EDISON

Mobile ecosystems

Devil in the details

Technology

18 March 2014

Ecosystems are becoming more sophisticated as users do more with their devices. Consequently, how one ecosystem differs from another is becoming less obvious. We have introduced four new laws of robotics to better evaluate the different players. iOS continues to gain in strength, while Google is still struggling with software problems. The lead challengers are Microsoft, Xiaomi and Yahoo! all of which have a lot to do.

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- **Maturing market.** Users are becoming more sophisticated in terms of what they demand from their digital lives. Ecosystem providers are beginning to cotton onto this and differentiation between the players is becoming more difficult.
- **Devil in the details.** To take this increasing sophistication into account, Radio Free Mobile has expanded the criteria by which the quality of an ecosystem is judged from 3 to 7. This is to take into account the increasing sophistication of ecosystems, as well as the ability to more accurately reflect their strengths and weaknesses.
- **Four new laws – Law 4: app equivalency.** How well the app store of an ecosystem compares to Apple. **Law 5: data sharing.** How well the user experience is enriched through apps and services sharing data. **Law 6: user data integration.** How well an ecosystem understands its users. **Law 7: software consistency.** How consistent is the software used across the devices on which the ecosystem is present?
- **iOS.** Our research indicates that Apple has decided not to compete on Digital Life services, but instead to differentiate through exclusive functionality based around Home Kit, Health Kit and Apple Pay. The superb reception of the iPhone 6 has given Apple more time to get this strategy up and running before commoditisation starts to bite.
- **Google** has the largest ecosystem, but the user experience remains hobbled. The quality of the user experience and Google's inability to get its software into the market in a timely fashion, continue to be serious hindrances to user loyalty and Google's ability to monetise Android. We expect Google to aggressively exert its control over Android software in the short to medium term.
- **Microsoft** still has a massive hill to climb. Its ecosystem is gradually getting better, but it continues to hide its light under a bushel. Its marketing remains very weak and users still have no idea why they should consider Microsoft's ecosystem. As a result, Microsoft actually lost market share during 2014.
- **Others.** Xiaomi and Yahoo! head an ever-growing list of challengers.

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Acknowledgements: Edison Investment Research exclusively uses Counterpoint Research for the sourcing of historic handset and tablet shipment data. Edison Investment Research has a commercial partnership with Counterpoint Research. Details of Counterpoint's products and services can be found at www.counterpointresearch.com

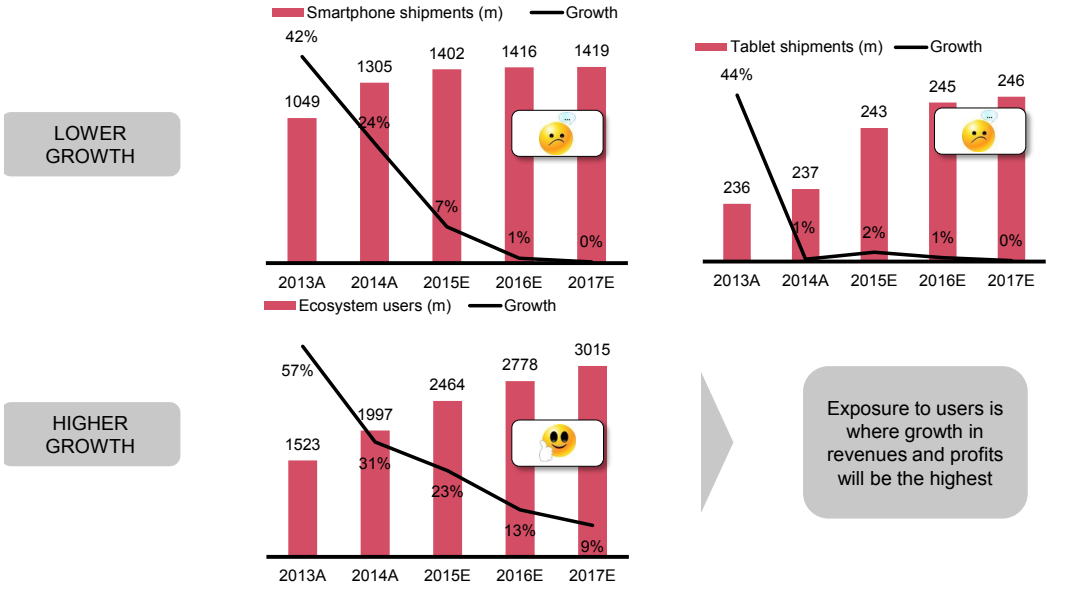
Counterpoint
Technology Market Research

Market update

Smartphones, tablets and ecosystem users

As the market for devices continues to slow, life is likely to get harder. This is because manufacturers will have to fight for share to see any growth and because they will have to become more innovative in finding new ways to keep users engaged. Even the mighty Apple will succumb to this problem as ultimately its bread and butter comes from selling devices rather than subscriptions or advertising (Exhibit 2). Google, Yahoo!, Facebook and so on do not suffer from this problem as their growth is geared to users that are still showing good growth (Exhibit 1). However, of all the players, we suspect that Apple will be happy to sit on top of the market, earning excellent returns, albeit with little or no growth. It is at this point that we would expect it to turn its attention to TVs, wearables or other markets where it currently has no position.

Exhibit 1: Smartphone, tablet and ecosystem forecasts 2013-17e



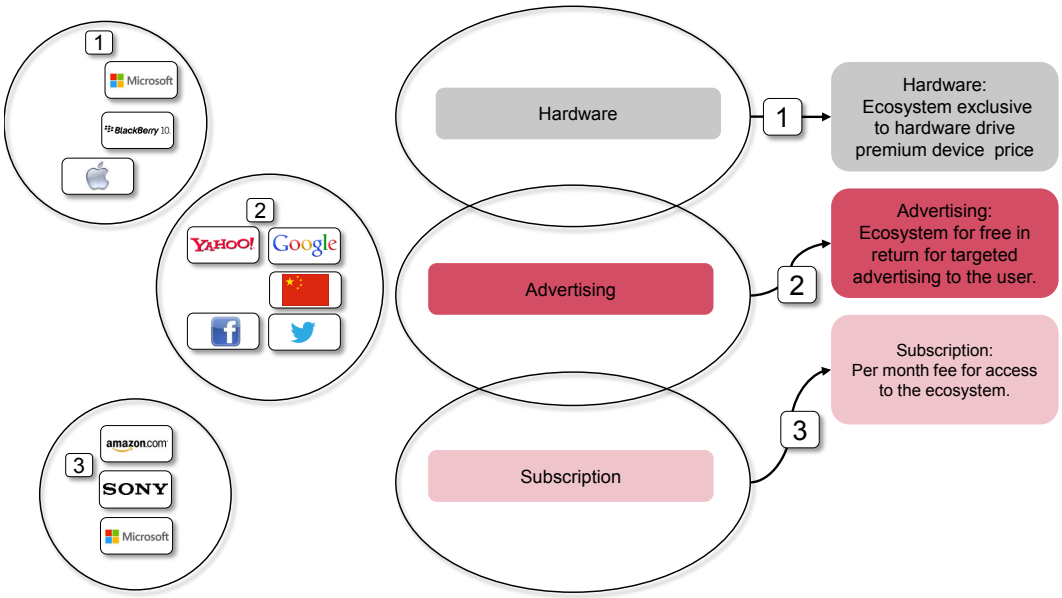
Source: Edison Investment Research, Counterpoint Research

It is important to understand the method of monetisation of the ecosystem as this has direct relevance on how well an ecosystem will be able to grow without having to fight for market share. Ecosystems monetising through devices have very little revenue growth, whereas those that have can generate revenues on a per-user basis and should see more than 10% revenue growth pa for at least the next two years.

There are three ways that the ecosystem can be monetised (Exhibit 2): **1) Monetisation through hardware.** This involves keeping the ecosystem exclusive to the devices from a single manufacturer and earning a return on the ecosystem through premium device pricing. If the ecosystem is desirable, users will be willing to pay for access to it. This is exactly what drives Apple's margins and what almost every other device maker is trying to emulate; **2) Monetisation through advertising.** This involves giving the ecosystem away for free and then monetising by making users targets for marketing campaigns sold to advertisers. This is a very effective method for the mid- and low tiers, but requires excellent infrastructure to be effective. This method requires a good score on laws of robotics 3, 4 and 6 to achieve effective monetisation. It should come as no surprise to see Google get top marks on each of those laws; and **3) Monetisation through subscription.** This involves monetisation by selling access to the ecosystem for a fixed fee per month or per year. It is the least developed of all of the business models but we can see this becoming more popular if users become fed up with being constantly bombarded with advertising.

This model can also sell itself on its security and privacy as there is no need to track user behaviour or to share it with any third parties. Amazon (page 29) has followed this route with Amazon Prime, but has seen no real success. We think that Microsoft may also follow this route by expanding its Xbox Live offering to cover more Digital Life services or by offering Windows 10 on a subscription basis like Office 365.

Exhibit 2: The three models of monetisation of ecosystems



Source: Edison Investment Research

We expect that all ecosystems will adopt one of these three monetisation methods or potentially a combination of both. A good example here would be Microsoft, which could be content with low margins in devices that are then augmented by an ecosystem subscription. As with Digital Life, this analysis explicitly excludes revenues made from selling content. This is because we consider content sales, like e-commerce not to be an incremental revenue stream enabled by the ecosystem. If the internet or the ecosystem did not exist, the user would probably have spent the money on a DVD or a CD rather than buying it online. We focus instead on the opportunity for monetisation related to the user living his Digital Life on a mobile device. An example of this would be the degree to which iTunes on iOS makes the platform preferred and enables Apple to charge a premium price for its devices.

Ecosystems

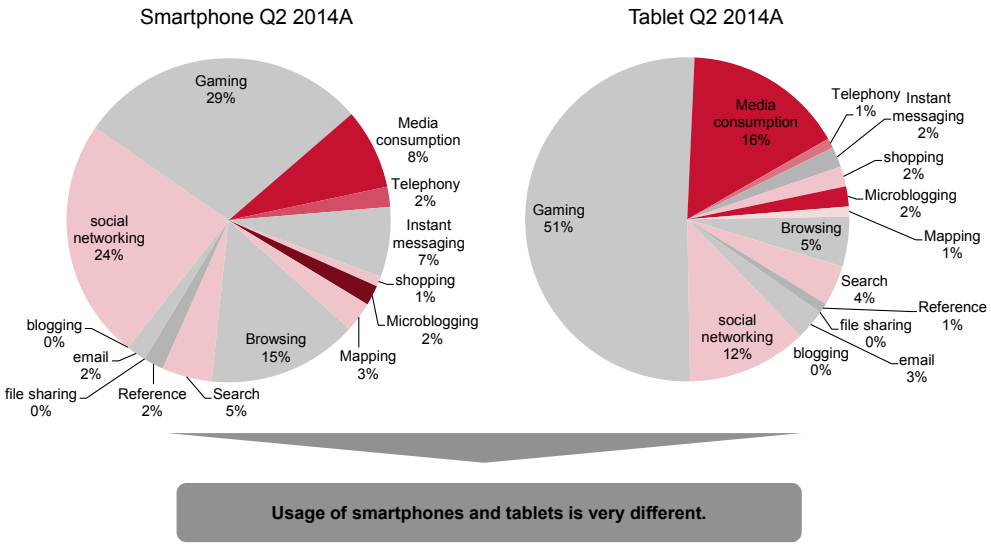
Our analysis of the ecosystem is in two parts. **Firstly,** an analysis of how well an ecosystem addresses the market opportunity. This is the Digital Life analysis (see below). **Secondly,** we provide an analysis of how good the ecosystem is at providing Digital Life to its users. This comprises the seven laws of robotics analysis. The two are then combined to give an overall picture of the ecosystems (Exhibit 16), which is then used in combination with an assessment of their strategies to estimate their size, success and value (Exhibit 15).

Digital Life

The Digital Life pie (Exhibits 3 and 4) remains central to our analysis of the digital ecosystem. It is a measure of how much time users spend engaged with digital services on their devices outside voice and text (and e-commerce). Analysing each ecosystem on this basis gives a very good idea about how well developed an ecosystem strategy is and how much more work or investment is

needed to assemble the right assets to have a complete offering for the user's Digital Life. It also gives a good assessment of how big the monetisation opportunity is.

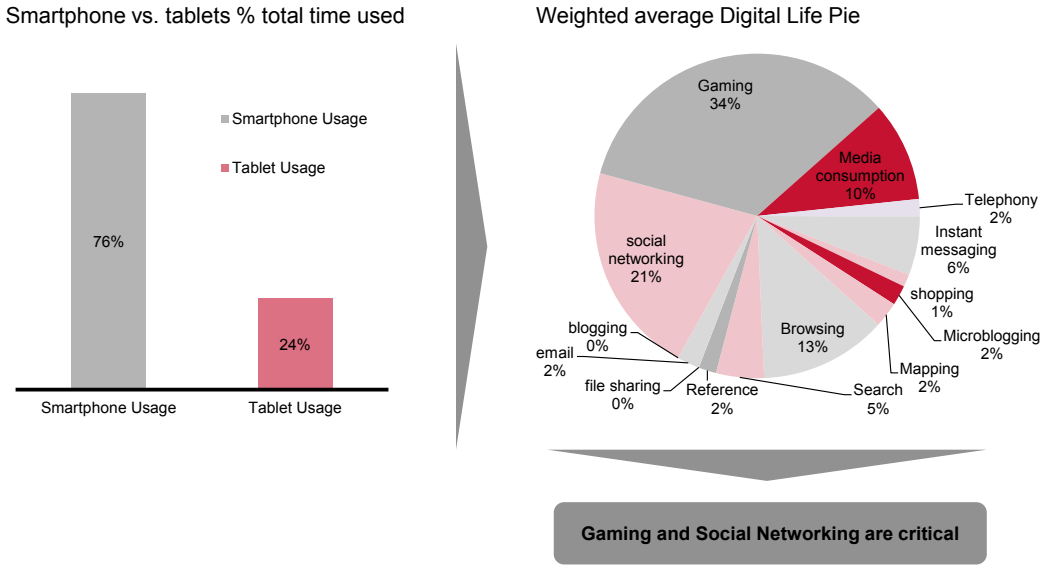
Exhibit 3: Radio Free Mobile Digital Life pies, Q214



Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

A key observation from this analysis is that **the whole is much greater than the sum of the parts.** This is for two reasons. **Firstly,** the more of the pie that is addressed, the more the ecosystem will know about the user. Therefore, targeting will be more accurate, more relevant and hence carry much higher ASPs. **Secondly,** the greater portion of Digital Life that the ecosystem addresses, the more time the user will spend in that ecosystem. Hence there will be a greater opportunity to target the user. Combining these two reasons makes it clear that both ASPs and volumes will increase as coverage improves, giving a much greater uplift in overall revenues. This is particularly important for those ecosystems that aim to monetise users via advertising (Exhibit 2).

Exhibit 4: Radio Free Mobile combined Digital Life pie, Q414

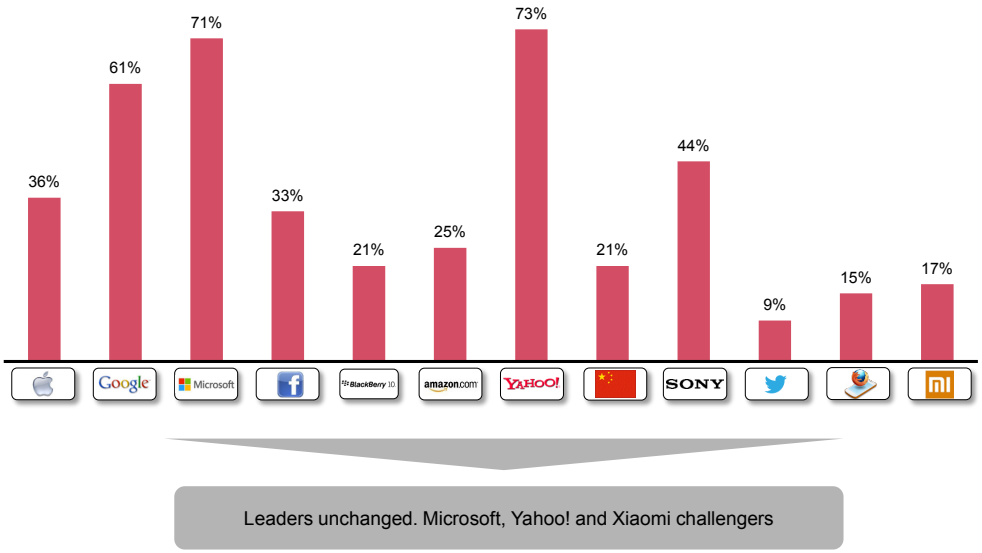


Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

It is surprising that although new fads come and go, the way smartphones are used does not change that quickly. The Digital Life pie represents the core activities in which users are engaged on digital devices and in many instances, new fads and crazes fit into one of the categories that already exist. For example, the wildly popular Heads Up app is actually part of the gaming segment,

just as Snapchat belongs to the instant messaging segment. Consequently, we have seen no meaningful change in the usage patterns over the last three months, although it is clear that some parts are growing more quickly than others. Improving usability and the network effect have meant that shopping, instant messaging and productivity (enterprise) usage has been growing much more quickly than the others. Consequently, we expect that the segments of the Digital Life pie will change somewhat when it comes to their relative size and importance during 2015. We do not see a new segment entering in 2015. How each ecosystem scores on the Digital Life analysis is shown in Exhibit 5 below.

