Carrier Billing: Global Market Trends and Forecasts

Web-based content and PSMS out-size the OS app store segment, but apps will end up with the biggest slice
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Executive summary

- The OS app stores – Apple App Store, Google Play, Windows Phone Store, and BlackBerry World – have taken much of the limelight in carrier billing in recent years, but they only represent 14% of the carrier billing revenue pie today. However, this is the fastest growing segment and it should overtake all other segments in revenue size in 2017.

- The biggest slice currently still belongs to the rapidly shrinking premium-rate-services (PRS) and feature-phone-content segment – the latter largely concentrated in Japan and other Asia Pacific markets. In second place is the online PC games segment, which will continue to yield growing carrier billing revenue over the next five years – although not at the same pace as the app stores.

- Asia Pacific contributes by far the largest chunk of carrier billing revenue, largely driven by China’s burgeoning independent app store market and enormous online games market, and Japan’s still considerable Web-based mobile games market and unparalleled apps ARPU.

- Even though carrier billing and emerging markets are often mentioned in the same breath, carrier billing is not just a means of enabling remote payments among the unbanked. It works just as well as a frictionless alternative to credit/debit cards for mobile micropayments in developed markets. That is where its main market is currently, and it is where it will continue to be over the next five years.

- Carrier billing may have a strong use case, but it often falls short on the commercial and ease-of-deployment fronts.

- The poor payouts often offered by carrier billing to merchants, especially in emerging markets, means that much of the carrier billing opportunity today is confined to high-margin content, such as in-game virtual goods, and not to royalty-laden digital media such as streamed music or movies. However, operator bundling of OTT media services such as Spotify and Netflix is providing a rich new seam for carrier-billed content.

- Other factors conspiring against carrier billing include hostile regulation, unfavorable taxes, antiquated technology, and operator fickleness. Again, most of these issues are particularly acute in emerging markets.

- New alternatives to enabling digital purchases in cash-based societies have emerged in recent years which threaten carrier billing’s position in certain parts of the world – including cash kiosks and mobile-money wallets.

- But carrier billing is a growing business which still has plenty of potential. Ovum estimates that, in all its guises, the global mobile carrier billing market was worth just over $14.5bn in 2014 and will grow to $24.7bn in 2019.

- Carrier billing is also undergoing a deep transformation as it migrates from the makeshift and clunky PSMS to the much sleeker and more efficient direct operator billing (DOB). That transformation has been given impetus by some of the new heavyweight merchants hooking up to carrier billing, such as Google, which need the flexibility and lower rates afforded by DOB.

Market overview

The use case
The use case for carrier billing is very strong. It is the most frictionless of payment mechanisms available to mobile users. Time and time again, it has been proven that carrier billing is a big boost to sales when enabled alongside credit card payments.

The business case
The business case for carrier billing, however, is not always straightforward. There are many parts of the world, mainly emerging markets, where conditions make it impossible for the carrier billing business model to work – especially in relation to app stores. Unfavorable tax regimes, regulatory crackdowns, carrier uncertainty and high prepaid-airtime overheads all conspire against carrier billing.

There are two commonly held beliefs about the carrier billing market that need debunking: The first is that most carrier billing activity is focused on Google Play and other app stores; the second that emerging markets are the biggest opportunity for carrier billing, because of their low credit-card penetration.

Belief 1: Most carrier billing activity is focused on Google Play and other app stores
The app stores are commonly seen as carrier billing’s main market, following the decline of the feature-phone content market. But that ignores the numerous other segments that make up the
carrier billing market today, such as independent app stores, online PC games, operator bundling, and off-store D2C channels – as well as premium-rate messaging services such as charity donations, TV voting, and competitions. All these other segments represent the lion’s share of the market today (see Figure 1).

The slice comprised by the main app store of each smartphone OS – what Ovum defines as the OS app stores – is nevertheless growing in importance and will become the biggest slice by 2019. Independent app stores – largely comprising alternative Android stores to Google Play, including handset makers such as Samsung, online players such as Amazon, operator-branded stores, and a multitude of local Chinese stores – will grow from the fourth biggest slice in 2014 to the second biggest in 2019.

However, seen from the point of view of carrier billing aggregator revenue – intermediaries who provide merchants with a single access point to multiple operators’ billing systems – the app stores (both OS and indie) represent a smaller market share than their overall transactional value. That’s because the two biggest component parts of that market, Google Play and the Chinese app stores, have mostly bypassed aggregators to establish direct links with operators.

Belief 2: Emerging markets are the biggest opportunity for carrier billing, because of their low credit-card penetration

Emerging markets represent just over 40% of the global carrier billing market (see Figure 2), and their share would be significantly smaller if it was not for China – which contributes two-fifths of all the carrier billing revenue generated in the developing world (see Figure 3). Developed markets will continue to play a leading role unless the structural barriers holding back carrier billing in emerging markets can be lifted.

Carrier billing is a universal mobile payments mechanism that can fill the gap in circumstances in which people
have no alternative way of paying remotely for digital goods. But it is also a convenient substitute in cases where people do have other means of making such payments. The high credit-card penetration in developed markets is therefore no barrier to carrier billing adoption.

**Market evolution**

Carrier billing is a growing market. The number of carrier billing connections is increasing and so are global revenues. More importantly, the share of mobile digital goods purchased via carrier billing is growing.

Ovum estimates the current value of the global carrier billing market to be significantly higher than some of the more widely diffused estimates currently in circulation. That is in part due to differences in interpretation. For example, Ovum includes PSMS in its definition of carrier billing, whereas other estimates often confine themselves to direct operator billing.

There has also perhaps been a certain degree of undervaluing of some markets, such as China, Japan, and South Korea. China has seen a big rise in carrier billing revenue over the past two years after changes made by operators there to billing arrangements for third parties. In Japan and South Korea, carrier billing has long been a major payment channel for digital content and services. Combined, these three markets alone have a multi-billion dollar worth.

**Technology changes**

Carrier billing is a market in evolution. It started out in the late nineties as a product of the premium-rate telephony services market, in the guise of PSMS. Premium-rate SMS messages were used to both deliver and pay for content and services – with operators’ SMSCs acting as makeshift billing platforms. WAP billing came next. This applied a Web-based user interface to carrier billing, to make it more appropriate for mobile-Web payments – although the background billing channel was more often than not still PSMS.

PSMS and WAP billing primarily belong to the feature-phone era, when ring tones, wallpapers, Java games, and SMS alerts were the main content consumed on handsets by mobile users.

The focus today is on direct operator billing (DOB), which is when a direct link is opened up between third parties and an operator’s billing systems – rather than going via an SMSC. Not only does it provide a much more seamless user experience than PSMS, but it is much more flexible, reliable, instant, and provides a better ability to respond when things go wrong. Some merchants, including the biggest of them all, Google, will not accept anything else – which has added a lot of impetus to the rollout of direct billing.

**Lower prices, tighter margins**

The likes of Google have also been driving the operators down on price – from 30% to 50% (or much more!) that they used to charge in the WAP billing/PSMS era to between 8% and 15% now – to fit within the app store business model, under which developers are guaranteed a revenue share of at least 70%. But this is happening within the context of greater price tiering, with, for example, the merchants of legacy feature-phone content or online-gaming sites often paying higher rates and physical-goods distributors often paying lower rates.

