



# Impact of Android within the overall Turkish economy

2017



**OC&C**  
Strategy consultants

uncommon sense

# About OC&C Strategy Consultants

**More than 30 years of unpicking the most complex business challenges with simple, uncommon sense.**

More than 30 years of unpicking the most complex business challenges with simple, uncommon sense. We're an international consulting firm, but we've never seen size as an end in itself. Our expertise is focused on a few core specialisms, allowing us to deliver results that get noticed.

Our people are agile thinkers, cut from different cloths but united by a relentless curiosity and desire to solve problems.

To us, each client challenge is unique, so boilerplate solutions don't cut it. We interrogate a problem until we find its root. Then we develop a powerful way to solve it. We don't duck the difficult answers, we give clients the strategies they need.

For any inquiries regarding the contents of this study, please contact OC&C Istanbul.

OC&C Strategy Consultants  
Astoria Kempinski Towers  
Büyükdere Caddesi, No:127  
A-Kule, Kat:5, 34394  
Şişli, Istanbul, Turkey  
T: + 90 212 2854020





## Disclaimer

This report was prepared independently by OC&C Strategy Consultants who have been commissioned by Google Turkey to research and size the mobile internet economy in Turkey. Information provided herein, which may include recommendations, are prepared and intended for use as a discussion on the ways to support the growth of the mobile internet economy.

The report is based on a variety of inputs from multiple sources including official data sources such as various country based Statistical Institutes and ICT Authority publications, and other privately published data sources such as news articles, sector reports and interviews. Therefore, accuracy of analysis and conclusions are dependent on the detail and accuracy of declared data. Parties do not guarantee and are not responsible for the currency, propriety, accuracy or reasonableness of any statements, information or conclusions contained in the source documentation used.

The information given herein is for informal guidance only and neither Google Turkey nor OC&C Strategy Consultants nor any company stated within this paper makes any expressed or implied warranty, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product, or process disclosed, or represents that its use would not infringe privately owned rights. Parties are not responsible for any use that may be made of this document.

OC&C Strategy Consultants have assumed responsibility for the final form and content of this document, subject to the limitations noted above. Should you have any inquiries about the analysis within the document or related matters, please contact OC&C Strategy Consultants Istanbul Office.

# Table of contents

|   |    |
|---|----|
| I. Introduction   | 5  |
| II. Turkish mobile landscape  | 7  |
| III. Definition of the Android landscape                                    | 8  |
| A. Business segment   | 9  |
| B. Consumer segment   | 10 |
| IV. Macro-economic impact of the Android Ecosystem (business segment)       | 11 |
| V. Google and Android's extended support to Turkish enterprises             | 14 |
| A. Android creates new revenue streams                                      | 15 |
| B. Android helps to create international players from local champions       | 18 |
| C. Android boosts innovation culture in start-ups and new ventures          | 21 |
| D. Android accelerates digital transformation of enterprises and government | 24 |
| VI. Appendix  | 26 |
| A. Market sizing methodology  | 27 |

# I. Introduction

Turkey is a large country, ranking 17<sup>th</sup> and 19<sup>th</sup> in the world according to GDP and population, respectively, according to the IMF. The Turkish economy has shown substantial growth with 5.5% real GDP growth between 2011 and 2016 also in many ways; fueled by its young, large and dynamic population of c.80 million, 56% of which are under 35.

This sizeable and young population base continues to provide a promising environment for digital and mobile technologies, where:



Mobile penetration of the total population has increased by 3.1pp in the last three years and has reached 94% as of 2016



Total broadband subscribers, both mobile and fixed, have grown with a CAGR (compounded annual growth rate) of 23% over the last three years, reaching 62.2 million in 2016 where share of mobile within broadband is now at 83%



This large base and growth is also made possible by continuing smartphone penetration. At 68% of mobile subscribers, smartphones are the key factor behind growth in data traffic. Mobile data traffic has increased with a CAGR of 92% since 2013 and reached 102 million GB by end of 2016

All of the key indicators above, but particularly the increase in smartphone penetration and the resulting data traffic are directly complemented (if not, completely generated) by Android. Android's open source business model and support has radically expanded smartphone development and penetration across all socioeconomic segments as devices within all price levels – not just “high end” became available. The Google Play Store has also played a significant role in this growth with literally millions of apps and content services made available to smartphone users.