Exhibit 5: Coverage of Digital Life by ecosystem



Source: Edison Investment Research

Seven laws of robotics

To date we have used the Three Laws of Robotics to provide a qualitative assessment of the ecosystems under coverage. Digital Life is a measure of how well the ecosystems address the total opportunity, but it makes no assessment of good they are. For the last 18 months, we believed that three simple rules were sufficient to obtain a good view of how well an ecosystem is performing. However, over the same period ecosystems have become more complex and more sophisticated. As users begin to use digital ecosystems for more and more functions, there are other aspects emerging that affect the user experience and consequently how strongly a user will identify and prefer one ecosystem over another. We continue to believe this preference represents the essential criteria that will determine how well an ecosystem can be monetised by its owner through any of the three methods (page 2).

To add further granularity, we have added four more laws of robotics to the original three to get a better assessment of how good the ecosystems under assessment are at addressing the needs and desires of the user. For readers that are new to our ecosystem analysis, the original Three Laws of Robotics are described in more detail in Mobile Software – iRobot, 6 March 2014.

The seven laws

1. **Easy and fun:** an ecosystem must provide easy and fun access to digital life.
2. **Set up:** an ecosystem must be simple and easy to set up and use.
3. **Traffic capture:** an ecosystem must capture traffic on its own servers.

The above represent the original analysis, with laws 4 to 7 added as tests to bring greater depth and relevance to the results.

4. **App equivalency:** an ecosystem must offer access to a good range of third-party apps.
5. **Data sharing:** an ecosystem must allow Digital Life services to share data.
6. **Data integration:** an ecosystem's user data must be integrated.
7. **Software consistency:** an ecosystem must have consistent device software.

In addition to adding four laws, we have moved to a quantitative scoring system for each ecosystem against the seven laws. Each ecosystem is assessed against each law and given a score out of 5 based on how well it performs against those criteria. (5 is the best score and 1 is the worst). Each ecosystem can then be given a score out of 35, which is translated into a percentage and displayed in Exhibit 13.

Law 4: App equivalency

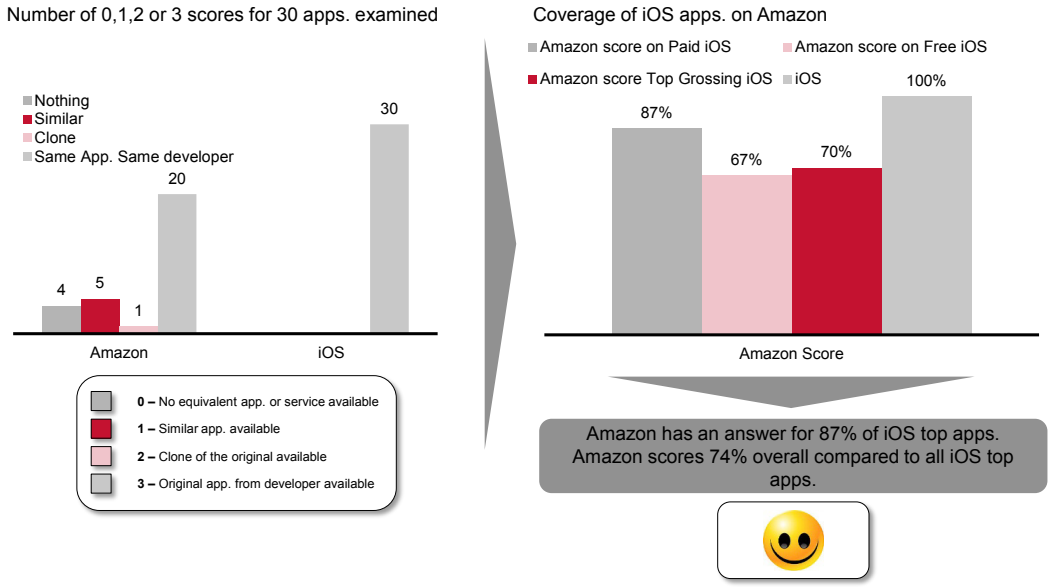
Following the launch and huge success of the Apple App Store in 2008, easy availability of high-quality apps from third parties has become a very important part of the ecosystem experience as far as the user is concerned. In recent years this has been so much the case that some devices have suffered significant returns simply because the user could not find the apps they wanted on the device or its app store.

Creating an app store is also a horrible chicken-and-egg situation. Developers are, for the most part, small organisations that have very limited resources when it comes to supporting multiple platforms. They have to prioritise their resources and in most cases this means making the app or service as good as possible, with supporting multiple platforms being an afterthought. Consequently, when it comes to deciding which platform or platforms to support, developers base their decision on how much money can be earned from supporting one platform or another. An ecosystem that has many millions of users is a much greater draw for developers due to the much larger addressable market. At the same time, to draw users into an ecosystem, there needs to be a large range of apps and services available. Those ecosystems that are not already large have really struggled with this problem, and even throwing money at developers to write apps has not met with a great deal of success. **It is important to note that having good availability of apps is only a part of what it takes to have a successful ecosystem.** A good example of this is Amazon, whose app store scores very well when tested for app equivalency, but remains one the smallest and least relevant of all the ecosystems.

To date iOS has led the way as its users spend far more on apps and services than the users of any other ecosystem. This is partly due to iOS users being predominantly in the high-end demographic, but also because iOS makes it much easier and fun to discover and buy new apps and services. Consequently, most developers will develop for iOS first and think about everything else as an afterthought. This means the Apple App Store is the benchmark against which all other app stores should be compared. This is the basis for assessing how good the other app stores are at delivering enough high quality apps to keep users happy.

At any one point in time (29 January 2015), we compare the top 10 apps in the US App Store to paid, top grossing and free charts to what is available in the app stores of competing offerings. Unlike similar analyses, we do not see this as a black and white comparison. This is because an app from another developer that has exactly the same function as one in the Apple App Store may end up being just as good as the original. Consequently, each app needs to be judged on how well it offers the same service or experience available on iOS.

Exhibit 6: Amazon vs Apple App Store, 20 January 2015



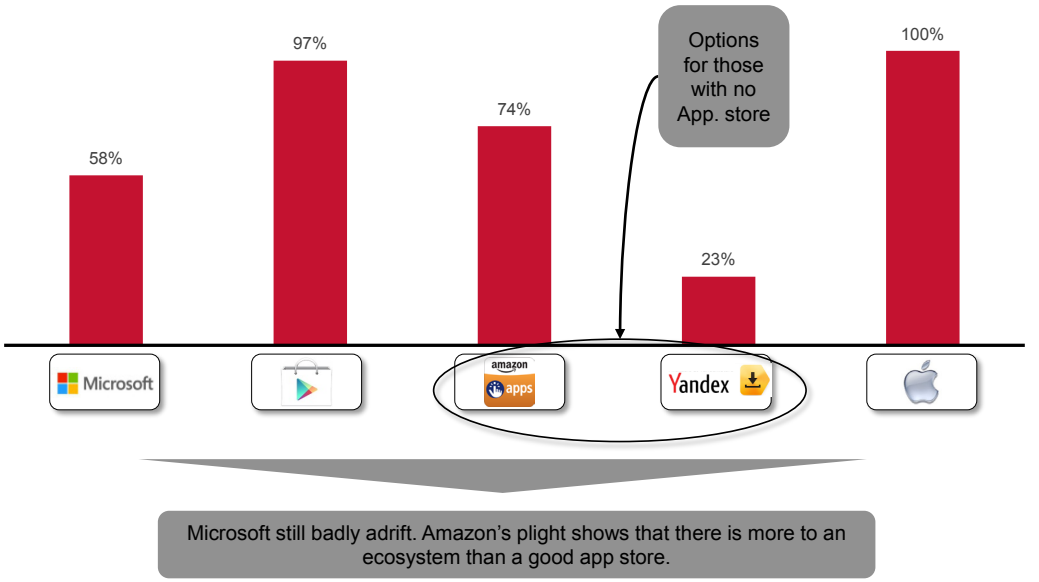
Source: Edison Investment Research, Apple, Microsoft, App Annie

We have developed a four-tier system for comparing other ecosystem apps to those available on iOS (Exhibit 6, left-hand side). 1) a score of zero indicates that there is no equivalent app or service available on the competitors' app store. 2) a score of 1 indicates that there is a similar app available. 3) a score 2 of indicates that there is an app available where the functionality is almost exactly the same. 4) a score of 3 indicates that the same app from the same developer is available. This gives an indication of how many of the iOS's most popular apps the competitor has an answer for. In the case of Amazon, we can see that 26 out of 30 (87%) of the most popular iOS apps are also available in some form to Amazon ecosystem users.

The analysis is then taken one stage further to produce a quantitative assessment of how good the coverage is. This can be seen on the right-hand side of Exhibit 6. This is achieved by scoring how well the competing app store has replicated the experience of iOS in each of the three categories. With a maximum score of 3 (original app from original developer), the maximum score when compared against each iOS chart is 30. This score is then expressed as a percentage to give an understanding of how it compares to iOS. An overall score for the three charts can be calculated using a simple average. In this case Amazon has pretty good coverage across all of the iOS charts and scores 74% in terms of well it is able to replicate the apps and services offered by the Apple App Store.

This process was repeated for Google Play, Windows Phone and Yandex (Exhibit 7). Ecosystems that do not have an app store of their own often co-exist with Google Play on the device, which means that availability of third-party apps and services is not a big issue. However, any ecosystem taking this route will suffer from the fact that it is having to compete with the Google ecosystem, which will be front and centre on that device. We think this could be a significant disadvantage to any ecosystem trying to compete for the heart and mind of the user, as Google will have effective control of the device, prioritising its services over those of all others (Exhibit 22).

Exhibit 7: Law 4 – how well each app store measures against iOS



Source: Edison Investment Research, Apple, Amazon, Yandex, Google Microsoft, App Annie

Each ecosystem is assessed according to which app store is made available to its users and then given a score out 5 based on the overall score it receives from this analysis (Exhbitis 11b and 12b).

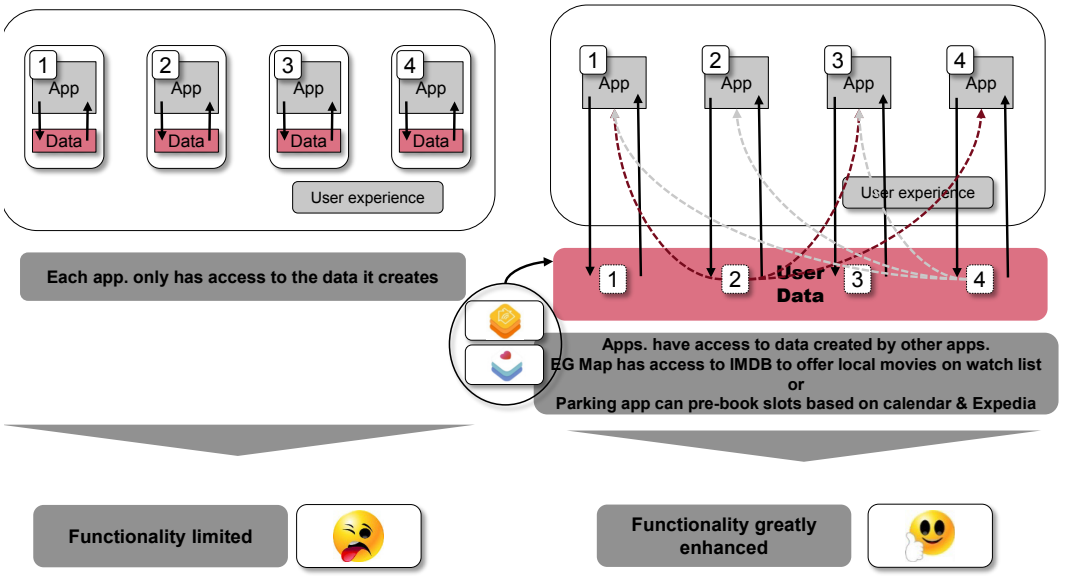
Law 5: Data sharing

To date apps on smartphones have existed in glorious isolation from one another. This effectively means that an app only has access to the data it has created or the data associated with its specific function or service. In iOS this is implemented by having each app in its own software container together with all the data that the app has created or has associated with it. For example, non-Apple movie players often appear to be occupying many gigabytes of space. This is because the movies they play and the player themselves are held in a container to which there is no access in or out (Exhibit 8, left-hand side).

This is by far the easiest way to implement apps, as by limiting access the scope for the app to cause malicious damage or to steal data is greatly reduced. It also means that no testing is required to ensure data are in a form that can be read by multiple apps. To date, this has not really been a problem, but new uses for digital devices are still emerging. Consequently, this will not last forever and pretty soon we think that this simplified system will inhibit the development of functionality. This is similar to the "whole is much greater than the sum of the parts" concept in Digital Life. We think that by having access to the data generated by other apps and services, individual apps can become much more relevant and useful to the user. For example, a parking app that has access to the user's calendar and Expedia having the ability to automatically reserve parking slots based on where the user will be at different times. A further example of this would be a digital assistant like Siri, Google Now or Cortana having access to the data created by all the other Digital Life services and third-party applications. This would give the digital assistant a much greater ability to prompt the user and to offer relevant help to the user in question. The greater the relevancy, the greater the user engagement and, consequently, the stickiness of the ecosystem. It comes as no surprise that Google Now offers by far the best answers to questions and a better ability to bring relevant information to the user's attention in a timely fashion.

We believe that this sort of functionality (as long as it works and is reliable) would be much more valuable to the user. Implemented correctly, we think it could be a differentiator that would influence the user's decision about where to live his Digital Life.

Exhibit 8: Law 5 – how well do Digital Life services share data?



Source: Edison Investment Research

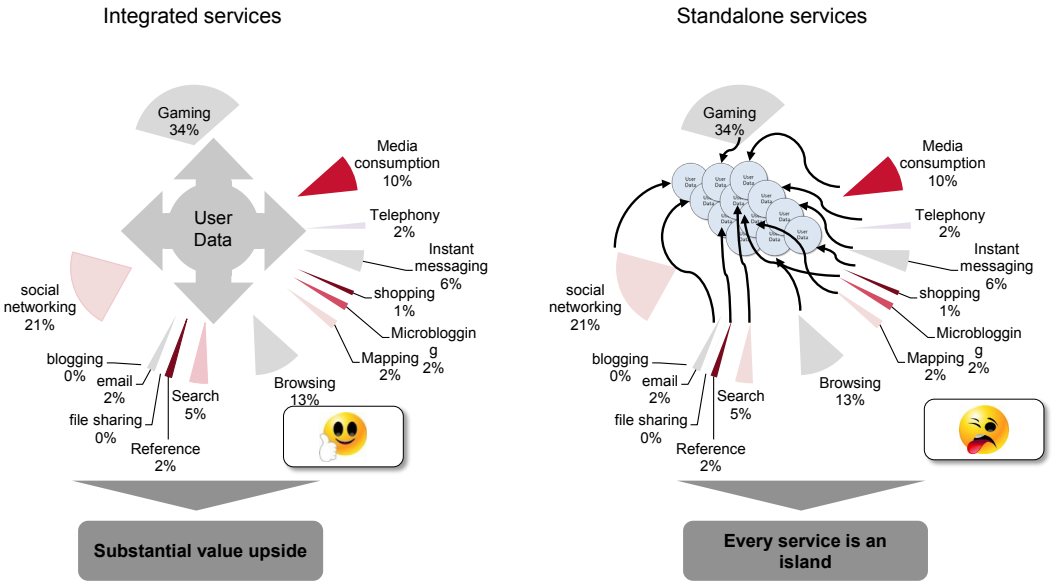
This is why we have included an assessment of how well apps in an ecosystem can share data as a contributing factor in assessing how good an ecosystem is at providing Digital Life services and apps to its users. It is important to note that iOS scores badly on this measure as apps developed for iOS continue to exist in glorious isolation. We think that Apple has recognised this issue and the environment in which services written for Health Kit and Home Kit will be very different. Here we think that apps will be able to easily share data, but the level to which Apple allows this remains to be seen.

Law 6: User data integration

While Law 5 refers to the ability to share data on the device, Law 6 refers to an ecosystem's ability to understand usage as a user profile rather than a series of separate activities. This means the ecosystem needs to have all the information collected from its Digital Life services in a single database. This is the only way an ecosystem can really hope to properly monetise using advertising as its mechanism (Exhibit 2). This is because when it comes to the user data the whole is much greater than the sum of the parts. This is for two reasons. **Firstly,** the more of the pie that is addressed, the more the ecosystem will know about the user. Targeting will therefore be more accurate, more relevant and hence carry much higher ASPs. **Secondly,** the greater portion of Digital Life that the ecosystem addresses, the more time the user will spend in that ecosystem. Hence there will be a greater opportunity to target the user. Combining these two reasons makes it clear that both the ASPs and volumes will increase as coverage improves, giving a much greater uplift in overall revenues. To achieve this, the ecosystem must be able to understand the user as a single entity that engages in a series of activities (Exhibit 9, left-hand side).

Most ecosystems today are very far from having all the user data in one place (Exhibit 9, right-hand side). This is particularly acute in ecosystems that have increased their Digital Life coverage by acquisition, eg Yahoo! and Microsoft, both of which have a very poor understanding of their users as they are unable to differentiate between different users and the same user using multiple services. This is not a technically difficult problem to fix, but takes a lot of time and involves a lot of messy software plumbing.

Exhibit 9: Law 6 – how integrated is user data from different services?



Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

We think that in the long term, the ability to better understand and hence serve one's users will be important for all ecosystem providers, not just those reliant on advertising for monetisation (Exhibit 2). This is because a better understanding of one's users will mean a better ability to offer Digital Life services that are relevant, fun and useful. This is why we use this measure for all ecosystems, not just those that utilise advertising as their monetisation mechanism.