For operators, there has been a change of focus from the “high margins but more niche” carrier billing market of the feature-phone world to the “low margins but higher volume” market of the smartphone world. There has been a squeeze on margins for aggregators too. Their share of transactions has dropped from up to 10% in the old days to between 2% and 5% now.

The tighter margins have led to consolidation in the aggregator market. Recently, US-based Boku, one of the big global aggregators, acquired another big player, Germany-based Mopay, after having acquired India’s largest aggregator, Quebecell in 2014. In 2012, France-based Netsize, which had been acquired by digital security giant Gemalto, snapped up DOB aggregator Ericsson IPX.

DOB also changes the legal status of carrier billing from a telephony service to a payments service, turning operators into payment service providers – although it is still restricted to certain types of goods and services. With the move to DOB, operators have also begun to shift internal responsibility for carrier billing from their wholesale to financial-services departments.

These changes parallel the decoupling that has occurred between content and its carriage. Whereas mobile content used to be delivered via mobile specific channels, such as SMS or WAP, today it tends to be an extension of mainstream digital content and works across different network and device types.

**Patchy coverage**

The rollout of DOB has been slower than expected. In the developed world, there are still around 20% of operators...
that are not DOB-enabled. In the developing world, it is around 75%.

And carrier billing, of whichever flavor, is still not available everywhere. In the developing world, especially sub-Saharan Africa, there are still many operators that have not started enabling billing for third parties – or, if they have, there are often no pan-regional or global aggregators that have hooked up to these carriers to offer access to them on a cross-network basis. The result is that sub-Saharan Africa appears as a big blank in global aggregator coverage maps.

There are also gaps in coverage in developed countries – even in the most powerful of them all, the US. One of the national carriers, T-Mobile US, has pulled the plug completely on carrier billing, and, although the other national carriers are still offering it, they are no longer doing so via aggregators – only directly to merchants.

In Europe, meanwhile, the lights went out on Google Play carrier billing across all of Vodafone’s networks in November 2013, after the carrier group and Google fell out over contractual differences. The surprise breakup was significant, considering that the carrier billing deal with Vodafone had been Google’s first with a major European carrier.

These events show that operators’ commitment to carrier billing cannot be guaranteed – that, on a whim, an operator can switch off access to its billing systems, leaving the ecosystem relying on that access out on a limb, unable to do anything about it.

Emerging carrier billing rivals
Carrier billing is not necessarily the only compelling alternative to credit cards in cash-based economies. In recent years, in sub-Saharan Africa and the Russia/CIS region, new services have emerged that are encroaching on carrier billing’s territory.

In Africa, mobile money services are much more widely deployed than carrier billing and offer much more competitive rates than the extortionate rates normally charged by operators there for billing. Some mobile money wallets, such as Safaricom’s iconic M-Pesa service, have begun to accept digital-good purchases. In some countries – Uganda, for example – aggregators are offering cross-network access to mobile wallets, which does provide an opportunity for mobile-connectivity aggregators wanting to diversify into new payment types.

In Russia and CIS, meanwhile, there are several networks of “instant payment” kiosks dotted around the region that enable users to feed in cash to pay for things like utility bills and loan repayments, as well as, most crucially, putting money into electronic wallets, with which they can later make online payments from either PCs or phones. There are hundreds of thousands of these cash kiosks and they can be found outside virtually every subway station and other key transit points. They all target the very demographic that carrier billing most effectively addresses: people without bank accounts and credit/debit cards.

Failure of aggregator alternatives
The role of the aggregators seemed threatened four to five years ago both by efforts from operators to multilaterally publish cross-network public APIs for carrier billing and also by Google’s insistence on striking direct deals with operators in order to use its market muscle to knock operators down on price.

But operator cross-network API efforts have come to naught and Google has started to allow operators to integrate with its app store via aggregators such as Bango, after finding that the pace of its carrier billing rollout was too slow.

The Wholesale Applications Community, a cross-network API initiative unveiled in February 2010, chose to debut with an in-app payments API – reflecting strong developer demand for carrier billing, above all other APIs. But the initiative soon ran out of steam because of a lack of operator commitment and was wound down in July 2012.

Its successor, the OneAPI Exchange, is also focusing on carrier billing but with a more pragmatic approach. Rather than forcing participating carriers to republish APIs under a single standard and rally around behind a joint brand, the OneAPI Exchange works with existing carrier API programs and proprietary APIs, and provides cross-network access through a federated system that glues the various programs together. The system is powered by API specialist Apigee. One of its aims is to reduce operator reliance on aggregators, with the argument that aggregators obscure the operators’ brands. However, the poor track record of the multilateral operator initiatives suggests that OneAPI Exchange’s chances of survival are poor.

Meanwhile, carrier group Telefonica embarked on its own ambitious carrier billing API project two or three years ago. Called BlueVia, it had started out in 2010 as a multi-API, long-tail experiment that eventually
morphed into a service just focused on carrier billing and selected B2B partners – with the ambition of becoming the new Visa of the carrier billing world, in direct competition with aggregators.

BlueVia got as far as getting Telenor on board, but at the beginning of 2014 it was closed down by Telefonica which decided that it was going to be too costly to bring about BlueVia’s ambitious vision. Instead, the operator has gone back to an aggregator outsourcing model.

Operators’ indecision and lack of vision combined with the painfully slow pace of formal standardization processes all plays into the hands of aggregators, which can provide the links for a single point of access to mobile-network resources.

Market dynamics
Carrier billing: What is it and how does it work?

Definition
There are different interpretations of what constitutes carrier billing. Some people exclude its old version, PSMS, from the definition, and talk of PSMS and carrier billing as two separate things. Others include all value-added service charges to mobile subscriber phone bills or prepaid mobile credit, including operators’ own-brand services, such as ring-back tones and TV, or an own-brand app store.

Ovum’s definition
Ovum defines carrier billing as a technology that enables mobile users to make payments to third parties through their monthly phone bill or prepaid credit, and covers all flavors of that technology: PSMS, WAP/Web billing, and direct operator billing (see Figure 4). It does not include billing for operators’ own services. But it does include billing for OTT services sold by operators to their subscribers as part of bundling and other distribution deals – but only when the service sold has a price of its own and is not added for “free” into a mobile tariff, as part of a hard bundling deal.

For the purposes of this report, it does not include carrier billing offered by fixed-line telecoms/broadband providers either. But it does include mobile carrier billing used on fixed-line services, including desktop websites and consoles.

Billing for both cellular and non-cellular devices
Not only are there different kinds of carrier billing but also different ways of enabling it, depending on whether it is used on cellular-connected devices or not. If it is on cellular-connected devices, it is very simple, just requiring one click from the user in the case of DOB. That is because the SIM card in the device automatically identifies the user and matches that ID with the user’s payment details stored in the mobile network’s back-end systems.

If the payment takes place on a non-cellular-connected device, such as a PC, it typically becomes a three-step process: users input their mobile number on the website where they want to make their purchase; they receive an SMS on their phone containing a PIN code; they then key in the code on the website to enable the payment.

Some aggregators, such as Neomobile, are obviating these additional steps by negotiating access to operator user-ID APIs (also known as “URL header enrichment” or “IP2CLI”), alongside the standard charge-to-bill APIs. Few carriers allow access to user ID – even though it is always encrypted – and those that do only do so for trusted partners.

