, with 80% combined market share of available apps. However, industry sources (notably Gartner) suggest their combined market share by downloads could be as high as 90%. We believe the Microsoft, Amazon and Blackberry stores share the bulk of the remainder.

As the app market has developed, the economics for developers have remained largely fixed. Developers typically take 70% of the net app selling price, with the store retaining 30% to cover their own costs – including payment fees. Developers face two key challenges 1) How to maximise sales of their apps and 2) How to get paid. Although it is not the only available billing solution, Direct Carrier Billing (DCB), also known as Direct Operator Billing (DOB) provides a robust solution for the latter.

The DCB opportunity

There are several payment methods in the mobile payment ecosystem. These are summarised in the following graphic.

The mobile payment eco-system



Source: Analysys Mason

App stores typically use the customer's own credit cards for billing purposes. Whilst this has proven a robust and largely efficient method for app stores to collect payments. It is arguably not a panacea. Over recent years, Direct Carrier Billing (DCB) has become an increasingly popular method for app stores to bill their customers.

In simple terms, DCB allows customers to buy digital content by adding the purchase cost directly to their mobile phone bill. DCB has been historically been available in several forms, including payments via premium-rate SMS and premium-rate calls. However, the technology has seen significant evolution in recent years, now including payments for digital content.

DCB has a number of significant advantages for users, app stores and mobile network operators (MNOs) including:

DCB advantages for App stores

- Significantly higher conversion rates: According to a recent report by Analysys Mason, app stores which have integrated DCB solutions have seen a 5-6x increase in conversion rates compared with credit card billing. According to Bango, conversion rates can be as low as 50bps when only a credit/debit card payment option is presented. The average conversion rate for carrier billing in app stores using the Bango Payment Platform during 2014 was 82.4%*
- Increased average transaction values: Amdocs reported a 33% YoY increase in average transaction value for Google Play transactions processed on its carrier billing platform in 2012.
- Access to a growing mobile subscriber base: Although mobile device penetration has slowed in certain major markets over recent years, growth rates remain robust in other territories. For example, in India, the market added 5 million new mobile subscribers in June 2015.
- Access to the “unbanked”. With c7bn mobile connections globally, the mobile phone is increasingly ubiquitous. In many markets, mobile penetration is significantly higher than credit card or bank account penetration. Although there are significant geographic variations (for example high credit card and mobile penetration in markets such as the US and UK), global credit card take-up is somewhat lower than mobile phone penetration (*7bn mobile phones globally vs 2.2bn credit cards – source Amdocs*)
- Note with the exception of Apple, all of the key app stores have implemented DCB, including Google, Amazon, Blackberry, Samsung and Microsoft. Public comment from Apple as to the delay to them adopting DCB has not been forthcoming. However, there have been some experiments in a handful of markets (e.g. the Philippines) with the digital sale of iTunes gift cards which can be purchased using carrier billing. It therefore would seem that Apple does have a degree of interest in DCB.

DCB advantages for Mobile Network Operators

- Access to the mobile payments value chain. As shown on the chart on the previous page, app store payments via credit card essentially shut out MNOs from mobile payment revenues. DCB allows them to participate in this market and extract addition value from the subscriber base
- Increased customer satisfaction: Premium SMS and call billing is more prone to user-generated billing errors and fraud. Furthermore, evidence suggests fewer price points are available for content.
- Lower customer churn: Ease of use means customers generally have a favourable view of DCB. MNOs can use this as a marketing differentiator against networks that don't employ DCB.
- The ability to use “big data” arising from DCB as an ERP tool. Operators have the opportunity to leverage the wealth of information that emerges from consumer activity on their DCB platform to monitor traffic volumes and usage patterns. This can feed directly in internal resource allocation plans, for example network planning.
- Note, MNOs can apply certain safeguards in customer account management for risk mitigation purposes – for example customizable spend limits, daily spend limits etc.

DCB advantages for Users

- Ease of use: From a user perspective, with one click, they can access and pay for digital content. There is no need to register the phone, no need to keep a credit card on file with the store. It is therefore a much quicker and more convenient billing method than using a credit card.
- No incremental cost: App stores and networks operate on a revenue share basis with the cost of operating a DCB platform shared between them. For the user therefore, content typically costs the same whether paid for by credit card or via the mobile bill.

Quantification of the market opportunity

With a long list of benefits of DCB to app stores, operators and users, demand for DCB-billed transactions is expected to grow significantly over the near future. According to Analysys Mason, DCB-billed content will generate over \$12bn of annual revenues by 2020 (our own forecast is \$11.8bn). Juniper Research believes that in Europe alone the value of digital content billed via direct carrier billing will reach more than \$5.2bn by 2017. We believe this figure may prove somewhat optimistic. However, these forecasts certainly highlight that DCB is a multi-billion-dollar marketplace.

An alternative way to scope the opportunity is by looking at the number of carriers that utilise DCB and the number that potentially could. According to trade body GSMA, there are over 700 networks globally. According to Bango, around 160 have already implemented carrier billing. Our working assumption is that not all networks will implement carrier billing due to concerns over complexity and the ease on relying on traditional credit card billing. The 700 figure also includes private networks which are unlikely to require DCB since they are not serving a typical MNO customer base. Nevertheless, we believe that there may still be 400-500 commercial networks that could implement DCB, implying an ultimate MNO opportunity 4-5x higher than the current level.

Competitive positioning

Perhaps unsurprisingly, the initial DCB deployments were instigated by MNOs attempting to interface directly with the app stores. However, anecdotally, we believe that over recent years operators are appreciating the value of leveraging third party platforms to offer carrier billing in app stores. Telefonica Group, for example, launched an in-house DCB platform called BlueVia in 2010. However, after just 2 or 3 years, this was dropped, with Bango picking-up much of the business that was slated to run across the BlueVia platform.