Law 7: Software consistency

Throughout the history of the mobile phone industry, software consistency has been a recurrent theme. Back in 2002, one the main reasons Motorola had big problems with its user interface was that there were at least 30 versions of its handset software knocking around in its handset division. This made it impossible to fix any issues with the code as no one would know which version to fix and fixing all of them was a crazy waste of resources. In 2004 a lack of software consistency also dealt a death blow to J2ME (Java Micro Edition) as separate implementations were so different and so badly documented that developers had no idea which version to write for or which APIs were present. Furthermore, to address all the market, at least five or six different versions had to be written. This meant that very few games or apps were available for J2ME which, combined with its performance and battery life issues, meant that it never became the platform that many hoped it would.

This problem is alive and well today and mostly to be found in the Android camp. iOS and Windows Phone are controlled by single companies and so the code is tightly controlled ensuring good software consistency. In the case of Android, it is both open source and incomplete, which means that anyone can tinker with the code that is there, but needs to add a lot to create a viable ecosystem (Exhibit 10). We strongly believe this is a major factor reason usage of Android-powered devices is way below that of iPhone and why many developers prefer to develop for iOS before considering Android.

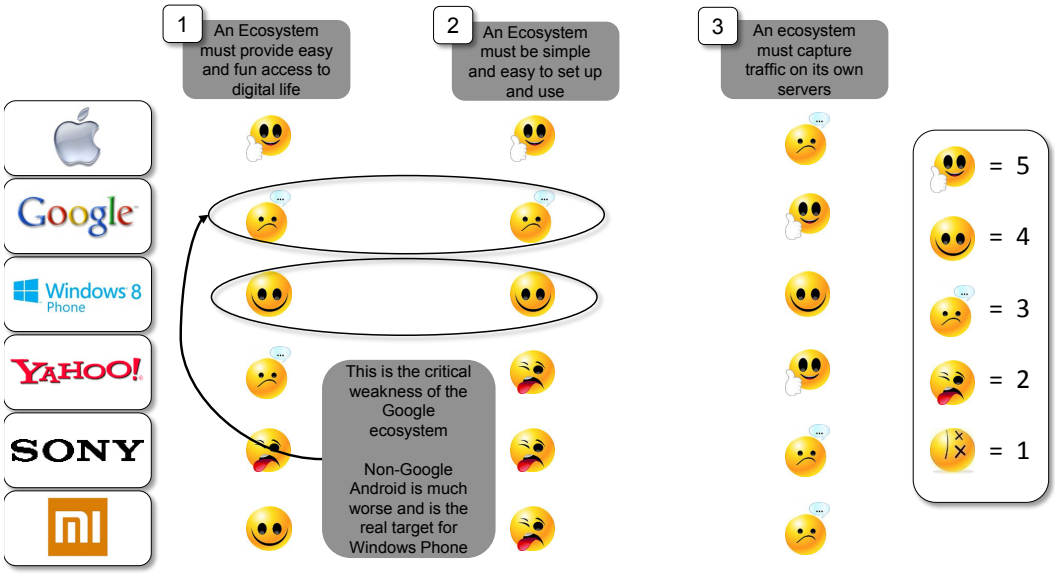
Exhibit 10: Law 7 – software consistency in Digital ecosystems

Source: Edison Investment Research

Consequently, we believe that software consistency is a significant factor in determining how well an ecosystem will appeal to its users. There are two levels at which software consistency is important. **Firstly,** it is important that smartphones within an ecosystem have a high level of consistency. This includes both different versions of the same code (eg iOS7 and iOS8 – vertical consistency) and how the same code is implemented by different device manufacturers (eg Android 4.4 KitKat – horizontal consistency). **Secondly,** as usage becomes more sophisticated we think that other devices will play an increasingly important role. Tablets already have a significant enriching effect on the overall experience and we see this expanding into consoles, computers, TVs and so on. Consequently, if Digital Life services and third-party apps can run everywhere without having to be rewritten, it will have a significant benefit for both users in terms of utility and for developers in terms of addressable market.

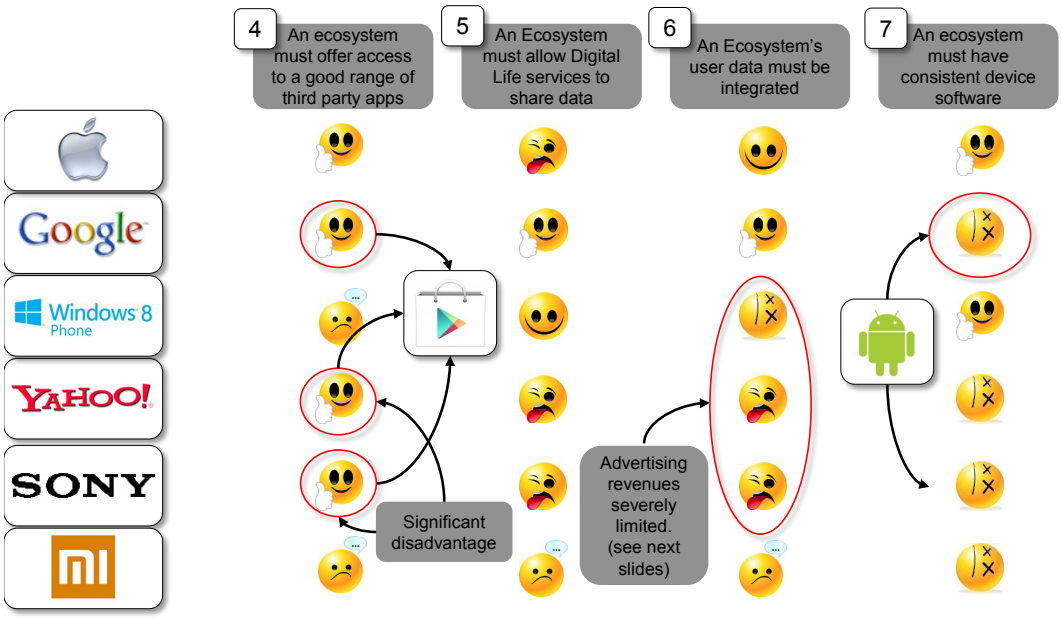
Each of the ecosystems that we look at has been assessed on the basis of the seven laws with the results shown in Exhibits 11a-b and 12a-b. These results are then quantified and summarised in Exhibit 13.

Exhibit 11a: Law 7– seven laws of robotics for mobile ecosystems



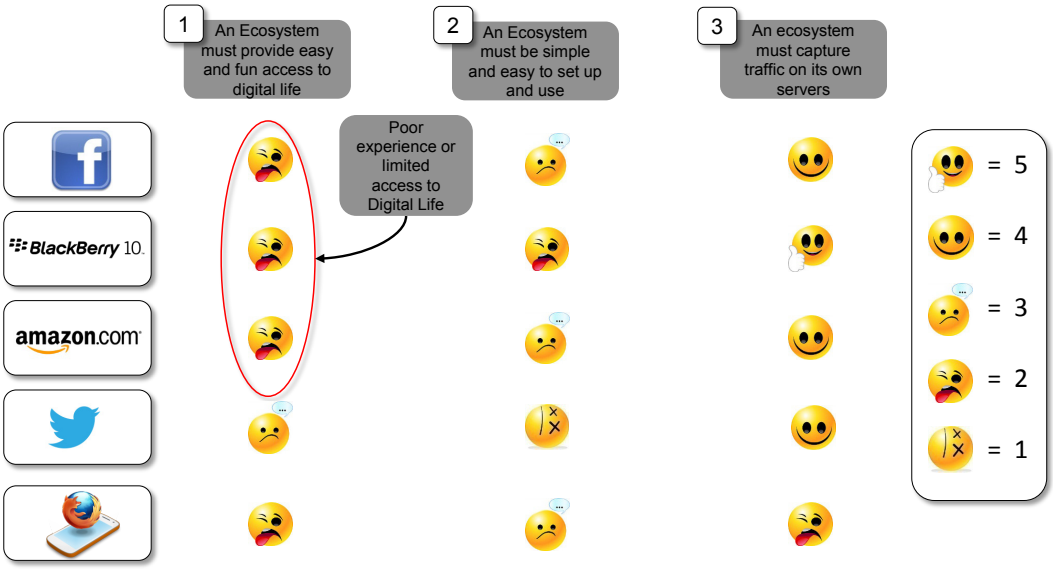
Source: Edison Investment Research

Exhibit 11b: Law 7 – seven laws of robotics for mobile ecosystems



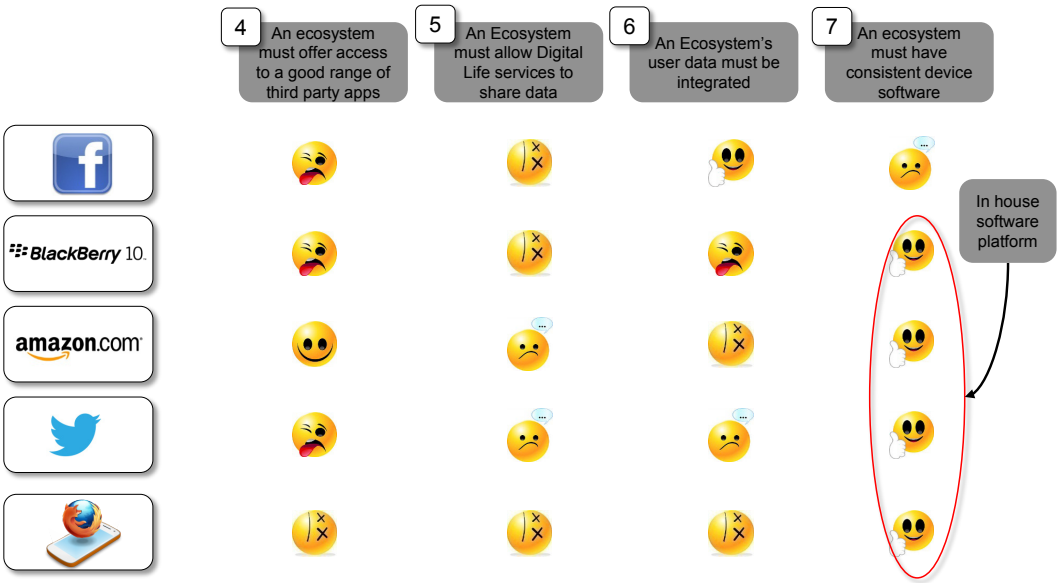
Source: Edison Investment Research

Exhibit 12a: Law 7 – seven laws of robotics for mobile ecosystems



Source: Edison Investment Research

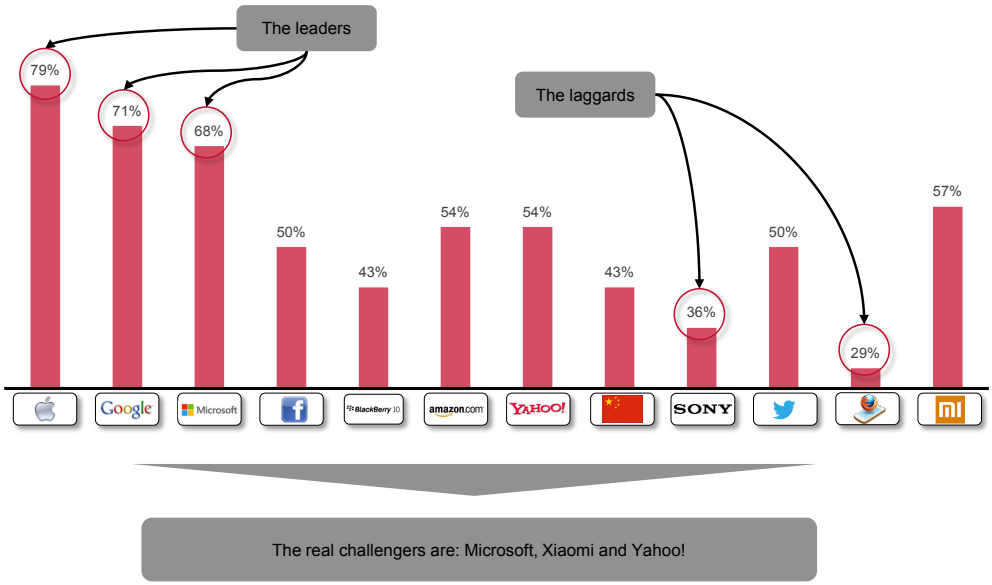
Exhibit 12b: Law 7: Seven laws of Robotics for mobile ecosystems



Source: Edison Investment Research

Each ecosystem is rated against the seven laws and an overall score determined by comparing the score to the maximum possible as a percentage. These scores for the ecosystems are shown below in Exhibit 13.

Exhibit 13: Score against the seven laws by ecosystem



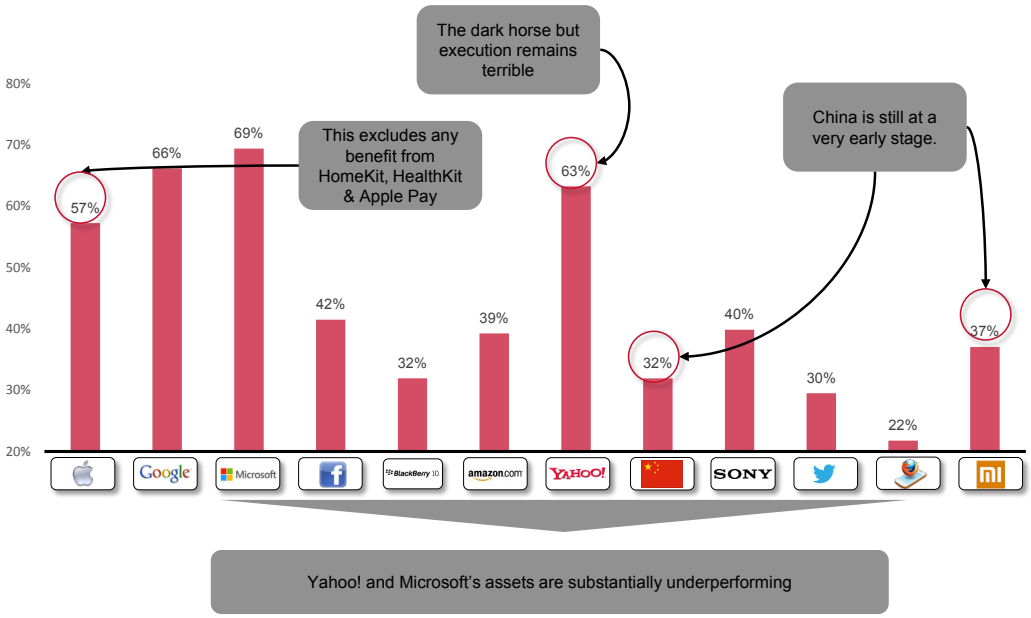
Source: Edison Investment Research

Our analysis shows that, in terms of quality, iOS remains the gold standard. This comes as no surprise, but what is more relevant is that the challengers are nipping more and more closely at its heels. We think that if this analysis had been performed three or four years ago, there would have been a gulf between iOS and the next best, but these results clearly show that the gap is closing. This is why Apple's weak position in Digital Life is so important and why it is moving to differentiate its offering through Health Kit, Home Kit and Apple Pay.

Ecosystem status quo

The overall picture of how well the ecosystems should be performing is achieved by combining the Digital Life score (Exhibit 5) with the score from the seven laws of robotics (Exhibit 13) to arrive at an assessment of how successful the ecosystem should be. These data are shown in Exhibit 14. For the most part, the ecosystems that are currently the most successful (iOS and Google) are among the highest-scoring ecosystems. However, there are two standouts: Yahoo! and Microsoft. Both of these continue to score far higher than one would expect given the level of success they have enjoyed to date. We think that both of these ecosystems are suffering from specific issues that arise from within the companies themselves, which are hindering the launch of their ecosystems. For Yahoo!, it appears to be an inability to execute its mobile vision, while Microsoft appears to be incapable of educating users about why they should live their Digital Lives with Microsoft.

Exhibit 14: How the ecosystems measure up overall

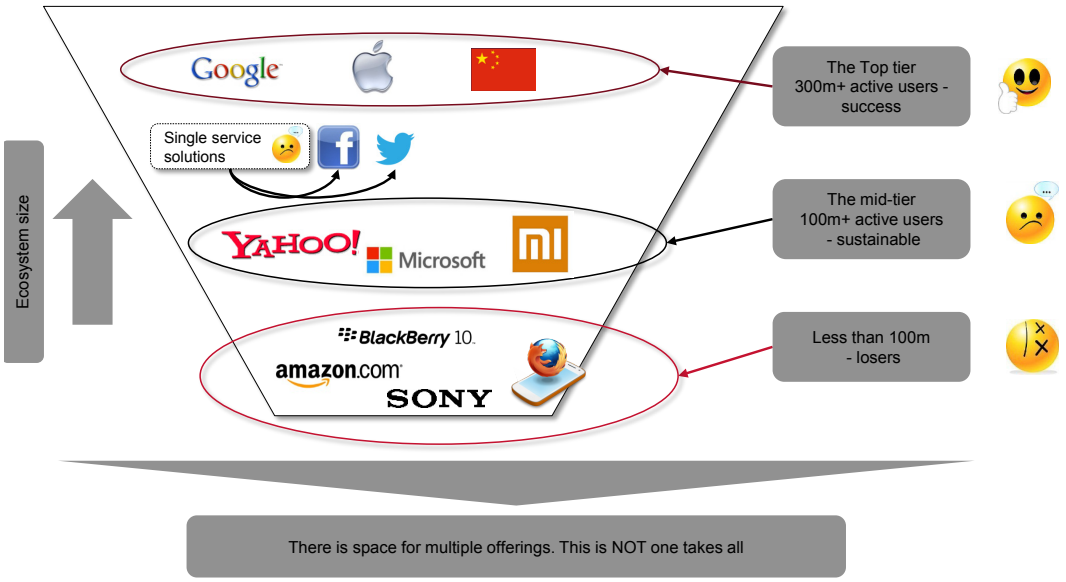


Source: Edison Investment Research

This analysis is then used in combination with device shipment forecasts to estimate how big these ecosystems are in terms of how many users are actively using them. **We believe the size of an ecosystem is the single most important measure of how much value it can create for its owner.** We calculate the current size of all the ecosystems now and forecast how they will evolve over the next three to five years.