There is also a big difference between the end-user experience of PSMS and DOB.

Premium SMS (PSMS)
PSMS is a premium-rate telephony service that uses an operator’s existing messaging infrastructure as a makeshift billing system to enable payments for non-telephony services (see Figure 5).

The user experience that PSMS offers is rather clunky; for example, with

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<th>Figure 4: Carrier billing, Ovum definition</th>
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<tr>
<td>What is included</td>
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<tr>
<td>PSMS, WAP/Web billing, direct operator billing (DOB)</td>
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<tr>
<td>Both mobile and fixed-line content/services</td>
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<td>Third-party content/services bundled/distributed by operators</td>
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Source: Ovum

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<th>Figure 5: Main carrier billing types</th>
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<tr>
<td>Name</td>
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<tr>
<td>Premium SMS</td>
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<td>WAP billing</td>
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<td>Direct billing</td>
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Source: Ovum
mobile-originated transactions, users usually have to text a keyword to a short-code number and then wait to receive a couple of follow-up SMS messages before they can access the content or service they have paid for. Downloadable content is sometimes delivered as an attachment, but more often than not access is gained via a Web link – both delivered by the last message received. Users click on the link to go online to browse or initiate a download. Seamless it is not.

PSMS has many other limitations. It is not very reliable, leading to a high rate of revenue leakage, since message-delivery failures or delays mean that content gets delivered without being billed. According to aggregator sources, on one European network that still uses PSMS for billing, over a quarter of billing requests do not produce a response within 30 seconds.

There is also little flexibility on pricing. With PSMS, price points are limited to increments of, say, $0.10, US$0.25, or $0.50. So if an application costs $1.95 or $4.99 to download, none of the aforementioned examples would be able to match its price exactly.

There are also limitations on the kinds of transactions that can be conducted via PSMS. For example, the E-Money Directive introduced by the European Commission several years ago stipulates that “telephony-mediated” billing, such as PSMS, cannot be used to pay for goods not delivered to payees’ mobile phones, effectively ruling out the purchase of physical goods other than tickets and coupons. Digital goods are allowed, however. By contrast, the Directive leaves the path clear for operators to enable purchases of physical goods using direct-billing systems, providing an e-money license is obtained.

Beyond the revenue leakage and poor revenue share for content providers typical of PSMS, providers of content and services have to contend with high fees for renting short-code numbers, typically used in print, billboard, and TV ad campaigns.

On the plus side, PSMS is cheaper to implement than installing dedicated billing systems to enable DOB. It also still makes sense as a mobile content payment and delivery mechanism on mobile devices that have no data connection, making an IP-based billing mechanism such as DOB irrelevant.

WAP billing
WAP billing is an earlier alternative to PSMS than DOB. As the name implies, it was developed to make carrier billing more suited to paying for content and services accessed via mobile browsers – WAP being the acronym by which the mobile Internet used to be known, when it was a stripped-down branch of the main Web.

WAP billing is usually a Web-based user-interface layer added to PSMS. Users are presented with a Web front end on which they just click a button to pay, even though the back-end processing is done via PSMS, using the operator’s SMS platform (SMSC).

WAP billing was used in some instances as a way of combatting the PSMS-based scams that became rife in the old mobile content world. In the UK, for example, operators introduced PayForIt, a WAP-based billing mechanism managed by certified aggregators that shows users a screen disclosing the full details of the transaction they are about to carry out, asking for confirmation. But PayForIt has struggled with adoption because its applicability is limited to Web-based transactions, not all operators mandated it, and it initially led to a big drop in sales for content merchants because of the extra steps it added before users could click to buy.

Direct operator billing (DOB)
DOB extends the internal billing systems of operators to third-party merchants. Usually, operators expose three APIs: charge-to-bill, refunds, and SMS notifications.

It is much better than PSMS in terms of both the user experience and the benefits to merchants. DOB transactions typically take less than five seconds to process and can cater to any price point between the minimum and maximum allowed. A fuller set of error codes for unsuccessful payment requests is provided than is with PSMS. It is also possible to set up automated refunds, cutting down customer-support-call costs.

DOB also allows real-time reporting to be provided on transactions and user behavior. Some aggregators provide dashboards that enable merchants and operators to understand their customers better – showing attempted, completed, or cancelled payments, as well as failures and errors and refunds; top items sold, both in-store and in-app; conversion rates; etc.

Use case
Carrier billing has consistently been shown to markedly boost paid downloads and in-app purchases in app stores where it has been introduced. This is because carrier billing is the easiest way to pay on phones and it is also often seen as less risky than card payments.
**Frictionless experience**

Keying in credit- or debit-card details on a cramped phone screen is time-consuming and awkward, no matter how “smart” the phone might be or how big its screen or keypad. Most digital-good purchases are impulsive and noncritical, and having to fiddle around with a handset’s tiny keypad to type a card’s number, expiration date, holder’s name, and billing address is one of the surest ways of killing the impulse-buy moment. And, even after inputting all their details, users still need to key in a passcode or password to authenticate each payment. Most users simply do not bother or give up halfway through.

With carrier billing, the user’s payment details are already stored in the operator’s back-end systems and the user is automatically authenticated through the SIM card. In the case of DOB, it is simply a case of approving the payment and that is it. PSMS is more involved.

**Security**

Another barrier to card payments on phones or PCs is the risk felt by many users of keying in and sharing their card-account details online. In many parts of the world, such as Eastern Europe and the Middle East, there is a distrust of online card payments. Even though card details are much easier to key in on a PC, for many users around the world, especially in emerging markets, PCs are shared devices which they access in cyber cafes and other such places. A lot of online gamers in developing Asia Pacific markets, for example, play from cyber cafes. By comparison, keying in one’s mobile number and a one-time code sent via SMS seems a lot safer.

**Revenue boost**

Data revealed by Bango of BlackBerry App World, one of the app stores it enables, shows a big jump in end-user spending after carrier billing is introduced alongside the credit/debit card payments already enabled on the store. In Germany, the store saw an eightfold increase in spending; in the US, it was a more moderate threefold increase; while in South Africa, there was massive fiftyfold increase (see Figure 6). In Germany, there was also significant cannibalization of card usage by carrier billing.

The differences between the three countries reflect the greater or lesser prevalence of credit/debit card usage in each country: Germans are famously credit-card shy while Americans have a well-developed credit-card culture.

Further data from Bango shows how DOB offers much better conversion rates than cards, even among users who have already registered their card details and are about to make their second purchase on the store with those stored details (see Figure 7).

**Bill shock**

One adverse aspect for the carrier billing user experience is that of bill shock. Any non-telephony items added to a monthly phone bill might stand out more, and be more alarming, than if they appear on a credit card bill or bank statement.

Although this is a problem, it mostly occurs within the context of “friendly fraud” – where, for example, a child

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**Figure 6: Impact of DOB on end-user spend, BlackBerry App World store**

**Figure 7: Conversion rates of DOB and credit/debit cards compared**

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<tr>
<th></th>
<th>Credit card</th>
<th>DOB</th>
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<tr>
<td>First transaction</td>
<td>10-12%</td>
<td>70-77%</td>
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<tr>
<td>Second transaction</td>
<td>20-25%</td>
<td>80-88%</td>
</tr>
<tr>
<td>Overall conversion rate</td>
<td>2-3%</td>
<td>56-68%</td>
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Source: Bango
has inadvertently or surreptitiously overspent on in-app purchases, which end up on the parent’s phone bill. Bill shock at one’s own spending is rarer, reportedly accounting for less than 10% of bill-shock cases. It is also a phenomenon pretty much confined to postpaid subscribers.