We have identified a number of key advantages for operators to favour a third party DCB supplier over development of an in-house solution. These include:

- Speed to market: The established third-party suppliers make much of their speed to market, with at least one supplier claiming a lead time measureable in weeks. Our feeling is that in-house development cycles are likely to be significantly longer.

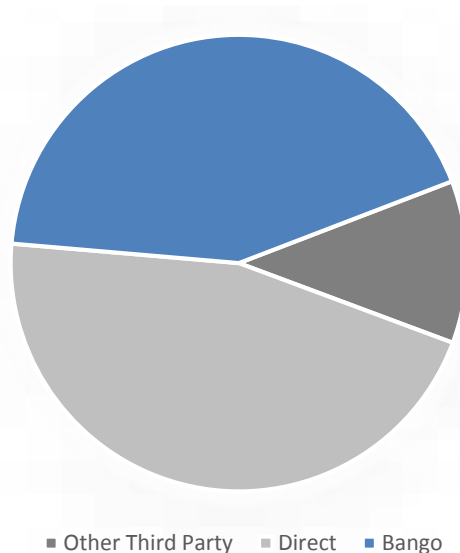
Research from Bango has attempted to quantify the impact of delay. From empirical data, Bango calculated that one MNO lost out on \$4m of revenue due to a three-month delay in launching DCB.

- Lower development costs: The third-party vendors have significant experience of DCB installations for a number of MNOs and app stores. Economies of scale should be available over and above in-house development.
- Lower risk: This previous experience also reduces risk. Third-party vendors have experience that in-house developers and project management teams may not

Market shares:

There are a number of independent providers in the app store payments market place. Below we present a summary of their respective market shares, followed by a brief discussion of the businesses.

App store DCB market shares (Total market = 278 activations)



Source: Company Data and Progressive Equity Research estimates.

We estimate that there are currently 278 DCB activations globally, with Microsoft, Google and Blackberry representing 263 of these. Of the 278, we believe 127 are direct app store:MNO relationships, with the remainder being third-party connections. Of the third-party activations, **the market is dominated by one player – Bango, which has 119 activations. This represents a share of over 40% of the total market (278), and is almost three times the aggregate of the key third-party DCB suppliers.** As will be discussed below, Bango was an early entrant into the mobile payment space. Over the past sixteen years it has made significant investments in both its platform and product set. The benefit of this historic investment appears to be apparent – it has almost half the market.

Bango is the exclusive DCB provider to the Amazon, Blackberry, Mozilla and Samsung app stores. It has one third-party competitor on the Microsoft store and a strong position on the the Google Play store.

Bango Plc (BGO.L, 101p, current mkt cap £53m)

Founded in 1999, Bango was an early entrant into the mobile payments space, partnering with leading operators to launch 'charge to bill' services and opening-up mobile payments to early adopters and major content publishers. From 2001 to 2005, Bango established the "browse and buy" model for mobile payments. This technology delivered a familiar e-commerce experience on a mobile phone screen. By 2005, when Bango floated on AIM on the London Stock Exchange, Bango had a broad section of content providers using its direct-to-consumer billing platform. The arrival of faster mobile internet connections and better devices gradually drove more usage of mobile services

As discussed above, by activations, we believe that Bango is the dominant player in the space. A significant presence on the Google Play store is accompanied by exclusive DCB access to the Amazon app store and Blackberry Store. We believe that Bango is one of just two providers offering DCB access to the Microsoft store.

As a listed company, Bango has greater disclosure than the other players listed here, with detailed financial history being fully available. Bango also provides detailed marketing materials, which reveal a full product set. We believe this offers Bango a key competitive advantage over the other players discussed here. The Bango DCB offering includes the following products:

Bango Payment Platform – a unique, scalable, plug and play architecture that permits MNOs to interface with all major app stores supporting DCB.

GRID – A Business Information (BI) tool for app stores to research, plan and activate DCB with mobile operators globally

BOOST – Analytics of key operational metrics in order to drive increased user spend

DASHBOARD – A tool for real-time, online measurement of customer spend, the products being bought, prices paid and any errors that occur

Key MNO customers include AT&T, Deutsche Telekom, Telefonica and, Vodafone.

Boku

US-based, Boku claims connections to over 250 operators globally. It also has a blue-chip list of merchant clients, including EA, Facebook, Sony and Spotify. However, we note that the website does not list any of the key mobile app stores on its client page. Boku is privately/ VC owned, and has completed a number of fundraisings over recent years. As a private company, publicly-available financial information is limited. However, market sources suggest that the company delivered revenue of c\$200m in 2013 and has raised over \$75m of funding over the recent past.

Fortumo

Fortumo was established in 2007, when the three founders identified mobile payments as an emergent alternative payment platform. Fortumo's geographic focus is on emerging markets, and connects app stores to MNOs in 91 countries, claiming this to be more than any other operator. Although this implies a broad degree of coverage, we believe that much of the business is based on premium SMS billing. Based in Finland, and privately-owned little financial information is readily available.

Netmobile AG (N1M.F, €6.32, current market cap €78.6m)

Based in Germany, Netmobile was founded in November 2000. The company has a broad product set, including white label solutions such as direct carrier billing, mobile payment and mobile TV services. 87% owned by Japanese MNO DoCoMo, the company retains a stock market listing and therefore publishes financial information. For the first half of 2015, the company reported revenue of €65.2m, with EBITDA of €7.6m and net income of €1.7m. Netmobile has operations in over 40 countries worldwide, connecting over 160 networks.

Key MNO customers include Bouygues Telecom, Sunrise and Vodafone.

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