Radio Free Mobile's key assumption that an ecosystem needs 100m+ subscribers to be viable and more than 300 million to be really successful remains unchanged. Anecdotal evidence from the market indicates that these assumptions are about right as the ecosystems that are failing are all below 100m in size and all those making good money are now well over 300m in size. Other consumer devices such as wearables, TVs, PCs and consoles do not yet contribute meaningfully to the ecosystem and as such have not yet been included in this analysis. We expect to include these other device categories as they begin to have a meaningful impact on the user experience.

Exhibit 15: Ecosystem users by provider, 2016e

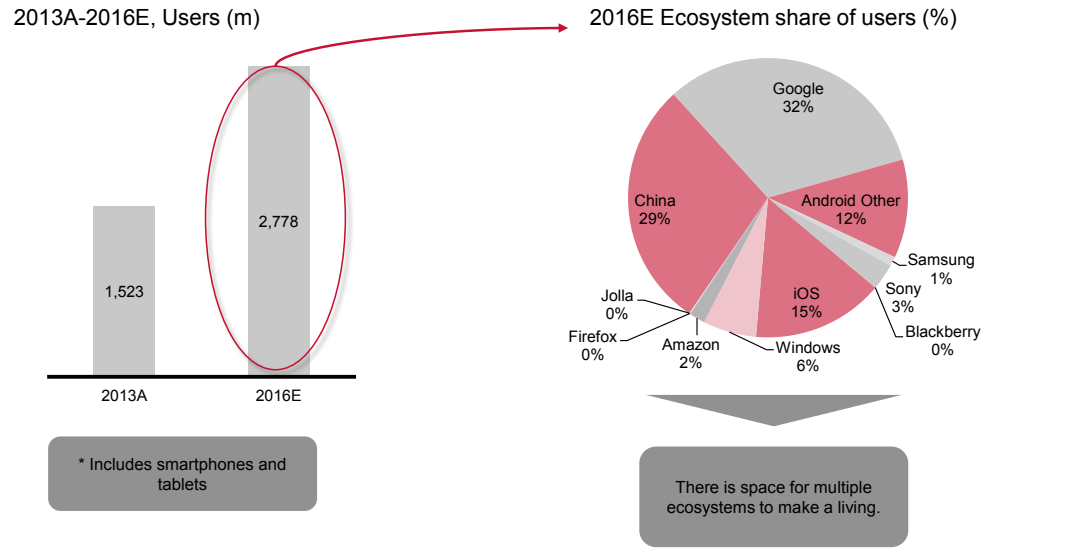


Source: Edison Investment Research, Counterpoint Research

The size of the available market is continuing to grow quite quickly. This is because the size of the ecosystem is the second derivative of the device markets (see Mobile Ecosystems – The second derivative, 6 March 2014) and still less than half of all mobile phone users in the world own a smartphone. Consequently, there is still space for new ecosystems to enter the market without having to win over existing smartphone users. We expect almost all of this activity to take place in emerging markets and there are already numerous new ecosystems emerging that cater to the specific requirements of some of these, such as India and China.

However, the ecosystem still needs around 100 million users to be viable and only Apple and Google fulfil that criteria at the moment. We believe China will have at least 900 million smartphone users, making it big enough to support three large ecosystems on its own. We expect that the three big players will be Baidu, Tencent and Alibaba, with Xiaomi vying for a large piece of the home market.

Exhibit 16: Smartphone and tablet users by ecosystem, 2013-16e

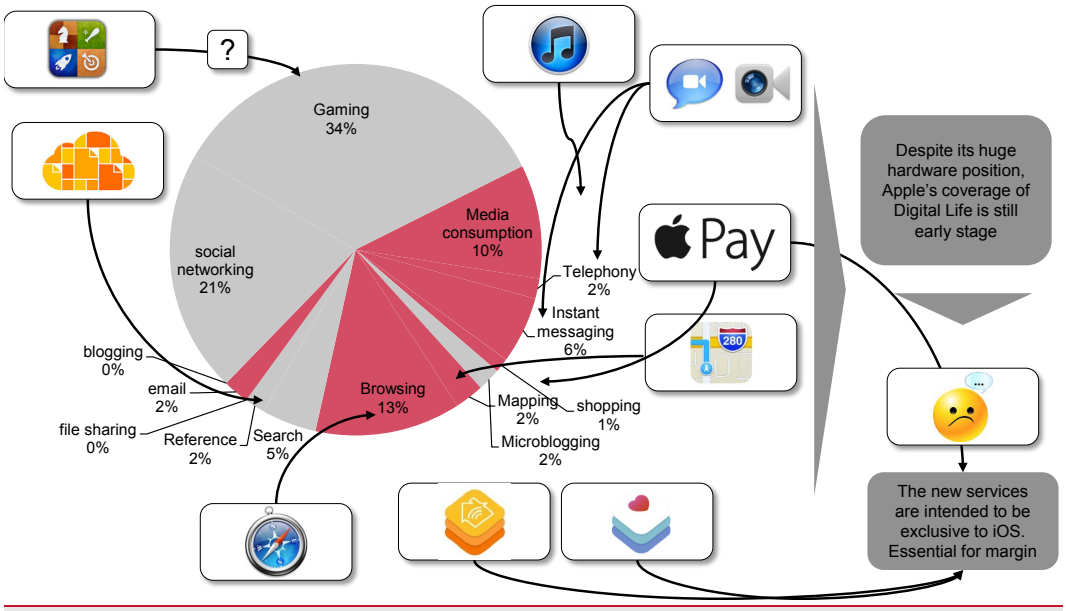


Source: Edison Investment Research, Counterpoint Research

iOS

Apple's weak position in Digital Life has not changed (Exhibit 17). The score remains very low at just 36% (Exhibit 5). We believe Apple still lacks a real offering in either gaming or social networking. Furthermore, other offerings such as iCloud and Maps continue to trail competing offerings in terms of functionality and reliability. With such a weak offering in Digital Life, the question that will soon be asked is how Apple differentiates in the long term, as its unique selling point today is the fact that it distributes third-party apps and services in a fun and easy-to-use way. If all ecosystems can offer the same apps and services at the same level of quality, Apple will have lost its edge and thus its ability to charge $1,000 for a mobile phone.

Exhibit 17: Apple's position in Digital Life

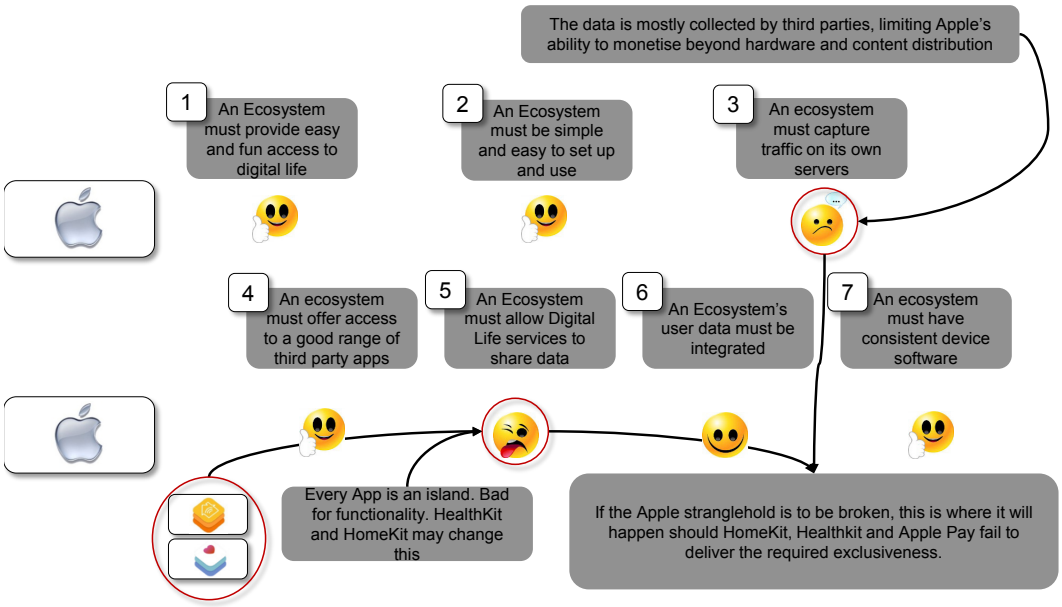


Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

Outside Digital Life, iOS remains the gold standard (79%, Exhibit 13) in terms of quality of user experience when examined against the seven laws. Its nearest competitor Google scores 71%. Furthermore, Apple scores most strongly against the laws which, for the moment, users will notice most. These are ease and fun of use, set up, access to third-party apps and software consistency (1, 2, 4 and 7, Exhibit 18). The other laws will become more important in the future as ecosystems mature, giving Apple a few years of differentiation before its edge in ease of use and third-party app and service distribution is competed away.

The superb reception of the iPhone 6, which is currently in the midst of a substantial product cycle, is also likely to sustain Apple during 2015. The iPhone 6 is a huge jump up from its predecessors as it addresses the single biggest gripe that users had with the iPhone: its relatively small screen. This has allowed Apple to compete in the larger screen market for the first time, as well as giving existing users a very good reason to upgrade. So strong is its appeal that we estimate that iOS added 43 million new ecosystem users in Q414 alone. This is by far the biggest jump in users that we have seen Apple make since it began tracking ecosystem users in 2012. This, combined with its ease of use, gives Apple time to get its strategy to maintain its long-term differentiation up and running. Now that Apple seems to have a pretty good idea of what this (see below), it is now a matter of execution.

Exhibit 18: Analysis of the iOS ecosystems using the seven laws of robotics

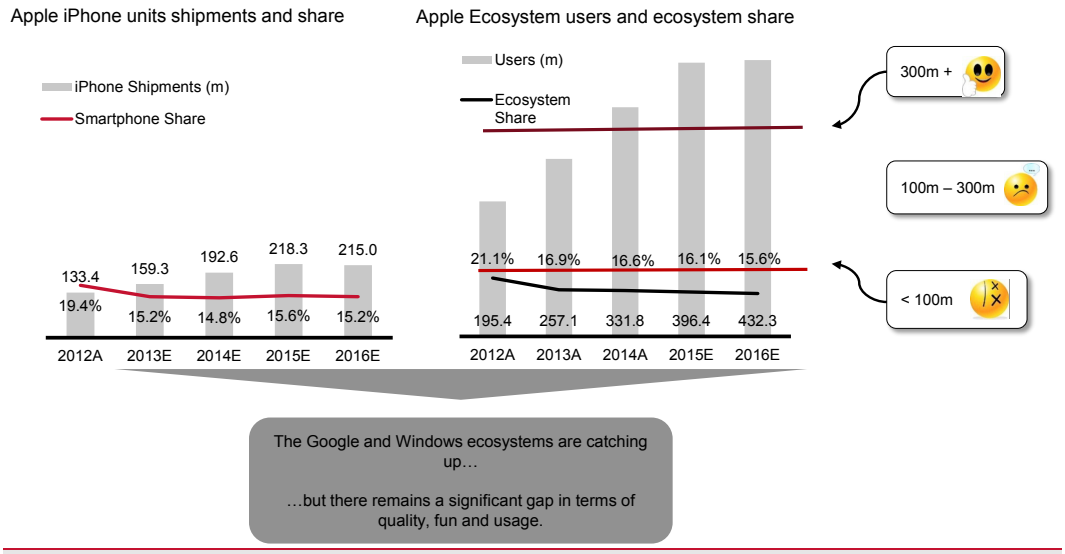


Source: Edison Investment Research

We believe Apple is fully aware of its weak position in Digital Life and that it has also realised it lacks the DNA to create compelling Digital Life services. Consequently, it has realised a need to come up with functions that will be exclusive to iOS. It is as a result that we believe Health Kit, Home Kit (see Mobile Ecosystems – Command and Control, 26 June 2014) and Apple Pay have been born. **These are not Digital Life services in their own right, but facilitators that allow the services and devices of third parties to come together to create a service that is of far more value to the user**. For example, heart rate alone does not give a great picture of a user's health. However, the combination of heart rate, blood pressure, sleep patterns, blood oxygenation and physical activity may be combined to give a useful picture of what is going on and where any potential problems lie. This requires a range of devices and services to communicate with each other, which is where Apple's Health Kit API comes in. This allows all these data to be stored in one place and to be analysed together when device and service makers make their devices compatible with the API. The situation for Home Kit is exactly the same. It is for this reason that Fitbit has declined to make its data compatible with Health Kit. It sees the value in the data and has decided to go it alone rather than ceding that value to Apple.

The use of Health Kit and Home Kit should allow Apple to ensure that the user experience for owners of these devices and users of home automation and health services have a superior experience on Apple than elsewhere. The same can be said for Apple Pay, which is a proprietary service that is exclusive to iOS devices. The fact that software consistency across the entire iOS ecosystem is extremely high makes targeting these devices much easier for developers. This is why we believe Apple intends to maintain the exclusiveness of the iOS ecosystem even when all apps and services are available on all ecosystems at an equal level of quality. **Apple is in effect creating mini ecosystems in iOS, which will not be available on non-Apple hardware.**

Exhibit 19: Forecasts for the iOS ecosystem, 2012-16e

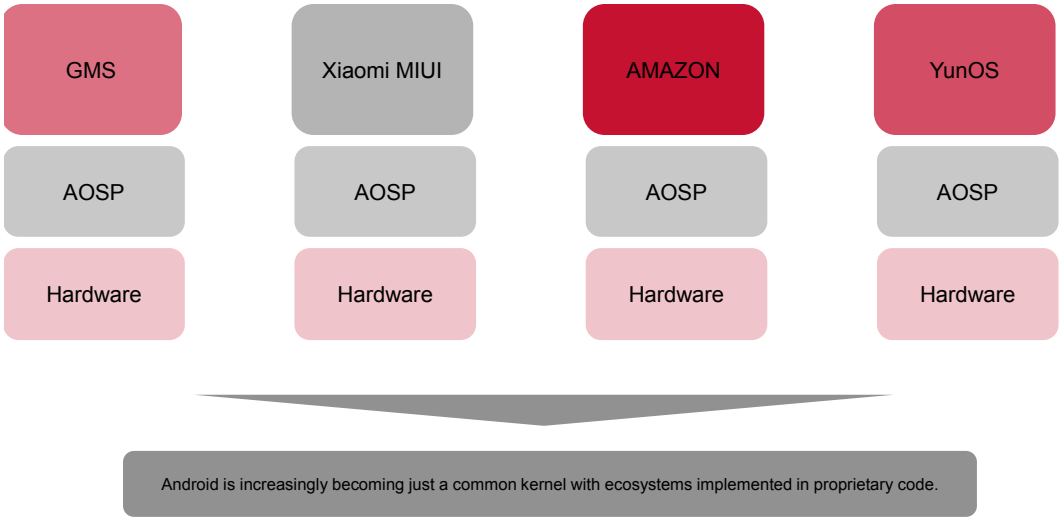


Source: Edison Investment Research, Counterpoint Research

Google

Google's biggest problem is rapidly becoming the fact that it is based on Android. It is important to remember the distinction between Google and Android. Android is open source software that can be used to build a mobile phone (among other devices). It is not an ecosystem in its own right. It is merely an OS, on top of which the Digital Life services that make up an ecosystem can be implemented. There are already multiple ecosystems that exist on the Android OS and with every quarter that passes more seem to be launched (Exhibit 20).

Exhibit 20: Ecosystems based on Android

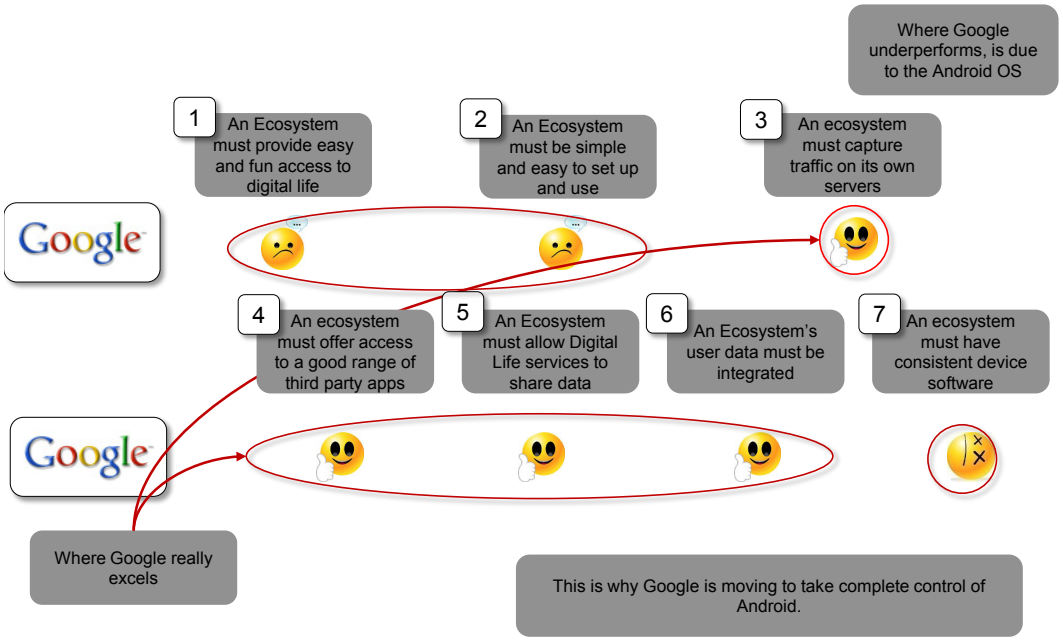


Source: Edison Investment Research, Alibaba, Xiaomi, Amazon, Google

The different uses to which Android is being put have caused a lot of inconsistency in the underlying Android code. Because it is open source, if the device maker finds something they do not like or that does not suit the purpose of the device, it can easily be removed or changed. While this may work for a specific device it creates inconsistency and chaos among different devices running Android, which results in a nightmare for developers and makers of other devices designed to communicate with smartphones. (This is horizontal consistency (top of Exhibit 10).