One way in which bill shock can be managed is via dynamic spending limits – whereby operators start with a low spending limit to minimize potential shock and then gradually raise that limit, according to the user’s profile.

Wi-Fi/offline issues
Another issue that can spoil the carrier billing user experience is when mobile devices roam onto Wi-Fi or lose connectivity altogether.

Wi-Fi has become a bearer for a lot of apps activity and media consumption on phones, because of its greater data throughput capacity compared with most cellular data connections. Over 50% of app store sessions are conducted over Wi-Fi, for example. But once a user roams away from the cellular network to Wi-Fi, his operator has no visibility of his movements and the app store, app, or website where he ends up has no visibility of which operator he is subscribed to, nor of his billable identity – essentially disabling carrier billing.

This was an issue that was largely unforeseen in the early days of app-store carrier billing and caught the likes of Google unawares. And surprisingly few operators have put systems in place to get around it.

Instead, many aggregators have made it their job to come up with wraparounds, not only to save the relevance of carrier billing – their “bread and butter” – in an increasingly multiplatform world, but also to provide operators and merchants with another reason for using them as intermediaries. Many operators do not want to go to the expense of developing such wraparounds in-house.

A usual workaround is for the aggregator to automatically allocate an ID to a user the moment he switches from cellular to Wi-Fi – an ID that is connected to the user’s operator and billing details.

Some aggregators have also developed wraparounds for offline usage. For example, Fortumo has an in-app purchasing SDK for Android that supports offline payments as the pricing information is included inside the SDK itself so that when the user downloads the app, the payment information is included as well.

Meanwhile, for non-cellular connected devices such as tablets, some aggregators ask users for their phone number to set them up for carrier billing.

Market segmentation
Ovum has segmented the carrier billing market into the following main categories:

- **OS app stores.** These refer to main app stores of the various smartphone operating systems: the App Store (iOS), Google Play (Android), Windows Phone Store (Windows), and BlackBerry World (BlackBerry).
- **Indie stores.** These are all alternative stores to the OS app stores. Examples include Amazon Appstore, AndSpotMarket, AppsLib, Aptoide, Baidu Mobile Assistant, Mobango, Nokia Store, Opera Mobile Store, Samsung Galaxy Apps, SlideMe, and Tencent App Gem.
- **PRS/feature phones.** This refers to both the premium-rate-service (PRS) and feature-phone-content markets. PRS comprises primarily premium SMS/MMS services, such as charity donations, competitions/ quizzes, information alerts, and TV voting, delivered to both feature phones and smartphones. Feature-phone content, as the name implies, refers to content and services primarily designed or associated with feature phones, or the feature-phone era, such as handset-personalization products like ring tones and wallpapers, Java games, and WAP portals. This market is also largely enabled by PSMS, as well as WAP billing.
- **Browser-based.** This category includes the smartphone-like feature-phone markets of Japan and South Korea, which, although they are being rapidly marginalized by the smartphone ecosystems from abroad, still remain relatively sizeable – at least in Japan.

**Browser-based** refers to all content and services delivered via mobile browsers beyond feature phones (browser-based feature-phone content and services are covered in the ‘PRS/feature phone’ category). However, as well as pure smartphone-browser content and services, Ovum has included Japan’s chunky browser-based mobile games market, even though it is greatly, but not exclusively, feature-phone based. Browser-based content and services include dating, gambling, and adult sites.

**Online PC games.** These are carrier billing payments enabled on desktop sites for the purchase of in-game virtual goods and credits. Examples include Bigpoint, Facebook, Goodgame Studios, PlayStation Network, and Zynga. Some of it is console-based.
• **Bundling/off-store apps.** This category refers to OTT content and services distributed by mobile operators through bundling deals and other partnerships, as well as carrier billing deals struck between operators or aggregators and app publishers taking a direct-to-consumer route outside the app stores. Examples include music and video streaming services such as Spotify and Netflix, antivirus software such as Lookout, Uber-style taxi-booking apps, and stickers/game peddling IP messaging platforms such as Line.

• **Physical goods.** This category includes small value physical goods, such as snacks and merchandise, as well as “soft” physical goods such as tickets and vouchers.

**Pricing models**

Carrier billing rates have come down significantly over recent years, although this has been within the context of price tiering – so some of the old rates persist for old content types, such as ring tones and wallpapers.

The main driver for the introduction of lower rates has been the app stores, as well as attempts by operators to penetrate the physical goods market (see “Physical goods” section below). Because it has become standard for app stores to guarantee a 70% revenue share to developers, it leaves little margin for the other players in the value chain – typically, the app-store owner, the aggregator, and the operator.

**Revenue splits**

Nokia, whose app store was the first to embrace carrier billing, including the typically overpriced PSMS, would first deduct the operator share and taxes, and then split the remainder 30/70 between itself and the developer (see Figure 8). But it abandoned that model after it proved difficult to sell to developers, which would get significantly less than 70% of the retail price, as well as varying payouts for the same piece of content, depending on the percentage charged by each operator.

So, like all other stores, Nokia started paying developers their 70% share first and then paying the operator with whatever was left – often leaving virtually no money for itself.

Although this might sound like a lousy business model, it reflects app stores’ subservient status in the overall business of handset makers/OS providers. Handset makers/OS providers have app stores and other content services to make their devices more sellable and encourage customer loyalty. They are not an end in itself, but a means to an end. After all, the lifeblood of app stores is developers, so it is important to keep them happy.

The typical revenue split for app-store carrier billing value chain members is: 8–15% for operators; 5–15% for app-store owners; and 1–5% for aggregators (see Figure 9). Any value-added tax is deducted before the rest of the revenue is split out.

**Price negotiations**

The aggregators’ share – both in an app-store and non-app-store context – will vary according to several factors:

• The bargaining power of the merchant. The greater that power...
is, the more the aggregator is likely to be knocked down on price. Bargaining power often boils down to the volume of traffic that the merchant is likely to generate.

- **The level of risk of the country from which the end user is making a purchase.** For example, some countries have a higher risk of bad debt, chargebacks, and so on. The greater those risks, the more an aggregator is likely to push up its price to cover them.

- **The level of service being provided by the aggregator.** If the merchant just wants access to the operators’ billing APIs, then the aggregator will charge its lowest fee. If the merchant wants the aggregator to handle the whole cash flow, then it will be charged top price.

**Operator charges**

Beyond app-store billing, there are tremendous price variations in carrier billing. Some rates can be eye-wateringly high – up to 80% in countries such as Nigeria and Venezuela, for example. The global average is about 40%.

Whereas credit card card charges are always a mix of a fixed fee (typically between $0.15 and $0.50 per transaction) and a variable fee (typically between 1% and 5%), operators may or may not add a fixed fee to their revenue share from carrier billing transactions. Carriers such as O2 in the UK charge a fee of £0.07 (US$0.11) per transaction, for example.

**Cost of prepaid money**

In cash-based economies where most mobile subscribers are prepaid, it is hard to reduce the price of carrier billing below a certain level because of the huge overheads involved in airtime credit top ups. These are paid in cash to huge networks of neighborhood stores acting as top-up dealers on a commission basis. Local taxes also add to the cost.

**Price tolerance of different content types**

- **Virtual goods**
  Although carrier billing rates of more than 30% cannot work with the app store business model, they can work with own-IP virtual goods such as those sold within online games. These do not have much of an intrinsic cost – so no matter how small the payout, the developer is still better off than if no transaction had taken place (see section below on “Online games” for more details).

- **Feature-phone content**
  Higher carrier billing rates can also work with traditional feature-phone content, such as wallpapers, ring tones, and horoscopes, because these are already marked up to take account of the high billing fees. This is mobile-specific content with a largely PSMS pedigree.

- **Digital media**
  However, they cannot work with most kinds of mainstream digital media, such as music and video, because of the high licensing costs and low margins of such media. The likes of Netflix, for example, will not tolerate billing channels that take more than an 8% share of revenue.

**Price tiering**

One of the new developments of the past few years is the introduction of price tiering for carrier billing. Whereas before operators normally had just two official rates – one for “on-portal” (i.e. goods sold on the operator’s mobile content portal) and one for “off-portal” (i.e. goods sold on third-party content sites) – many now offer numerous rates to address different kinds of merchants and goods.

Carrier billing has come into competition with new value chains outside the telecoms space. At the same time, operators are under increasing pressure to find new revenue streams as their core assets increasingly depreciate in value. These two factors combined means that operators are much more open to negotiating rates as they seek new opportunities.

**Growth in average transaction price**

Another phenomenon that has been recently observed is an increase in the average value of in-app transactions, as developers realize that it is more cost effective to sell fewer items at a higher price. That way there are fewer refunds and fewer customer-support queries to worry about. For example, on the mobile game Clash of Clans, the cheapest in-app purchase is now $4.99 for a “pile of gems” – its virtual currency. The most popular purchase is a “bag of gems” for $9.99.

**Migration to DOB**

Even though most carrier billing connections are currently still PSMS, a greater share of carrier billing revenue is now coming through DOB connections. That is because DOB has become the predominant vehicle for carrier billing in developed markets, where the biggest portion of carrier billing revenue is generated.

Evidence shows that there is usually a big jump in end-user spending when operators transition from PSMS to DOB. DOB generates more conversions and therefore more spending.

**Definite momentum**

There is a definite shift towards DOB in the market. Ovum estimates that PSMS now accounts for around a 40% of total carrier billing revenue.
PSMS has virtually disappeared in the US, after the major carriers there shut down support for it in late 2013, at the same time as they cut their ties with aggregators. PSMS is also being squeezed out in other markets as the regulatory screws get tightened around it or carriers decide to update their payment offerings. In Germany, for example, regulatory restrictions mean that it is now virtually impossible to sell digital goods via PSMS, and in Sweden carriers abruptly switched off PSMS when they rolled out a joint m-commerce offering in February 2013, seriously damaging a thriving m-ticketing market there based on SMS.

Continued PSMS role
In most cases, however, it is not an either-or scenario. Most operators that roll out DOB also preserve their PSMS infrastructure to continue serving the legacy business that is still dependent on it. And they charge different rates for each, with PSMS yielding higher margins for operators.

Also, in markets such as India, where most mobile subscribers do not have data connections, PSMS is the only practicable way of enabling carrier billing.

DOB cost
The biggest barrier to the rollout of DOB is the investment required from operators to enable it in their networks. They require a capex investment in core charge-to-bill functions. Components have to be added to the operator’s billing systems to add third-party charges to postpaid mobile accounts or debit funds from prepaid accounts, as well as extend other BSS/OSS functions externally. There are a number of vendors that provide such components, including Aepona (now owned by Intel) and Amdocs, including on a billing-as-a-service basis.

Some carrier billing aggregators are also involved in that business. Infobip, for example, offers a no-capex/no-opex direct billing solution.

Operators can also minimize opex by integrating their DOB charge-to-bill API with one or two carrier billing platforms.

App stores
Market composition
There is no doubt that the app store market represents a big opportunity for carrier billing. But, currently, the biggest revenue slice of that market – Apple’s App Store – is not hooked up to carrier billing, nor is it likely to be for the foreseeable future.

The combined revenue of the App Store and its nearest rival Google Play was likely to be $21.4bn in 2014, of which about two-thirds was the App Store’s. This leaves $7.4bn for Google Play, of which only about 25% is carrier-billed currently.

Internationally, the big-brand app stores that are best plugged into carrier billing include BlackBerry World and Nokia Store, but these belong to waning stars in the mobile firmament. Others include Opera Mobile Store, from mobile-browser maker Opera Software, and Microsoft’s Windows Phone Store – but these are, in turn, only bit players on the app-store stage.

Google Play’s strongest contenders among the international big-brand stores are Amazon Appstore and Samsung Galaxy Apps. However, they have a long way to go yet to fully connect to carrier billing.

Connecting to carrier billing
All app stores outside the iOS ecosystem have, to a lesser or greater extent, been hooking up to carrier billing. Apple is unique in having collected the payment details of most of its device users on its payments platform, iTunes – which is why it has not needed carrier billing.

The leading players in the non-iOS pack – Google, Amazon, and Samsung – have been relatively slow at enabling carrier billing in their respective stores.

Google’s policy of striking direct deals with operators has made for slow progress. Even though it started striking deals in 2009, it had only about 20 carrier billing connections to show for it by the end of 2013 – although it did connect its three top grossing markets, the US, Japan, and South Korea, relatively early on. Also, there has been a step change over the past year, in part helped by Google’s acquiescence to allow operators to integrate with Google Play via aggregator platforms such as Bango’s. By the end of 2014, it had hooked up to 56 networks in 27 countries (see Figure 10).

Amazon has been even slower than Google. This is understandable, since, like Apple, it holds the payment details of many online shoppers. But not everyone buying Kindle devices and accessing the Amazon Appstore are necessarily Amazon e-commerce customers. Also, as the company penetrates further into emerging markets, it needs to think of alternatives to credit/debit card payments.

Samsung, meanwhile, also bypassed aggregators initially to hook up directly with operators, but has recently signed up with Bango and
is now in the process of replacing its existing PSMS-based connections with DOB ones.

**Small aggregator share**

Aggregators have a weak foothold in the big-brand app store market, especially in the part of the market that is generating most revenue – which is largely made up by Google Play and Chinese stores.

The fact that Google Play, which represents the bulk of app-store carrier billing revenue, has been striking direct deals with operators means that aggregators have not been able to share in most of those riches – in the top gossing Google Play markets of Japan, US, and South Korea, hardly at all.

An increasing number of Google Play carrier billing connections are being implemented by aggregators such as Bango and Net-M via deals struck between aggregators and operators. Often, aggregators earn integration and service fees from such deals, although a small transactional fee might also be negotiated in some cases. Bango tends to do more of the former while Net-M more of the latter.

Google expects operators to integrate with its APIs rather than the other way around: That is because Google saw just how unstandardized carrier billing was. So the integration burden falls on the operators’ shoulders, and some have wanted to outsource that burden.