This is a major reason that many Android-based ecosystems score so poorly for ease and fun to use, as well as software consistency (laws 1,2 and 7) and is the major reason why Android usage is around half that of iOS. Because Google builds its ecosystem (Google Mobile Services [GMS]) on top of Android, it also suffers from all of the same problems. We have long believed that this is responsible for pretty low loyalty to Android devices. With an array of other offerings snapping at its heels, Google needs to prevent the appeal of its ecosystem from being undermined by the chaotic nature of Android.

Exhibit 21: Analysis of the Google ecosystem

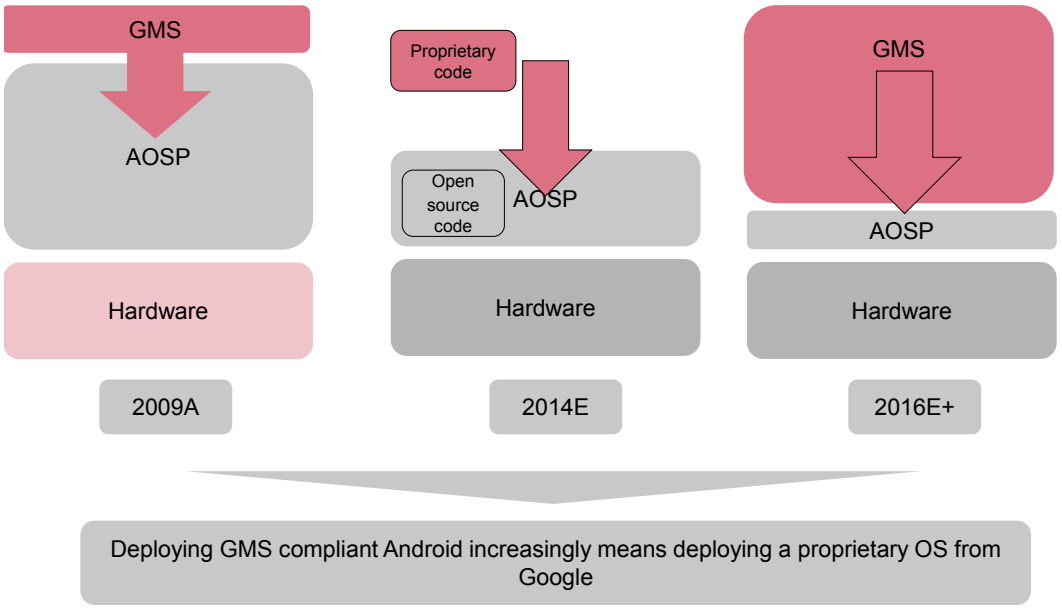


Source: Edison Investment Research

This is why we see Google slowly but surely taking control of the Android Open Source Package (AOSP). It is doing this by moving more functionality into GMS and out of AOSP (Exhibit 22). Key to this is that while AOSP is open source, GMS comprises code that is proprietary to Google. Consequently, any code that falls within GMS is completely under Google's control where no fragmentation or alterations are possible by device makers implementing GMS.

The net result is likely to be that GMS becomes almost all of the code on the device, leaving the AOSP as a small kernel. This will give Google total control of the device in a manner similar to Windows Phone or iOS. This is exactly what it needs to do to fix its shortcomings when compared to laws 1, 2 and 7 (Exhibit 21).

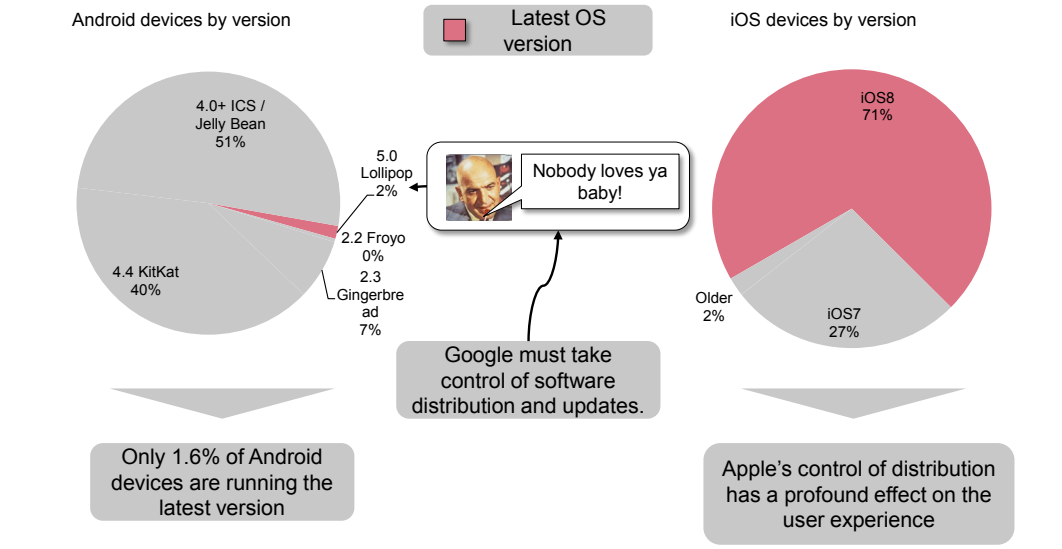
Exhibit 22: Development of GMS-compliant Android



Source: Edison Investment Research

In addition to taking control of the software code, Google will also have to take control of its distribution. Google's ecosystem software is currently distributed by the device makers and mobile operators as and when they are ready. This is why despite being available for over three months, Google's latest version of Android (Lollipop) is only present on 1.6% of all Google ecosystem handsets owned by users (Exhibit 23).

Exhibit 23: Android and iOS devices by OS version



Source: Edison Investment Research, Android.developer.com, Mixpanel

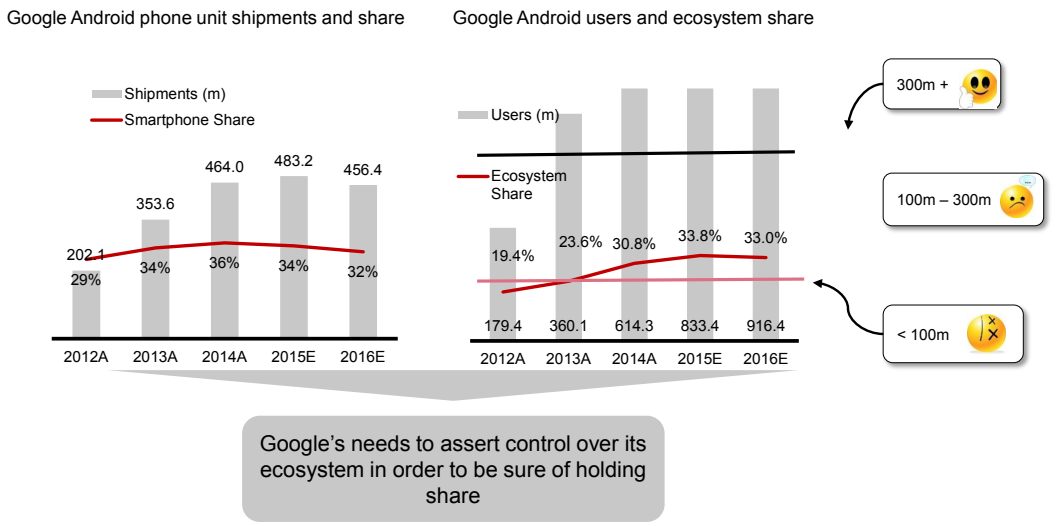
Lollipop (Android 5.0) promises to make substantial improvements to the user experience, with a new UI and 5,000 new APIs. It is also crucial to Google's plans to improve the user experience of its devices such that it can distance itself from its rivals such as Microsoft. There is very little point in investing huge sums of money in improving your ecosystem if the software sits on a shelf gathering dust while everyone else copies these innovations and pushes them to market. Unfortunately, this is exactly what is happening as the device makers have been exceedingly slow in launching new devices with Lollipop and even slower in upgrading existing devices via an over-the-air update.

By contrast, when Apple made iOS 8 available, 33% of all iOS devices had upgraded to the new version within three days and that number is currently sitting at 71% (Exhibit 23). This means that all of the improvements Apple has made in terms of making its ecosystem more easy and fun to use, as well as new features, can now be used by 71% of all users of the iOS ecosystem. By contrast, only 1.6% of Google ecosystem users are able to access the new features, which means all the cool new features that Google announced nine months ago remain unavailable to 98.4% of its users.

We have long held the opinion that Google needs to control its software to improve its user experience, but if it is unable to get that software into the hands of users there is very little point. This is why we also believe that Google will take control of software distribution when it can. If Google can have a direct relationship with the devices that are running its services, it will see much faster uptake of the improvements and upgrades that it makes to its user experience. This is a crucial element in the requirement for it to take control of its ecosystem, but is likely to be even more difficult to bring about than reducing AOSP to a small kernel.

While the user base continues to grow, Google's revenues will also continue to expand and so for the moment this issue is unlikely to be noticed by those scrutinising Google's overall performance. However, this will not last for ever, and we see that in 2016 or 2017 Google needs to have cracked this problem to prevent its user from being poached and to increase the revenues it earns from each individual user.

Exhibit 24: Forecasts for the Google ecosystem, 2012-16e



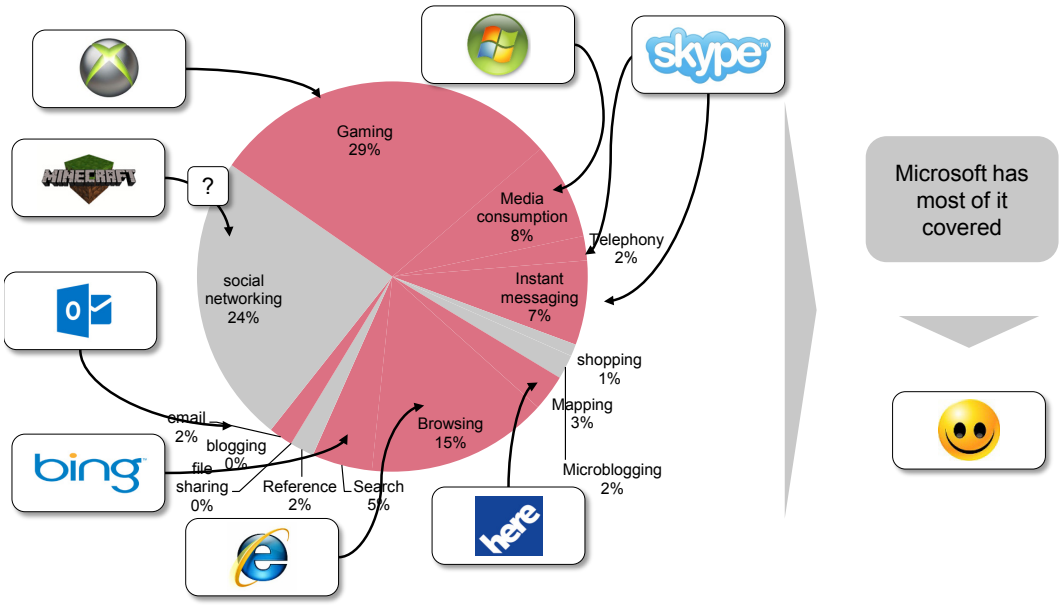
Source: Edison Investment Research, Counterpoint Research

Microsoft

Microsoft relaunched its challenge on the mobile phone industry in 2009, won its first A-list vendor in 2011 (Nokia), but is still struggling to be anything more than a footnote among the also-rans in the mobile industry. Microsoft is very strong in a number of other device types, but we have long argued that the mobile phone is the foundation of the ecosystem. The user spends far more time using the smartphone than any other device which, combined with its personal nature, drives ecosystem decisions to be made on the basis of this device only. This is why Microsoft has such a problem despite being incredibly strong in other areas. The ecosystem is defined by the smartphone, with other device types enriching the experience rather than defining it. Unless it wins users' hearts and minds on the mobile device, it will struggle to do so elsewhere. In this endeavour, Microsoft has been labouring for over 15 years and has had no lasting success to date.

Also, 2014 was not a great year as market share was lost despite the steady gains made over the preceding two years. Admittedly it was not much, falling to 3.3% from 3.6% in 2013, but the trend is going the wrong way. This has happened before as market share peaked in 2007 at 12.0% and declined from there to just 1.9% in 2011. We are of the opinion that history will repeat itself unless something changes, but the good news is that things have drastically changed at Microsoft.

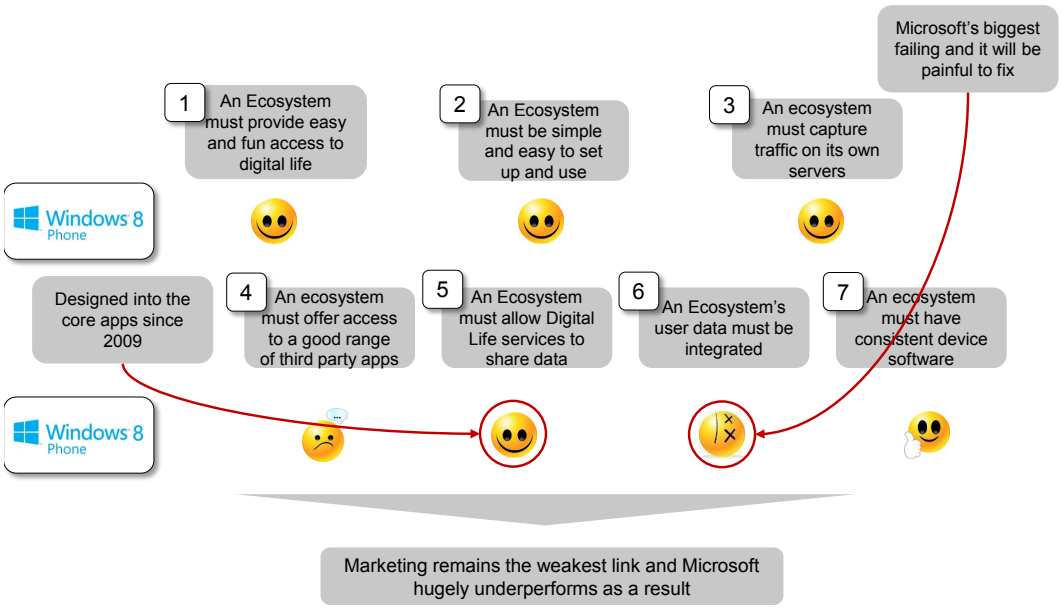
Exhibit 25: Microsoft's position in Digital Life



Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

In a short 12 months, the "Windows Windows Windows" mantra has been thrown out, to be replaced a strategy aimed at creating the maximum pull for its ecosystem. The signs are everywhere, from how the company now operates to the product launches it has made. It is no longer trying to force users to use Windows, but aims to offer them great experiences such that they will be enticed back over a period of time. These experiences are available on many platforms, but they will of course continue to operate better on a Windows device than any other. This is normal and is very common throughout the industry. In fact these days, Microsoft services tend to offer a better cross-platform experience than most of its competition.

Exhibit 26: Analysis of the Microsoft ecosystem

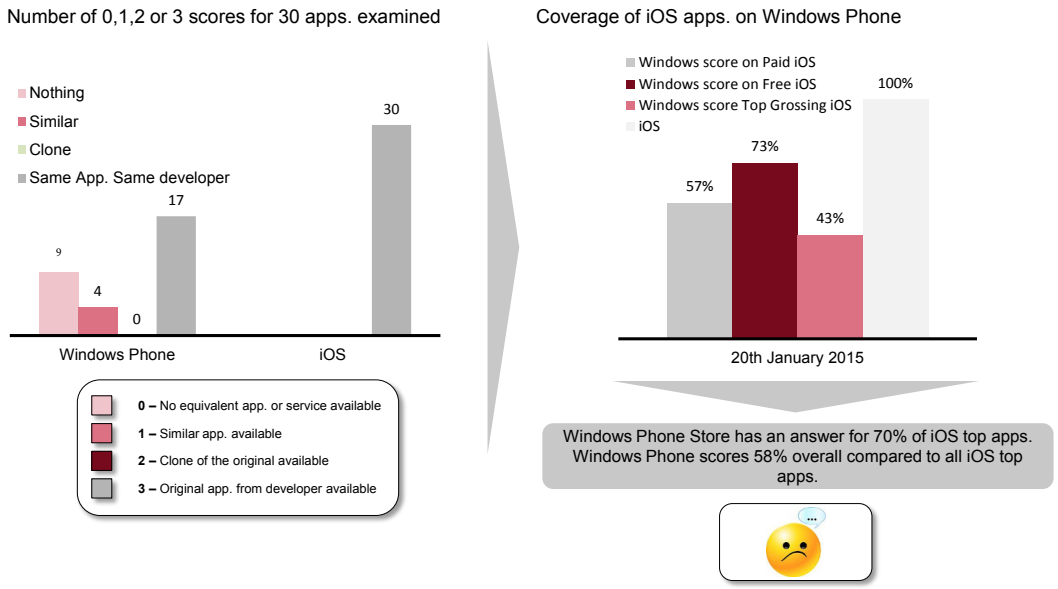


Source: Edison Investment Research

Combined with excellent coverage of Digital Life (Exhibit 25), this should mean that Microsoft is one of the leaders rather than a laggard. It is when one looks at the seven laws of robotics that the cracks begin to appear. Microsoft fares badly against laws 4 and 6 as its app store leaves a lot to be desired and its ability to really understand its users is very poor.