For aggregators, once they have integrated their platform into an app store on behalf of one operator, they can then offer that readymade integration to other operators, spreading the cost across many networks.

**Apple**

Should Apple ever open up to carrier billing it would make the app store sector a more lucrative proposition.

There have been rumors over the past year or so of Apple’s interest in enabling carrier billing in markets with a low credit card penetration. A carrier group present in Southeast Asia says that some of its subsidiaries there were approached by Apple representatives about carrier billing, but that what the subsidiaries had to offer was not good enough for Apple HQ in Cupertino.

**iTunes vouchers**

Carrier billing already has a presence of sorts within the iOS ecosystem, if a somewhat peripheral one. It has been possible to buy iTunes vouchers in Japan via carrier billing for some time. And in September, UK carrier O2, part of the Telefónica Group, rolled out iTunes-vouchers carrier billing in collaboration with aggregator Boku.

These deals are not struck with Apple directly, but rather with voucher/gift card resellers. In O2’s case it was with epay, the electronic airtime payments processor.

The stake this kind of deal provides for carriers in the iOS apps/content value chain is small but could become more significant as iOS penetrates deeper into emerging markets where there is a greater dependence on iTunes vouchers for iOS payments.

The distribution and revenue assurance of paper vouchers/gift cards is logistically fraught in emerging markets, so enabling e-vouchers – and their remote payment – is more vital there.

Telefónica has not revealed if it is planning to extend the service to its Latin American territories, but it must surely be thinking about it.

**Indie stores**

Beyond the OS app stores, there are numerous independent stores that provide developers with less crowded alternatives to getting their apps noticed and more localized channels to specific territories and audiences. They can also offer a better deal than

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Source: Google
the standard 70/30 developer/app store revenue split, and provide more monetization options.

To users, they often offer free apps and promotions, such as: a free app of the day or a discounted premium app; recommendations for apps that might not appear in the big-store top charts; and a curated selection of apps that might be much smaller than in the big stores, but is filtered for quality, a specific age group, purpose, or country.

Many also make carrier billing a selling point, especially those in the Android market, because of Google Play’s still patchy carrier billing coverage.

Some of these stores are direct-to-consumer; some are white-label and offered to third parties to roll out under their brand; and some are a combination of both.

**Chinese stores**
China has a profusion of independent stores, given the peculiarities of the Android apps market there. Google has a limited presence in China because it refused to agree to censorship demands from the Chinese government. Although Google Play is present, it is not enabled for payments.

At the same time, there is a huge grey market for handsets fed by numerous local OEMs that are building phones with forked versions of the Android operating system, minus the Google services that are part-and-parcel of Google-certified Android devices.

The consequence is that about 80% of Android phones sold in China do not come with Google Play preinstalled. Instead, there is a plethora of independent Android app stores (about 200, according to some estimates), provided by Internet companies, handset makers, mobile carriers, and other players. According to some estimates, only around 5% of Android apps in China are downloaded via Google Play.

There is no carrier billing aggregator market such as in China. App stores connect directly to carriers’ billing APIs. But some Chinese stores are beginning to look at foreign expansion, principally in other parts of Asia, which is providing an opportunity for aggregators that have billing connections in those parts. Fortumo, for example, has recently been contracted by Chinese indie stores Changyou, Oppo, Gionee, and 9Game (the latter belonging to Alibaba subsidiary UCWeb) to power payments in countries such as India, Indonesia, the Philippines, and Thailand.

**Online games**

**Large slice**
Carrier billing is more deeply embedded in the online games world than in the app store world. Several carrier billing aggregators, such as Boku and Zong, came into existence to serve that market. The client lists of many of the leading aggregators are filled with the names of top online games publishers, including Bigpoint and Goodgame Studios.

Ovum estimates the global online games market was worth at least $23bn in 2014, climbing to nearly $30bn in 2019. And it believes that online games currently make up the biggest growing slice of the carrier billing market – about a fifth.

**Easier business model**
Compared with app stores, online games offer a much easier business model for carrier billing to fit in with – regardless of whether it is PSMS, WAP billing or DOB, and regardless of how favorable or unfavorable the payout or tax rates might be. This makes the difficult trading conditions often found in emerging markets less of a barrier. Some of the biggest online gaming markets are to be found in emerging markets – for example, China, Russia, Brazil, Indonesia, and Mexico.

Most online games follow a freemium model that encourages users to buy virtual goods to enhance play or pay tolls to unlock new levels and features. The payments are for goods and services that are usually the game developer’s or publisher’s own IP, so no royalties need to be paid to rights holders. In fact, there is little intrinsic cost in those goods and services. Their price is essentially all mark-up.

So even when the billing mechanism used to enable those payments is a rip-off, robbing the developer of 50% or more of the money paid by users, as is often the case with carrier billing in emerging markets, it is still better than making no sale at all in the absence of other billing channels. The developer is still making money, even though the operator or the taxman might be getting the lion’s share.

In some parts of the world, such as Asia Pacific, online games and virtual goods have been major drivers for the development of online payments.

In Japan and South Korea, the majority of online and social gamers have traditionally preferred to make in-game payments via carrier billing. A few years back, South Korean online gaming company NHN said that 60% of the end-user payments it received were via carrier billing.
compared with just 5% via credit cards. In Japan, meanwhile, local market sources report that about 80% of social gamers pay via carrier billing.

**Security**

In the emerging markets of Asia Pacific and other parts of the world, many online gamers play from cyber cafes because they do not have access to a PC at home or own a laptop. As already mentioned in the “Use case” section above, the shared-device and public nature of cyber cafes add to the reasons why online gamers would rather pay for virtual goods via carrier billing than card – to avoid sensitive payment information ending up in the wrong hands.

**Spending levels**

According to usage data released by Neomobile for its Onebip service, taken from millions of transactions across 65 countries over the course of a full year, online gamers spend an average of €4.73 ($5.09) per carrier-billed transaction. It also found that average transaction values are higher in markets where higher carrier billing price points are allowed by operators. In Switzerland, the average transaction is €15.09, thanks to higher price points. Turkey also experienced a rise in average transaction value after operators there increased carrier billing spending limits.

**Competing billing mechanisms**

Increasing carrier billing price points works unless, of course, there are cheaper alternatives available to developers to extract payments from unbanked users, such as mobile money wallets or cash kiosks.

For example, in Russia (which is the eighth largest online games market) four years ago most online gaming sites relied primarily on PSMS to enable virtual-goods purchases. But two years later, most of those purchases were being transacted through e-wallets linked to cash-kiosk networks such as Qiwi. This change was due to the commission on e-wallet transactions being much lower than via PSMS – 3–5% compared with an average of 50%, respectively.

Website owners were encouraging users to switch away from carrier billing by offering them greater value when paying via the e-wallets. So, for example, they were giving users the choice of paying RUB65 ($2) via PSMS to get 100 “magic coins” or paying the same amount via Qiwi Wallet for 130 coins.

Russia’s biggest Internet company, Mail.ru Group, whose large stable of websites includes two of the three largest Russian-language social-networking sites, numerous e-commerce and media sites, and 34 MMO and 30 social games, reported at the time that 45% of its payments were from cash-kiosk wallets, 32% from other e-wallets, and only 10% from carrier billing (Figure 11).