To date we understand from conversations with the company that the single biggest reason for returning a Microsoft device to the store has been the lack of decent apps compared to iOS or Android (law 4). Microsoft continues to struggle against this comparison, but has seen significant improvement over the last three months. We test this by comparing the top apps in the Apple App Store with what the Windows Phone Store has to offer.

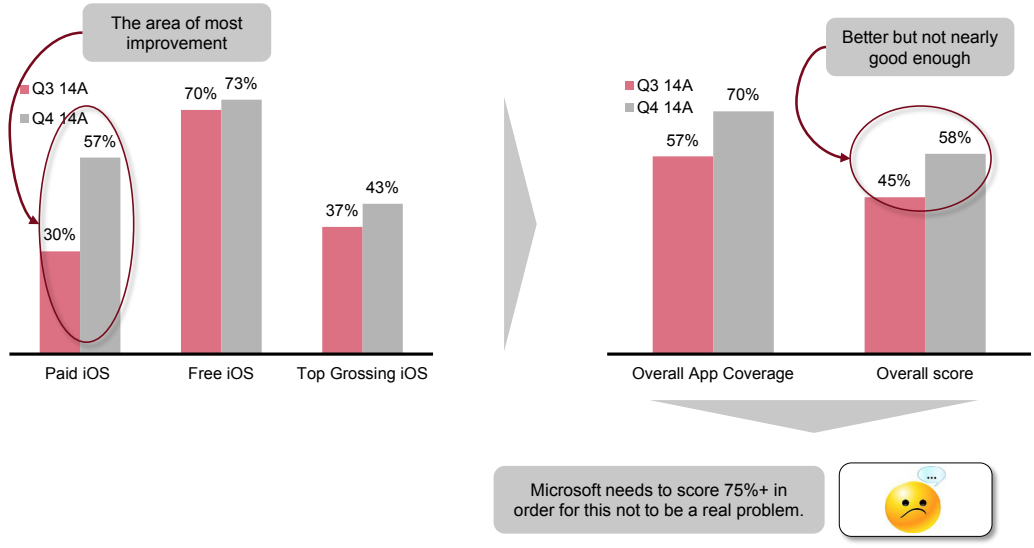
Exhibit 27: Windows Phone Store vs Apple App Store, 20 January 2015



Source: Edison Investment Research, Apple, Microsoft, App Annie

The last three months have seen a significant improvement in Microsoft's ability to offer an equivalent experience to iOS (Exhibit 28). As of 20 January 2015, we found that Microsoft had an equivalent app in its store for seven out of 10 of the top 30 applications in iOS. Particularly encouraging is the fact that 17 of those apps were from the original developer, giving a much better chance of faithfully recreating the experience.

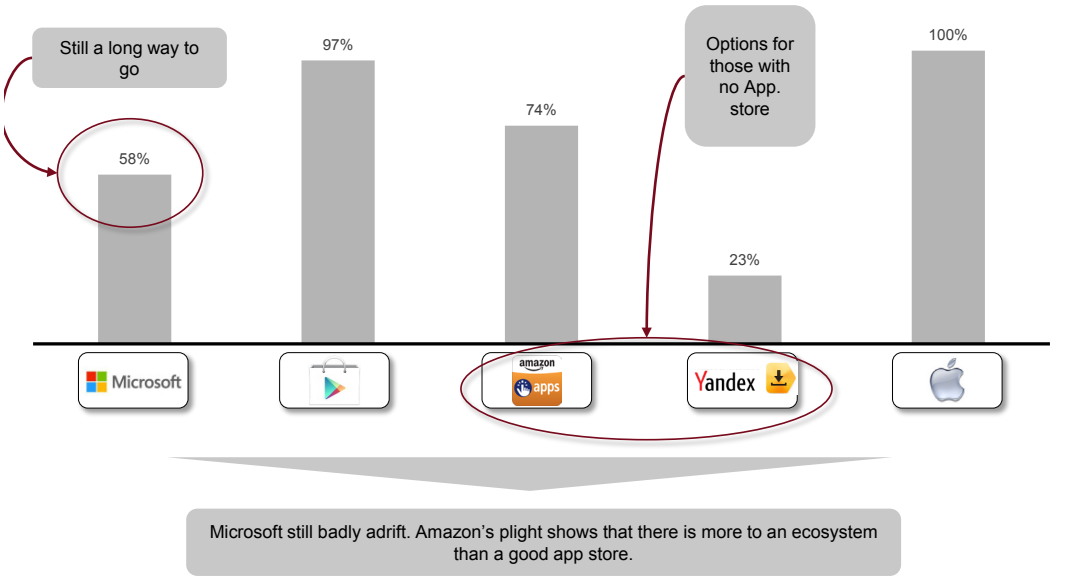
Exhibit 28: How has the Windows Phone Store improved? Q414, Q314



Source: Edison Investment Research, Apple, Microsoft, App Annie

Comparing this to Q314 (Exhibit 28), a big improvement is seen, especially in the Windows Store's ability to offer the same apps that are available in the iOS paid charts. Overall app coverage has improved to 70%, but Windows Store is still offering just 58% of the experience that can be gained on iOS. While this represents a significant improvement, Windows Store is still meaningfully behind its peers. Both Google Play and Amazon offer far better app equivalency than Windows Store (Exhibit 29), which makes it clear that a lot more work needs to be done.

Exhibit 29: How does Windows Store compare to its peers?



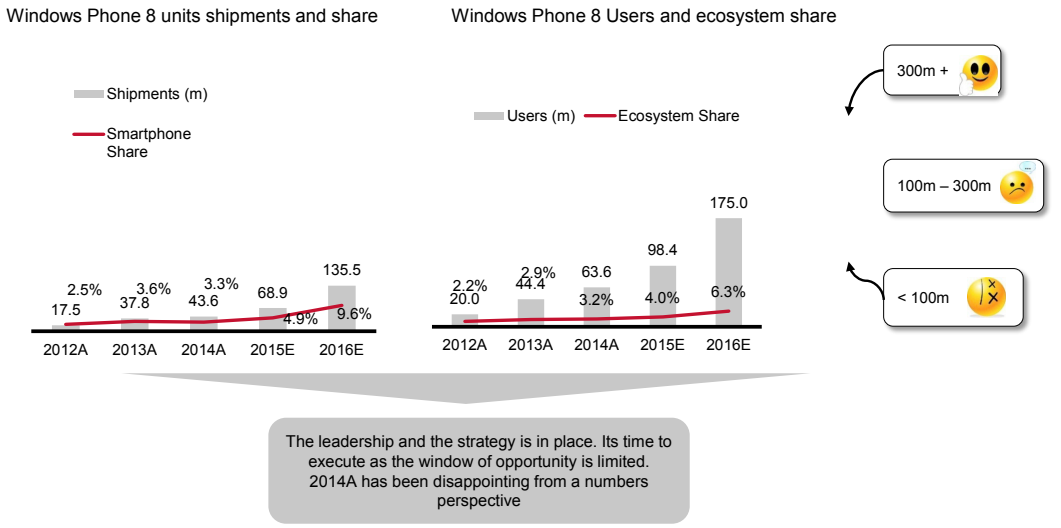
Source: Edison Investment Research, Apple, Google, Amazon, Yandex, Microsoft, App Annie

However, it is all not bad news, as the view of most commentators that success depends on having a decent app store does not appear to be correct. Amazon has a respectable offering through Amazon Apps, but its ecosystem is faring very poorly even when compared to Microsoft. This leads us to conclude that there is far more to having a successful ecosystem than just having an app store and it is as a result of Amazon's other failures that its ecosystem is failing to see any real traction.

In our view, this finding improves the outlook for Microsoft to succeed as the third ecosystem because it is clear that the barriers to entry are far higher than just having a decent app store. Against all the other measures, Microsoft fares pretty well, which means it has almost all the assets in place to succeed.

Where Microsoft still fails is in how it tells its story to potential users through its marketing efforts. It still seems to design its campaigns around the view that if it tells users the ecosystem exists they will adopt it in droves. What it is missing is the explanation. It is not nearly enough to tell users that it exists; it needs to explain why it is great and why users should live their Digital Lives with Microsoft. In many ways we think that 30 years of dominance in the PC industry have done the damage, as it has not been the position of the challenger for over 20 years. The challenger has to adopt a completely different philosophy and explain to users why its wares are worthy of attention. Microsoft's marketing department seems to think that it already has the attention of users, when actually they are fixated on Apple and Android. Unfortunately, there is still no sign of change at this part of Microsoft despite the huge changes that have already been made elsewhere. We hope that this will begin in 2015 and do not expect a material change in its position in the ecosystem until it does. A change in the acceptance of the Windows smartphone is likely to be the sign that everything is about to come right.

Exhibit 30: Forecasts for the Microsoft ecosystem, 2012-16e



Source: Edison Investment Research, Counterpoint Research.

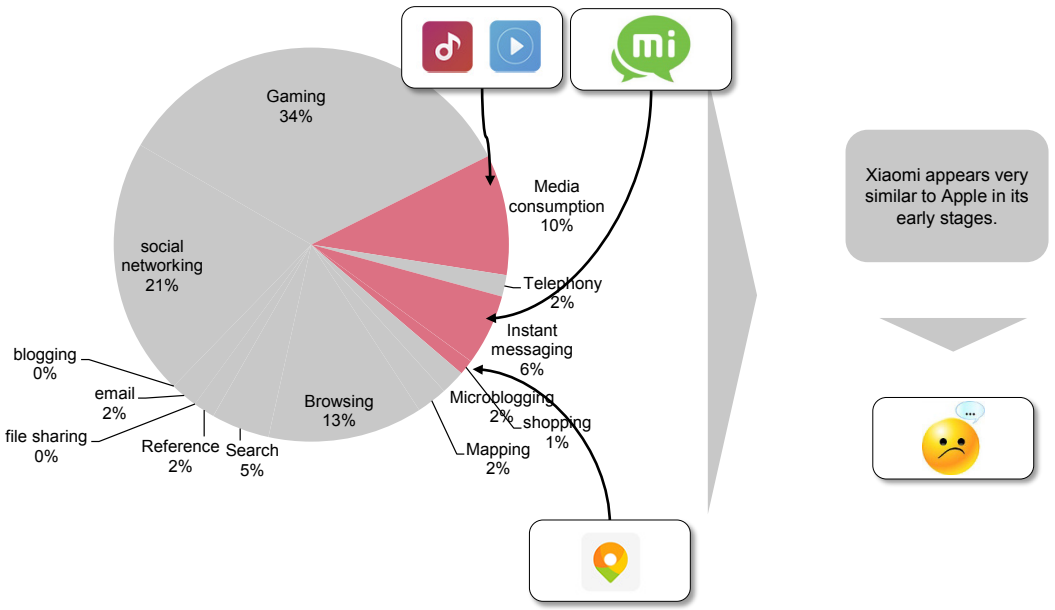
Xiaomi

Xiaomi had a stellar 2014, rocketing from an almost unknown to being the number one smartphone manufacturer in China. In 2014 it shipped 61.2m units, compared to just 18.8m the year before (Exhibit 32). With an estimated ASP of $250 per device this would put revenues for 2014 at $15.3bn and it is at that point that all sense of proportion stops. The assumption is that because Xiaomi is following the exact trajectory of Apple, it will make Apple-like margins and should have the valuation to match. It is on this basis that Xiaomi recently raised money at a valuation of $45bn, and explains how some are speculating that it will launch its IPO with a valuation of $100bn. Apple trades at 2.9x 2014e and 2.6x 2015e EV/Sales and we suspect that the $45bn valuation has been derived by applying this multiple to Xiaomi.

Unfortunately, there is a glaring hole in this argument. Apple trades at 2.9x 2014e and 2.6x 2015e EV/Sales because it is very profitable. Xiaomi is not and in 2013 had margins of just 1.3% compared to the market, which had assumed 13%. We calculate that Xiaomi generated $500m in EBIT in 2014 or margins of just 3.3%. Consequently, Xiaomi should be compared to Apple at the EBIT level rather than revenues to account for the discrepancy in profitability. Effecting this exercise and applying a 300% premium to account for Xiaomi's higher growth gives a valuation in the region $20bn. Consequently, a valuation of $45bn assumes a huge amount of success in the ecosystem, which remains very uncertain.

If Xiaomi can develop a thriving ecosystem, it will no longer have to sell its products at low prices. It will have user preference and in that instance will be able to monetise its ecosystem via premium pricing (Exhibit 2). While Xiaomi is on the path to delivering this strategy, it will not be easy as it is a very long way from offering music and movies to having a fully-fledged ecosystem. This is shown in Exhibits 31 and 5, where it is clear that Xiaomi has a very long way to go to complete its offering.

Exhibit 31: Xiaomi in Digital Life



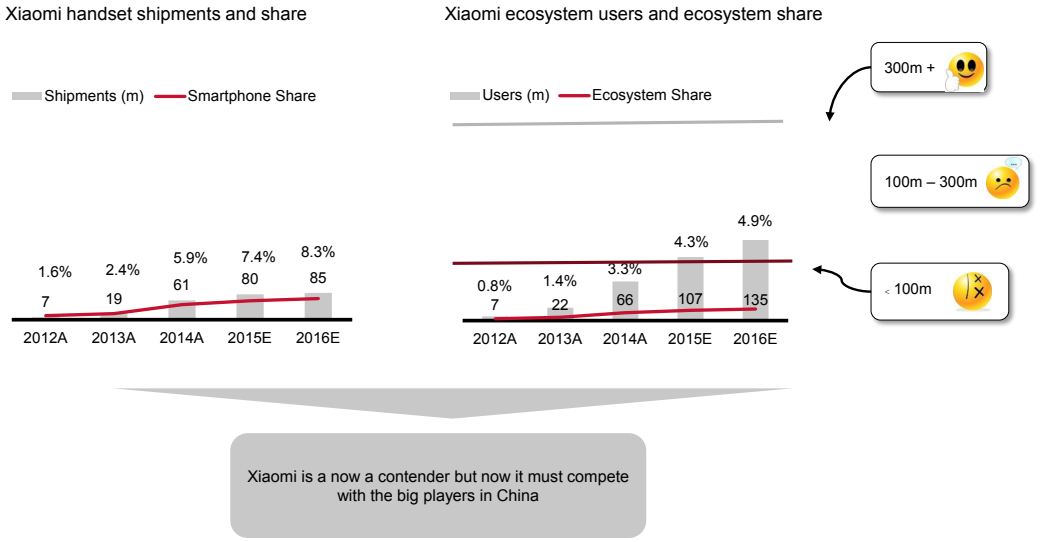
Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

A further problem is that Xiaomi's content is very oriented towards the Chinese market, which means it has very little appeal outside China. Furthermore, it faces fierce competition at home from the likes of Baidu, Alibaba and Tencent, all of which have ambitions with regard to developing ecosystems of their own.

At this point in time, Xiaomi is a long way ahead of all three of its competitors, but all three have much greater resources on which to draw when it comes to investing. Even at $45bn, Xiaomi's cash resources are likely to be much more limited, mainly because it does not have the internal cash generation capacity and must rely on outside investment. This means that Xiaomi must be more innovative, more selective and much more productive than its competitors when it comes to investing in its ecosystem to have a chance. Success is far from guaranteed and we are concerned that the end result is that Xiaomi can never make more than 2-4% EBIT margins on its devices.

In this instance a valuation of $45bn looks very high indeed, leaving the best prospect for Xiaomi going into partnership with one of its competitors. Alibaba has already invested in Meizu, leaving Tencent and Baidu as potential partners.

Exhibit 32: Forecasts for Xiaomi, 2012-16e

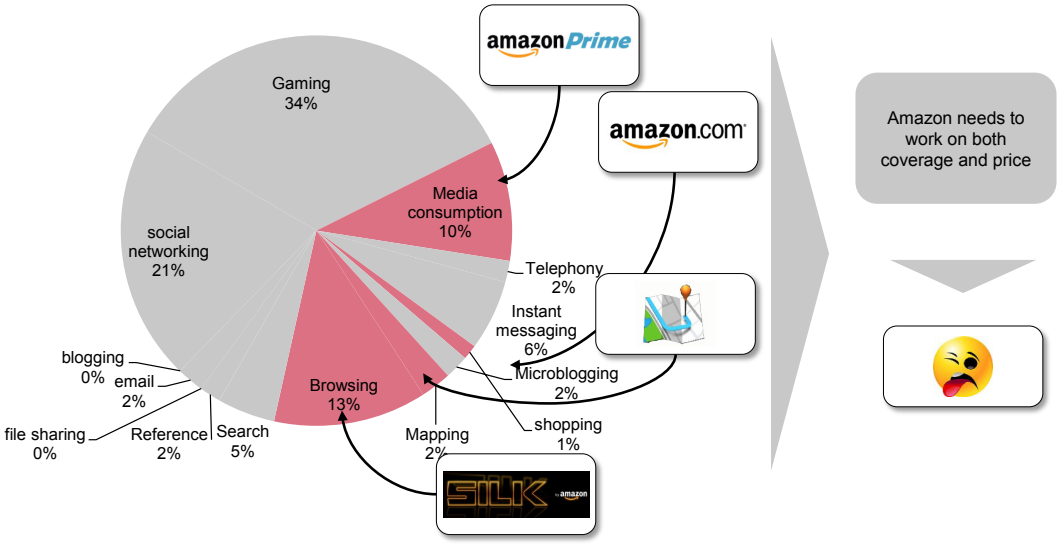


Source: Edison Investment Research, Counterpoint Research

Amazon

Amazon is still struggling to be relevant in the ecosystem. We continue to believe that the main reason for this is that Amazon has still not yet really internalised what the ecosystem is or what relevance it can have in terms earnings capacity. This is evident in the way that Amazon conducts its business in this area. It seems to have understood that it needs to cover certain aspects of Digital Life, but its approach is so haphazard that its strategy seems to us to be a random series of experiments rather than a co-ordinated attack on becoming an ecosystem. For example it has made acquisitions (like Twitch), but by allowing them to remain independent has ensured that Twitch will have very little to do with Amazon's Fire TV gaming offering. Furthermore, there appears to be no connection between the Fire TV and the Kindle Fire HD and the Amazon Fire phone. This is why we still consider that Amazon has no real gaming offering when it comes to Digital Life (Exhibit 33).

Exhibit 33: Amazon in Digital Life

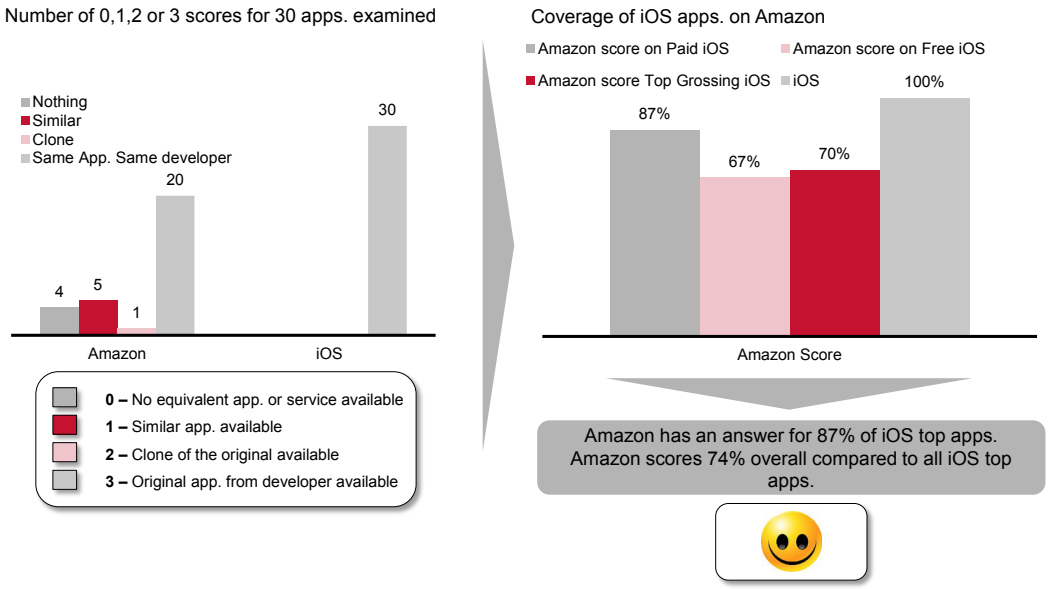


Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

Amazon's position in Digital Life (Exhibit 33) has seen no real progress over the last 12 months, and we do not expect to see much change in the coming 12 as its strategy in this direction appears to be unformulated.

By contrast, Amazon has done a good job in ensuring that its app store is well stocked with the apps that users are downloading from the Apple App Store and Google Play. The Amazon App Store was tested (by Edison) using the same methodology as for the Windows Store and was found to have a good level of app equivalency (Exhibits 7 and 34). We believe this is for two reasons. **Firstly,** the Amazon software is based on AOSP (Exhibit 20), making it very similar to the software Google used to create its ecosystem. As a result, developers that have worked for Google Play have very little work to do to make their apps also available on Amazon. **Secondly,** Amazon has a very strong consumer brand making it much easier to convince developers to publish the apps to its store as well as to Google's. As a result, the Amazon App Store offers a pretty good approximation of the experience that is available on iOS or on Google with an overall score of 74% (Exhibit 34).

Exhibit 34: Amazon vs Apple App Store, 20 January 2015



Source: Edison Investment Research, Apple, Amazon, App Annie

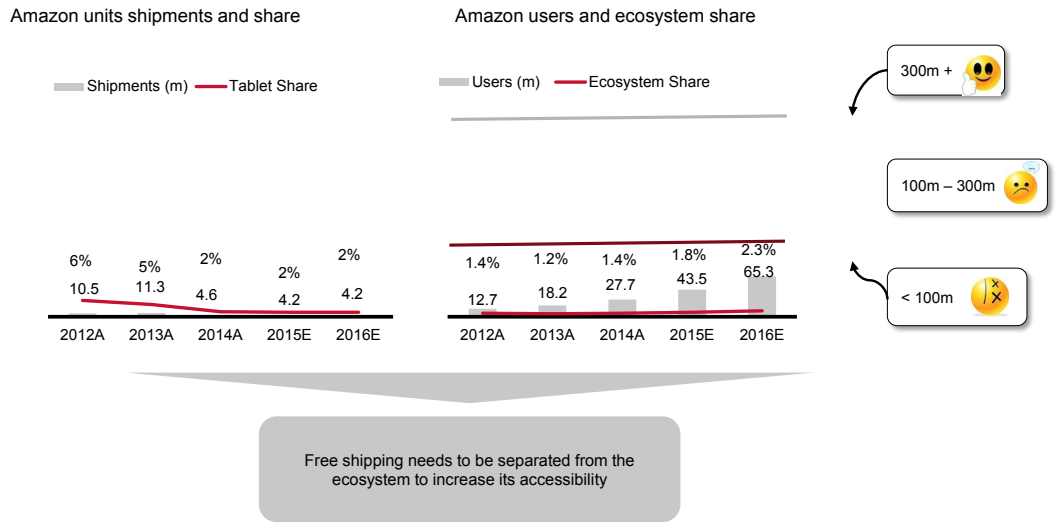
This surprising result also **puts to bed the notion that all one needs to make a decent ecosystem is a good app store**. Amazon has a good app store, but its ecosystem is virtually non-existent. This is why app equivalency is only one of seven criteria that need to be met to have a flourishing ecosystem from which good returns can be made. This is good news for Microsoft, as Amazon's failure shows there is far more to getting the ecosystem right than just the app store. Apart from the Windows store, our analysis shows that Microsoft scores pretty well (Exhibits 25 and 26) and if it can continue to improve its app store and its marketing, it should be in a position to become the third ecosystem.

There is still no sign of Amazon having any cohesive strategy around its ecosystem and, as a result, its forays into hardware are likely to be disconnected adding no real relevance to Amazon as a provider of an ecosystem. Furthermore, Amazon is rapidly losing share in the tablet space, with market share in Q414 at just 1.7% compared to 7.3% in Q413. We believe this is a significant problem as we have long believed that the Kindle Fire HD is the main route to the consumer because of its ecosystem. If this continues to fall, its ability to get its Digital Life services into the hands of users will be curtailed, along with its ambitions. Amazon is able to reach consumers through the hardware of third parties such as smart TVs and set top boxes, but this is limited to media consumption, which is only 10% of the addressable opportunity. We believe this route will

severely limit Amazon's ability to develop an ecosystem and is not a viable route to market for anything other than a competitor for Netflix.

Combined with the fact that Amazon is still pricing its ecosystem at $99 per user per year (free shipping plus the ecosystem), this is likely to keep a lid on users signing up as there are limits to the number of users that see a benefit from the free shipping option. Consequently, Amazon's ecosystem continues to be very small (Exhibit 35) compared to the others and there is no sign that there will be a turnaround anytime soon.

Exhibit 35: Forecasts for the Amazon ecosystem, 2012-16e

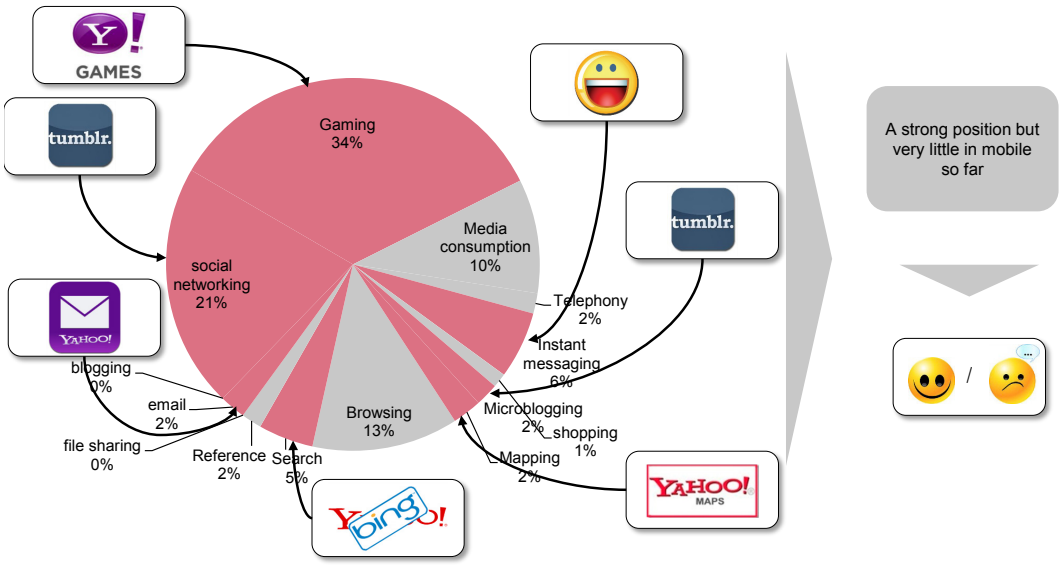


Source: Edison Investment Research, Counterpoint Research

Yahoo!

The last six months have been taken up with corporate activity around Alibaba. This has meant that the urgent work to turn the core business around has been left on the shelf. Yahoo! continues to have a very strong presence in the fixed-line internet, but has been unable to transfer any of that strength into mobile. This is unexpected as Yahoo! continues to score highly on the Digital Life analysis (Exhibits 5 and 36) and registers an average score when it comes to the seven laws (Exhibit 13).

Exhibit 36: Yahoo! in Digital Life



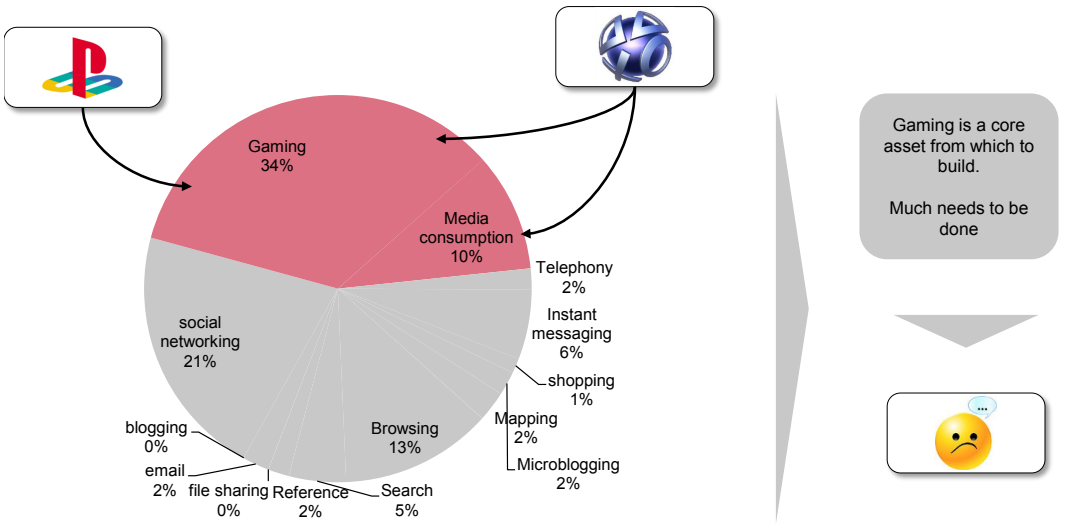
Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

Despite the strong collection of assets, very little has happened in terms of turning this collection of services into a fun and easy-to-use ecosystem. While there are many users of Yahoo! services in the fixed internet there are very few in mobile. Tumblr has brought in around 200 million, but these users still predominantly just use Tumblr and the cross-pollination that badly needs to happen in terms of other Digital Life services remains unexecuted. This is the single biggest challenge that Yahoo! faces. It appears to unable to execute on the acquisitions it has made and to bring them together on mobile in a way that would make Yahoo! a desirable place to live on mobile. Until this changes, revenues are likely to drift sideways driven by weakness in the display advertising market while all the growth being experienced by Google, Twitter and Facebook continues to pass it by.

Sony

One good quarter does not a turnaround make, but it is a sign that there may be light at the end of the tunnel. The combination of Sony's strong position in gaming, as well as the selfie craze driving demand for higher-resolution, front-facing cameras, has given Sony a boost. Neither of these two will last very long, but could work wonders for morale as well as giving Sony some breathing space to execute the very difficult task ahead of it. Unfortunately, Sony's new corporate medium-term strategy has raised more questions than it answers, leaving us with the concern that, after all, maybe top management has not realised what is at stake.

Exhibit 37: Sony in Digital Life



Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

This task involves taking its strength in gaming and using it in combination with its smartphone portfolio to glue all its assets together to create a unique Sony experience. The first hurdle is for leadership to understand what needs to be done. The second stage is to make that vision a reality, which we think will come in two stages.

Firstly, we think the PlayStation user experience badly needs to be fixed. Comparing the PlayStation user experience to Xbox shows it leaves a lot to be desired. The experience needs to be easy and fun to use and designed in such a way that users want to explore and look around to see what other cool stuff Sony has to offer. Instead, the user experience is unintuitive and clumsy to use, making the user want to leave Sony and go to the game as soon as possible.

Secondly, once fixed, this user experience needs to become consistent across all its devices from the PS4 to the smartphone to the TV. If users begin to identify with the Sony experience as a place in which want to live their Digital Lives, some of its pricing power could be regained giving it a much-needed margin boost.

The smartphone will be front and centre of this strategy as that is where users spend most of their time. Consequently, we believe the experience on this device continues to define the choice of which ecosystem to live with. Sony is coming from the console, but this is why the smartphone business is so important. With an excellent user experience created on the PS4 and migrated onto the smartphone, it will be on the smartphone where the real decision to do more than just gaming with Sony is taken. Consequently, we would see a move to jettison the smartphone business as hugely detrimental to Sony's overall ecosystem ambitions, even though that part of Sony only just breaks even.

Unfortunately, Sony's new medium-term strategy seems to imply that this risk is higher than we had anticipated as Sony's management may have de-emphasised the importance of the creation of a single and consistent ecosystem. The three pillars of the new strategy are: **1)** pursue profitability without necessarily pursuing volume; **2)** each business unit will have greater autonomy but also greater responsibility for helping to deliver group 10% RoE. Sony recognises that this will vary across the different parts of the business and has classified its businesses accordingly (growth drivers, stable profit and those that will be volatile); and **3)** each business unit will be positioned as part of an overall portfolio of assets rather than standalone units.

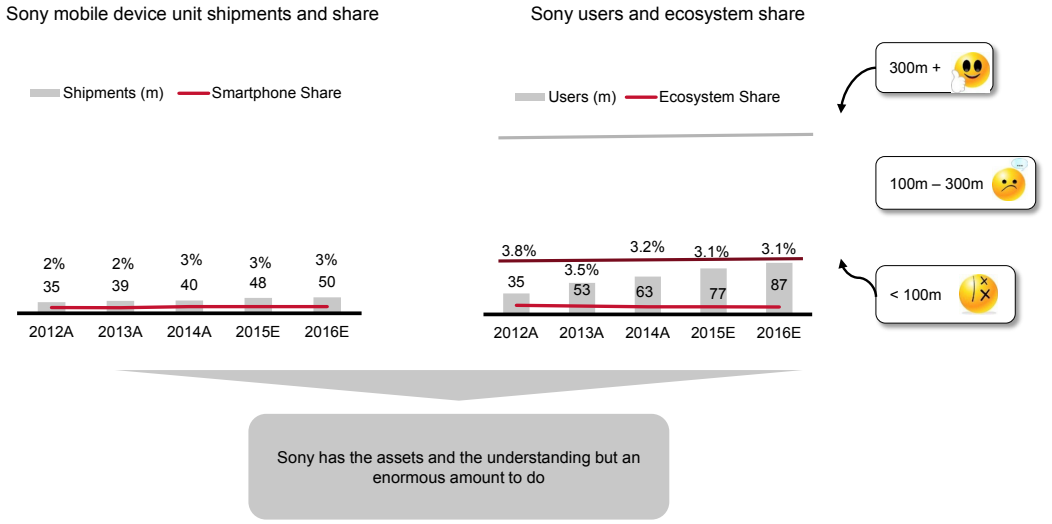
Sony also aims to continue its conversion into a holding company structure with the business units operating as wholly owned subsidiaries. The aim here is to speed up decision making and to

ensure that each unit is self-sustaining. Speeding up decision making and ensuring that each unit is part of an overall portfolio is good news for Sony's ecosystem ambitions, although the rest of it is troubling.