**Games’ predominance**

Games, in one way or another, make up the bulk of carrier billing transactions globally – not only via online gaming, but also via app stores, since games represent up to 80% of app-store revenues. Furthermore, the bulk of what gets transacted on the app stores tends to correspond to just a handful of top-selling games.

Bango released interesting stats last year showing that, of the top 100 selling pieces of content transacted via its platform, 97 were derived from just three games (Candy Crush Saga, Pet Rescue Saga, and Farm Heroes Saga), and every one of the top 70 sellers were from those three games.

**Other desktop opportunities**

The carrier billing opportunity on PCs is not just confined to online gaming.

**Dating**

Dating-focused social networking sites, such as Badoo, are using carrier billing as a payment mechanism on different platforms, including fixed-line. Dating is another area of social media, beyond gaming, in which it has been possible to levy payments from users. On Badoo, for example – which has 230 people signed up worldwide – users pay extra to get promoted in other people’s feeds. Other up-and-rising dating social-networking sites include Happn and Tinder.
Carrier billing is also being used for desktop apps. The Windows 8 store, for example, has enabled in-app purchases and subscription payments via carrier billing through the likes of Fortumo.

**Physical goods**

*Smallest slice*

A lot has been said about carrier billing’s potential in the physical goods arena – but with the exception of Far Eastern markets, such as Japan and South Korea, there is still relatively little happening on that score. Ovum estimates that it represents the smallest slice of the carrier billing pie now and will continue to do so going forward.

There are both legal and commercial barriers to using carrier billing for physical goods. In most jurisdictions, it cannot be done without an e-money license, which must be obtained by either the operator or aggregator/payments platform in question. But, providing the right legal hurdles are cleared, it is technically possible to get carrier billing certified for physical-good purchases.

**Commercial barriers**

What tends to be a more formidable barrier are the commercial considerations. For example, the risk around purchase, refund, and liability for physical goods tends to be more onerous than for digital goods. The operator or billing partners need to take that on board. Also, physical goods tend to have higher price points. Prepaid mobile subscribers typically do not have the balance required to pay higher prices, while postpaid subscribers may not have sufficient spend limits based on the operator’s risk profile.

Operators also need to introduce special carrier billing price tiers for physical goods that more closely resemble credit/debit card fees. That is because physical goods tend to have more tangible costs and are usually traded at much tighter margins than digital goods.

Several operators in the West and Asia Pacific have introduced special rates for physical goods. Some have had these for many years. Ovum is aware of several operators that offer rates around the 5% mark.

**Softer physical goods**

Despite this, carrier billing’s main inroads into the physical goods space have been around the “softer” variety – primarily tickets, as well as vouchers/gift cards (see “Apple” section above) and parking charges. In terms of “hard” physical goods, most activity has been confined to vending machines, for soft drinks and snacks. It has also been applied to phone accessories. In other words, it is used for low-value goods.

The market that is most evolved is South Korea, where reportedly around 40% of carrier billing transactions are for physical goods. But this is truly exceptional. In most other territories, the physical goods market is only just beginning to move out of the pilot/trial phase.

In Europe, m-ticketing for transport and parking is relatively well established in the Nordic region and has also taken root in some cities in mainland Europe. In Italy, for example, where a relatively large number of cities have introduced m-ticketing, aggregator Netsize is processing around 100,000 tickets per day.

Carrier billing has recently also extended into the realm of taxi fares. In Turkey, taxi app BiTaksi is using Neomobile’s Onebip service to enable carrier-billed payments for fares of up to TL100 ($43). The deployment is currently confined to the capital, Istanbul, and to Turkcell Platinum subscribers.

**Off-store content**

Another carrier billing segment is direct deals that are struck with media publishers and media platforms.

On mobile – and smartphones specifically – the direct-to-consumer opportunity for such companies has significantly reduced since the advent of the app stores. This has not stopped the likes of Deezer and Spotify striking deals with the likes of Boku. However, these carrier billing deals, apart from bundling or reselling deals with operators, represent a small part of the music-streaming companies’ business.

Aggregators, such as Boku and Net-Mobile, have also struck deals with the likes of Sony Entertainment Network, which has multiscreen games, music, and video offerings, including the PlayStation consoles. The biggest opportunity here for mobile payments is online. Consoles/set-top boxes offer a carrier billing opportunity for fixed operators, however, that does not enter into the scope of this report.

Although most media usage on smartphones is now via apps, there is still some activity on browsers. For example, as on PCs, there are online gaming sites – either pure-mobile ones or mobile-optimized versions of online sites. And most of the big mobile-game publishers, such as EA and Gameloft, have D2C mobile sites.

Another big draw for browser usage on phones is adult content.

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*Smallest slice*

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**Swedish debacle**
Swedish had arguably the strongest transport m-ticketing market in Europe, the purchase of SMS tickets to travel on buses and trains was commonplace there for many years. But, in anticipation of the EU’s new Payment Service Directive, which threatened to stop operators from billing for non-telecoms services, operators there banded together to form a payments joint venture, 4T Sweden, with e-money status.

As part of this initiative, they launched an e-wallet which replaced the old PSMS arrangement, but failed to prepare passengers and m-ticketing providers for the switchover. All of a sudden, people that had been buying SMS tickets for years could no longer do so and were told to sign up to the e-wallet to continue paying for transport via their mobile bill. The confusion caused led to a 70–80% drop in m-ticketing sales.

**Games merchandise**
In an interesting crossover between the digital and physical worlds, games developer Rovio and carrier SingTel recently launched in Singapore an online store for merchandise toys related to the iconic mobile game Angry Birds – and hired Fortumo to enable shoppers to buy the plush toys via carrier billing.

In a blog, Fortumo explained that branded plush toys make good candidates to be sold via carrier billing, because they are not very high-ticket items (costing between $5 and $50), have relatively high margins, and are usually impulse purchases.

**Market barriers**

**Taxation**
Unfavorable tax regimes tend to be the biggest barrier for the spread of carrier billing within specific territories. It is a problem that is particularly acute in emerging markets.

**Withholding tax**
Many countries in the developing world impose heavy taxes on outflows of money. This is particularly challenging when carrier billing needs to be enabled for global merchants and doubly so if the merchant in question is an app store, because of the tight margins of the app-store billing model (see “App stores” section above).

In India, up to 40% of capital leaving the country can be withheld at the border. Brazil is also a bad case, with withholding-tax rates of 20–30%.

This is not necessarily a problem if the merchant in question has a local subsidiary capable of taking receipt of locally-generated carrier billing revenue. But even for giants like Google, that is not always the case. For example, India’s high withholding taxes have been a barrier to enabling Google Play billing there.

There are ways around the problem, but none are straightforward. They essentially boil down to keeping the money within the country by setting up or partnering with a local entity and paying merchants from money reserves held in other countries with more benign tax regimes.

**Post-sales taxes**
Another complicating factor is taxes that are applied after sales, in addition to the retail price paid by the end user. For example, Malaysia has a general service tax applied to sales, and India charges an ongoing 12% license fee to operators on all their revenues.

But the big app stores do not tolerate taxes added post-sale. They simply will not do business in countries where such taxes are applied.

**Regulation/self-regulation**
The big changes happening in the payments space around digital and mobile has led to catch-up regulatory changes that have had repercussions on carrier billing – although sometimes operator reaction to these changes, rather than the regulation itself, is what has done most damage. A case in point was the rushed carrier-billing switchover pushed by Swedish operators that undermined m-ticketing (see “Physical goods” section above).