Making the business units more autonomous will not encourage them to co-operate and raises the risk that the old silo mentality returns in force. Furthermore, it makes the realisation of profitability from the ecosystem much more difficult. If Sony is successful in creating an ecosystem based on a great user experience derived from PlayStation and rolled out across the rest of the company, we can see a huge internal battle emerging over how that profit is allocated. If mobile becomes very profitable as a result of users willingness to pay up for the Sony ecosystem, how will this profit be allocated? The gaming and media segments will rightly demand some of the profitability due to their contribution to the ecosystem, but the mobile business will need that profit to meet its own targets.

Carving out the units also makes it easier to hive them off or shut them down, which makes us think that Sony has missed the fact that the real profit is generated when these businesses pull together. There are three ways to make money from the ecosystem: premium hardware pricing, advertising or subscription (Exhibit 2). Sony can realistically only address the first and last and both require a collaborative structure where the assets all pull together and incentives are based on overall performance rather than the individual pieces. This is exactly what Microsoft is doing and why we are increasingly confident that Microsoft has a real chance to be a major ecosystem. This new strategy from Sony raises more concerns than it addresses and makes us worry that, after all, Sony has missed the point of what it should be trying to achieve.

Exhibit 38: Forecasts for Sony, 2012-16e

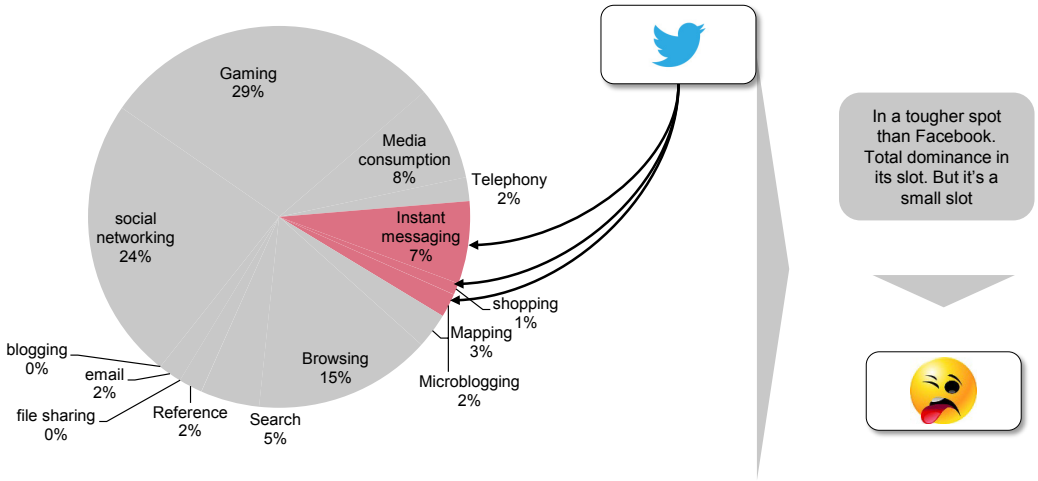


Source: Edison Investment Research, Counterpoint Research.

Twitter

While all the noise around Twitter remains centred on the growth (or lack thereof) of its user base, the most important strategic move it has made for some time is slipping by unnoticed. Now that the management upheaval appears to have come to an end, Twitter has been able to get on with addressing the biggest issue that it faces. This relates to its limited reach. When Twitter is tested against the Digital Life (Exhibit 39), its current services only cover a tiny proportion of the activities that users carry out on smartphones and tablets. This is why we think that in its current state, Twitter's revenues could stop growing at around $2bn. This is because it will have effectively monetised its addressable market and to grow further it needs to expand its reach into other areas of Digital Life.

Exhibit 39: Twitter in Digital Life



Source: Edison Investment Research, Nielsen, Google, Pewinternert.org, ComScore, NetMarketShare

This is why its Fabric initiative is so important. Fabric is a software development kit (SDK) that allows app developers to put hooks into Twitter's systems all the way through their applications. Apps can use Twitter as a login, get access to MoPub to allow monetisation through advertising or Crashlytics for reporting software crashes. While this does not sound like much, it is the beginning of Twitter's ability to get some access to Digital Life activities that lie outside its core microblogging service. For example a social networking app that has used Fabric will enable Twitter to see some of what its users are doing in other segments of the pie. This will give it a better idea of what its users are doing and hence it can be more relevant with its targeting.

We think that this is very far from actually having a service of its own in each of these slots but it is much better than nothing. If successful this should allow revenues to expand somewhat beyond the $2bn limit (see above) but the degree of this remains very uncertain. We are encouraged by the new direction taken by the management of Twitter as it appears to have recognised what the challenges are and is actively working on addressing them to secure longer term growth. How successful this will be remains to be seen but Twitter has taken the first important step in realising what needs to be done.

Conclusion

The four new laws of robotics allow for a much deeper understanding of where the strengths and the weaknesses of the different ecosystem lie. As a result, we believe the analysis presented in this report is a better reflection of the realities that a company faces when contemplating entering this market. To this end, it is clear that the requirements of building a great ecosystem where users want to live their Digital Lives will only get more complex and more onerous. Those that already have a base from which to start have an initial advantage, but it requires a lot of imagination, innovation and investment to create a flourishing ecosystem. The next two years are likely to see the real winners emerging, leaving a lot of blood in their wake.

Market forecasts

Exhibit 40: Mobile ecosystem user numbers and share

Ecosystem users (m)	2012A	2013A	2014E	2015E	2016E
Symbian	50.0	21.2	0.0	0.0	0.0
Tizen	0.0	0.0	0.0	0.0	0.0
Blackberry	0.4	0.4	0.0	0.0	0.0
iPhone OS	195.4	257.1	331.8	396.4	432.3
Windows	20.0	44.4	63.6	98.4	175.0
Facebook	0.0	0.0	0.0	0.0	0.0
Amazon	12.7	18.2	27.7	43.5	65.3
Firefox	0.0	1.2	1.9	2.3	2.5
Jolla	0.0	0.1	0.4	0.9	1.2
Android	614.5	1030.0	1517.4	1864.9	2053.9
o/w Google	179.4	360.1	614.3	833.4	916.4
o/w China	254.0	421.7	594.2	743.0	814.1
o/w Other	181.1	248.2	308.9	288.6	323.4
Yahoo!	0.0	0.0	0.0	0.0	0.0
Samsung	10.4	117.4	21.2	26.7	30.1
Sony	35.0	53.0	63.4	77.3	86.6
Xiaomi	7.2	21.6	65.7	106.8	135.3
Total	**925.6**	**1523.4**	**1997.4**	**2463.7**	**2777.9**

Ecosystem share of users	2012A	2013A	2014E	2015E	2016E
Symbian	5.4%	1.4%	0.0%	0.0%	0.0%
Tizen	0.0%	0.0%	0.0%	0.0%	0.0%
Blackberry	0.0%	0.0%	0.0%	0.0%	0.0%
iPhone OS	21.1%	16.9%	16.6%	16.1%	15.6%
Windows	2.2%	2.9%	3.2%	4.0%	6.3%
Amazon	1.4%	1.2%	1.4%	1.8%	2.3%
Firefox	0.0%	0.1%	0.1%	0.1%	0.1%
Jolla	0.0%	0.0%	0.0%	0.0%	0.0%
Android	66.4%	67.6%	76.0%	75.7%	73.9%
o/w Google	19.4%	23.6%	30.8%	33.8%	33.0%
o/w China	27.4%	27.7%	29.7%	30.2%	29.3%
o/w Other	19.6%	16.3%	15.5%	11.7%	11.6%
Yahoo!	0.0%	0.0%	0.0%	0.0%	0.0%
Samsung	1.1%	7.7%	1.1%	1.1%	1.1%
Sony	3.8%	3.5%	3.2%	3.1%	3.1%
Xiaomi	0.8%	1.4%	3.3%	4.3%	4.9%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Edison Investment Research, Counterpoint Research

Exhibit 41: Global handset shipments by vendor

Total Handsets Units by vendor Units (m)	2009A	2010A	2011A	2012A	2013E	2014E	2015E	2016E
Apple	11.4	24.9	46.6	89.3	133.4	159.3	192.6	218
Huawei	7.0	13.5	30.0	46.0	49.4	55.7	77.4	92
HTC	6.5	10.8	24.9	43.3	32.5	23.0	21.2	14
LG	102.6	122.1	114.2	86.4	58.4	71.0	78.4	73
Google Motorola	106.6	58.5	38.6	40.3	35.3	16.7	31.7	30
Nokia / Microsoft	472.3	440.9	461.3	422.5	335.2	256.0	198.8	175
BlackBerry	23.1	34.3	47.5	51.5	36.1	18.7	7.8	9
Samsung	199.2	235.8	278.6	316.2	386.2	462.5	401.9	401
Sony Mobile	93.4	54.9	41.8	32.6	32.7	38.5	39.8	48
ZTE	14.2	16.0	50.0	69.3	69.6	54.3	49.5	47
Others	185.8	199.6	463.4	579.6	578.5	586.5	756.0	758
	1211.2	**1596.8**	**1776.9**	**1747.3**	**1742.1**	**1855.1**	**1869.2**	**1887**

Market Share Handsets	2009A	2010A	2011A	2012A	2013E	2014E	2015E	2016E
Apple	2.1%	2.9%	5.0%	7.6%	9.1%	10.4%	11.7%	11.4
Huawei	1.1%	1.9%	2.6%	2.8%	3.2%	4.2%	4.9%	4.9
HTC	0.9%	1.6%	2.4%	1.9%	1.3%	1.1%	0.8%	0.8
LG	10.1%	7.1%	4.9%	3.3%	4.1%	4.2%	3.9%	3.9
Google Motorola	4.8%	2.4%	2.3%	2.0%	1.0%	1.7%	1.6%	1.3
Nokia / Microsoft	36.4%	28.9%	23.8%	19.2%	14.7%	10.7%	9.4%	12.7
BlackBerry	2.8%	3.0%	2.9%	2.1%	1.1%	0.4%	0.5%	0.5
Samsung	19.5%	17.4%	17.8%	22.1%	26.5%	21.7%	21.5%	21.5
Sony Mobile	4.5%	2.6%	1.8%	1.9%	2.2%	2.1%	2.6%	2.6
ZTE	1.3%	3.1%	3.9%	4.0%	3.1%	2.7%	2.5%	2.5
Others	16.5%	29.0%	32.6%	33.1%	33.7%	40.8%	40.6%	37.8
Smartphone %Market	**15%**	**19%**	**27%**	**39%**	**60%**	**70%**	**75%**	**75**

Source: Edison Investment Research, Counterpoint Research

Exhibit 42: Global smartphone shipments by vendor

Of Which Smartphones Units by vendor Units (m)	2009A	2010A	2011A	2012A	2013E	2014E	2015E	2016
Apple	25.1	46.6	89.3	133.4	159.3	192.6	218.3	215
Huawei	13.5	0.4	15.6	29.0	48.1	75.4	91.0	9
HTC	10.8	24.6	43.0	32.5	23.0	21.2	14.7	14
LG	0.6	5.6	19.0	26.4	47.7	60.2	58.4	59
Google Motorola	2.6	13.7	17.4	16.6	16.2	31.7	30.1	24
Nokia / Microsoft	70.9	102.2	84.6	36.4	33.6	42.4	68.9	135
BlackBerry	34.3	47.5	51.5	36.1	18.7	7.8	9.8	9
Samsung	5.9	25.4	90.5	212.4	322.5	313.5	327.7	330
Sony Mobile	1.4	10.3	19.6	34.8	38.5	39.8	48.1	49
ZTE	0.0	0.0	10.5	29.5	36.2	39.9	38.6	39
Lenovo	0.0	0.0	0.0	19.9	46.2	63.1	77.1	77
Xiaomi	0.0	0.0	0.0	7.2	18.8	61.2	80.0	84
Coolpad	0.0	0.0	0.0	19.0	32.5	40.7	55.4	56
Others	20.7	23.0	30.7	53.5	207.7	315.6	284.0	22
Total	**185.7**	**299.2**	**471.7**	**686.7**	**1048.9**	**1305.1**	**1401.9**	**1416**

Market Share Smartphones	2009A	2010A	2011A	2012A	2013E	2014E	2015E	2016
Apple	13.5%	15.6%	18.9%	19.4%	15.2%	14.8%	15.6%	15.2
Huawei	7.2%	0.1%	3.3%	4.2%	4.6%	5.8%	6.5%	6.5
HTC	5.8%	8.2%	9.1%	4.7%	2.2%	1.6%	1.0%	1.0
LG	0.3%	1.9%	4.0%	3.9%	4.5%	4.6%	4.2%	4.2
Google Motorola	1.4%	4.6%	3.7%	2.4%	1.5%	2.4%	2.1%	1.7
Nokia / Microsoft	38.2%	34.1%	17.9%	5.3%	3.2%	3.2%	4.9%	9.6
BlackBerry	18.5%	15.9%	10.9%	5.3%	1.8%	0.6%	0.7%	0.7
Samsung	3.2%	8.5%	19.2%	30.9%	30.7%	24.0%	23.4%	23.4
Sony Mobile	0.8%	3.4%	4.2%	5.1%	3.7%	3.0%	3.4%	3.5
ZTE	0.0%	0.0%	2.2%	4.3%	3.5%	3.1%	2.8%	2.8
Lenovo	0.0%	0.0%	0.0%	2.9%	4.4%	4.8%	5.5%	5.5
Xiaomi	0.0%	0.0%	0.0%	1.0%	1.8%	4.7%	5.7%	6.0
Coolpad	0.0%	0.0%	0.0%	2.8%	3.1%	3.1%	4.0%	4.0
Others	11.1%	7.7%	6.5%	7.8%	19.8%	24.2%	20.3%	16.0
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100**

Source: Edison Investment Research, Counterpoint Research

Exhibit 43: Global smartphone shipments by OS

Smartphones Units by OS Units (m)	2009A	2010A	2011A	2012A	2013E	2014E	2015E	2016E
Symbian	81.0	111.6	88.4	28.1	1.3	0.0	0.0	0
BlackBerry	33.9	49.7	51.5	37.8	18.7	7.8	9.8	9
iPhone OS	25.1	46.6	89.3	133.4	153.4	192.6	218.3	215
Windows Mobile / Phone	15.0	12.4	8.8	17.5	37.8	43.6	68.9	135
Linux	8.1	6.4	3.8	1.9	3.3	6.5	7.0	
Android	6.8	67.2	219.5	449.1	785.8	1031.1	1073.7	1014
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Others	15.8	5.4	10.4	18.8	48.8	23.5	24.2	34
Total	**185.7**	**299.2**	**471.7**	**686.7**	**1048.9**	**1305.1**	**1401.9**	**1416**

Smartphones Share by OS %	2009A	2010A	2011A	2012A	2013E	2014E	2015E	2016E
Symbian	43.6%	37.3%	18.7%	4.1%	0.1%	0.0%	0.0%	0.0
BlackBerry 9 and older	18.3%	16.6%	10.9%	5.5%	1.8%	0.6%	0.7%	0.7
iPhone OS	13.5%	15.6%	18.9%	19.4%	14.6%	14.8%	15.6%	15.2
Windows Mobile / Phone	8.1%	4.1%	1.9%	2.5%	3.6%	3.3%	4.9%	9.6
Linux	4.4%	2.1%	0.8%	0.3%	0.3%	0.5%	0.5%	0.5
Android	3.7%	22.5%	46.5%	65.4%	74.9%	79.0%	76.6%	71.6
Others	8.5%	1.8%	2.2%	2.7%	4.7%	1.8%	1.7%	2.4
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100**

Source: Edison Investment Research, Counterpoint Research

Exhibit 44: Global tablet shipments by vendor

Tablets Units by vendor (m)	2012A	2013A	2014E	2015E	2016E	2017E
Apple	65.8	74.2	63.4	67.3	68.0	68.2
Microsoft	0.9	1.6	0.4	0.0	0.0	0.0
BlackBerry	1.1	0.7	0.0	0.0	0.0	0.0
Samsung	17.7	37.6	42.4	35.1	35.4	35.5
Amazon	10.5	11.3	4.6	4.2	4.2	4.3
Asustek	7.0	12.2	11.3	9.6	9.7	9.7
Lenovo	2.7	9.0	11.5	11.8	11.9	11.9
Acer	2.6	6.1	3.6	4.9	4.9	4.9
Dell	0.0	0.0	0.0	0.0	0.0	0.0
HPQ	0.0	0.8	1.1	0.6	0.6	0.6
Sony	0.0	1.6	3.2	3.7	3.7	3.7
Others	54.8	80.4	95.4	105.6	106.6	106.9
Total	**163.0**	**235.5**	**236.9**	**242.7**	**245.1**	**245.7**

Tablets Share by Vendor	2012A	2013A	2014E	2015E	2016E	2017E
Apple	40.4%	31.5%	26.8%	27.7%	27.7%	27.7%
Microsoft	0.6%	0.7%	0.2%	0.0%	0.0%	0.0%
BlackBerry	0.7%	0.3%	0.0%	0.0%	0.0%	0.0%
Samsung	10.9%	16.0%	17.9%	14.5%	14.5%	14.5%
Amazon	6.4%	4.8%	2.0%	1.7%	1.7%	1.7%
Asustek	4.3%	5.2%	4.8%	3.9%	3.9%	3.9%
Lenovo	1.7%	3.8%	4.9%	4.9%	4.9%	4.9%
Acer	1.6%	2.6%	1.5%	2.0%	2.0%	2.0%
Dell	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
HPQ	0.0%	0.3%	0.5%	0.3%	0.3%	0.3%
Sony	0.0%	0.7%	1.4%	1.5%	1.5%	1.5%
Others	33.6%	34.2%	40.3%	43.5%	43.5%	43.5%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Edison Investment Research, Counterpoint Research

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