**PSMS scams**
Carrier billing scams, especially in relation to PSMS, have led to litigation and regulatory crackdowns in different parts of the world.

The most extreme intervention by regulators took place three years ago in Indonesia, where the local regulator shut down all of the country’s mobile value-added subscription services due to media reports of “credit theft” by rogue merchants. According to MEF, the mobile content industry association, the sweeping action reset the Indonesian VAS market to zero.

**US PSMS switch-off**
In the infamously litigious US market, the country’s four major carriers took their own drastic action in November 2013, shutting off most PSMS services except, in some cases, charitable donations. This followed costly class-action suits against the carriers for “cramming,” a scam by which users are unknowingly signed up to, mostly, PSMS subscriptions. The carriers were also responding to an anti-cramming campaign
led by the attorney general of Vermont State, which had drawn the participation of regulators from 44 other states. According to the attorney general, 60% of third-party charges placed on the mobile phone bills in Vermont were “crammed.”

Cramming is also common in other parts of the world, but in many countries where it had become rife, such as Brazil, Indonesia, and the UK, operators and regulators have been more effective at keeping it under control.

PSMS was a profitable business for US carriers, but ultimately the lawsuits and bad press associated with it became too much of a burden.

**Carrier fickleness**

Carrier commitment to carrier billing can sometimes be quite fickle, as demonstrated by Vodafone’s decision to end its global deal with Google Play and T-Mobile US’ decision to pull out of the market altogether. Ultimately, carrier billing revenues represent only a small fraction of overall carrier revenues, and other strategic considerations can get in the way.

Inside sources at Vodafone have told Ovum that the carrier group fell out with Google over contractual differences. In part, this may be a consequence of Google’s preference for striking direct deals with carriers. When a big carrier group like Vodafone and an online giant like Google come together, it can end up becoming a big clash of egos. In carrier billing, there are lot of elements around revenue assurance and settlement that have to be taken care of and, unless there is complete agreement over what each party is responsible for, it can lead to disagreements.

These kinds of clashes are more avoidable if a specialist, such as an aggregator, is used as an intermediary.

**Forecasts**

**Overall size**

Ovum estimates that the global carrier billing market was worth $14.5bn in 2014 in total transactional value, climbing to just over $24.7bn in 2019 (see Figure 12). Included in Ovum’s definition of carrier billing are all forms of levying charges from mobile bills or prepaid airtime credit to pay for third-party content and services – not only direct operator billing, but more traditional forms such as PSMS and WAP billing.

Market growth will be tempered by declining revenue in the PRS/feature-phone and browser-based segments (see Figure 13).

**Segments**

**PRS/feature phones**

Although a rapidly shrinking segment from which some aggregators are orienting themselves away, the market for premium rate services (PRS) and feature-phone content still manages to muster enough revenue to account for the largest slice of the global carrier billing market today – although it will be overtaken by indie app stores in 2016 and end up in fourth place by 2019, out of the seven carrier billing segments identified by Ovum.

The decline of the PRS/feature-phone segment would be sharper but for the fact that PRS revenue is still growing in some emerging markets. However, that growth will tail off at different stages during the forecast period.

In developed markets, there is still PRS growth around charity donations. TV voting – once one of the mainstays of the PRS industry – presents a more mixed picture. Although more channels and shows are adding interactivity to their programming, much of the text voting now is no longer charged at a premium and much of the audience participation is happening via companion apps.

Quizzes and competitions, another traditional PRS mainstay, are in sharp decline in developed markets, but are exploding in Africa, India, and other parts of the developing world, according to market sources.

**Online PC games**

The second biggest carrier billing segment is online PC games, which are the staple for many of the international carrier billing aggregators such as Boku.
degree to which online in-game payments are billed via carriers varies from territory to territory – from less than 2% in some territories to up to 15% in others.

Revenue from online PC-game carrier billing was $2.6bn in 2014, and is forecast to reach $3.4bn in 2019 and ending up ahead of the PRS/feature-phone segment, although behind the OS-app-store and indie-store segments. Throughout the forecast period, the biggest contribution to online-PC-game carrier billing revenue will come from China, where the online PC games industry is estimated to be worth $12bn or more today.

**Indie stores**

Indie-store carrier billing revenue will overtake online PC games this year to become the second-ranked segment. China, with its huge independent Android app store sector, is again the main protagonist in this segment, generating the lion’s share of revenue. China’s apps market is conservatively expected to grow nearly three-fold over the next five years.

The central role played by carrier billing in enabling payments in China’s Android app economy, contrasted by Google Play’s slow rollout of carrier billing globally, means that indie-store carrier billing will become the biggest revenue segment in 2016 but will then be overtaken by OS app stores revenue in 2017.

**OS app stores**

OS app stores are forecast to become the biggest carrier billing revenue segment in 2017. However, it could overtake indie stores and all other segments much earlier if Apple were to embrace carrier billing, something mooted by some industry insiders as an imminent prospect.

Regardless, the OS app store segment will be the fastest growing over the forecast period. The rate at which Google Play has been switching on carrier billing connections has accelerated over the past year and, as more countries are hooked up, the sharper the growth curve in carrier-billed revenue will be within the store. Still, it has yet to enable carrier billing anywhere in Africa or Latin America – although there are carrier groups in both continents that are planning to roll out Google Play payments across their footprints there sometime in the not-too-distant future.

**Browser-based**

The browser-based segment, which this year will move from third to fifth place in the revenue ranking, will struggle to sustain growth for the duration of the forecast period – largely due to the relentless growth of app usage at the expense of mobile Web usage, and to the declining Japanese mobile Web games market, which accounts for a large chunk of that segment currently.

**Bundling/off-store apps**

The bundling/off-store apps segment will be the second-fastest growing after OS app stores, as the trend for mobile operators to bundle OTT content and services into their subscription plans continues to accelerate. Beyond music streaming services such as Deezer and Spotify, carriers will increasingly be offering other subscription-based services such as Netflix, Lookout, and Evernote, helping this segment
register the second-fastest rate of growth over the next five years.

**Physical goods**

Finally, physical goods will remain the smallest segment of the carrier billing market throughout the forecast period. The segment is largely comprised of the purchase of quasi-physical goods such as bus, train, and parking tickets, postage stamps, and vending-machine products, via PSMS or apps. However, it is likely that mobile wallets such as Apple Pay and Google Wallet or the operators’ own wallets will increasingly steal market share away from carrier billing for these types of transactions.

**Regional split**

Asia Pacific’s disproportionate slice of revenue throughout the forecast period (see Figure 14) is the result of a combination of factors:

- An unusually large online PC games market in China, with a considerable carrier-billed element

Asia Pacific’s dominance in the carrier billing space reflects its growing dominance in the apps market, with Japan topping Google Play revenue and Japan and China being second and third ranked on iOS.

- An exploding apps economy in China dominated by local indie stores with good carrier billing connections
- The high apps ARPU levels in Japan and South Korea and Google Play’s relatively long-established carrier billing connections there
- A $2bn Web-based mobile games market in Japan that is largely carrier billed.

**Figure 14: Global carrier billing revenue, by region, 2014–19**

Source: Ovum
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