As in many other markets, Android has played a key role in the creation of a rich mobile Internet ecosystem in Turkey. Main stakeholders of this thriving ecosystem go beyond the usual suspects, i.e. consumers, telecom operators and device manufacturers & retailers, but also include traditional enterprises, digital start-ups and app developers and government projects which are going through digital transformation.

Our recent analysis has shown that these stakeholders (the whole “ecosystem” excluding consumers) have generated TRY 103bn economic value in 2016. This value is equal to 4.0% of Turkish GDP, indicating the importance of the Mobile Internet Economy in Turkey.

Furthermore, just the “Android” portion of this economy in Turkey is estimated to contribute an economic value of TRY 54bn, which corresponds to 2.1% of GDP. As a result of continuous investment and efforts, the Android Economy is expected to flourish further and reach up to 3.5% of GDP by 2023.





Android and Google's contributions are not limited to generating direct economic value. Thanks to the partnerships between Google and ecosystem players, all the following has become possible and/or easier:



New revenue streams: let it be new markets, new delivery channels, new customer segments or new products



Local champions with international presence in digital landscape



Innovation culture and ongoing support to startups throughout their business lifecycle



Digital transformation of enterprises and government

Although Android's contribution to the mobile ecosystem is straightforward and quantifiable within businesses active in the industry, consumers are the ultimate beneficiaries of Android and its lively ecosystem. For consumers, Android has made it easy and possible to utilize mobile Internet and all the "goodies" that come with it in a similar manner regardless of their status, demographics or income.

In a way, Android has supported democratization of information access among all segments of consumers - it has massively grown reach and inclusion.

# II. Turkish mobile landscape

Turkey is a large and dynamic economy with favorable macroeconomic drivers particularly for mobile growth:



17th largest economy in terms of GDP with its USD 857b size in 2016 and 5.5% average real GDP growth during the last 5 years



19th largest country in terms of population, 56% of which are under 35



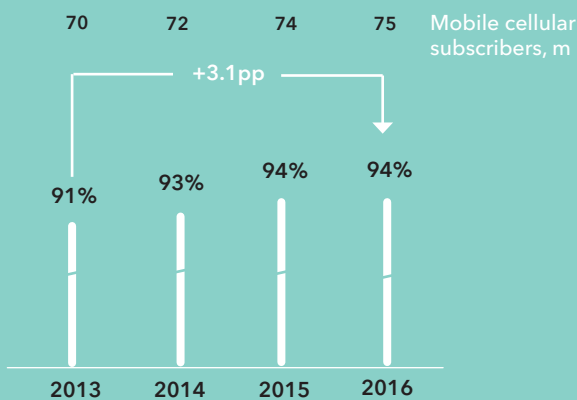
Still growing mobile subscriber base - reaching 75m and 94% of population penetration, which was 91% just 3 years ago



Fast growing broadband subscriber base, almost doubling from 2013 to 2016, 33m and 62m respectively. Within 15+ aged population, this base corresponds to 102% penetration

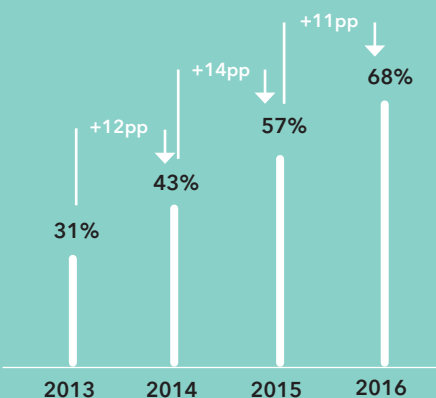
- 83% of the broadband subscribers are mobile and mobile broadband has been growing at a 29% CAGR since 2013
- Mobile data traffic has reached 102 million GB as of 2016, reaching c. 15% of fixed broadband traffic. In 2013 mobile was only as large as 5% of fixed data traffic

EVOLUTION OF MOBILE PENETRATION IN TURKEY, 2013-16 (% OF POPULATION)



Source: BTK, TURKSTAT, OC&C analysis  
Exhibit 1: Mobile subscriber penetration in Turkey

SMARTPHONE PENETRATION, 2013-16 (% OF MOBILE SUBSCRIBERS)



Source: Worldbank, Company Annual Reports (Turkcell & Turk Telekom), OC&C analysis  
Exhibit 3: Smartphone Penetration and Sales Volume in Turkey



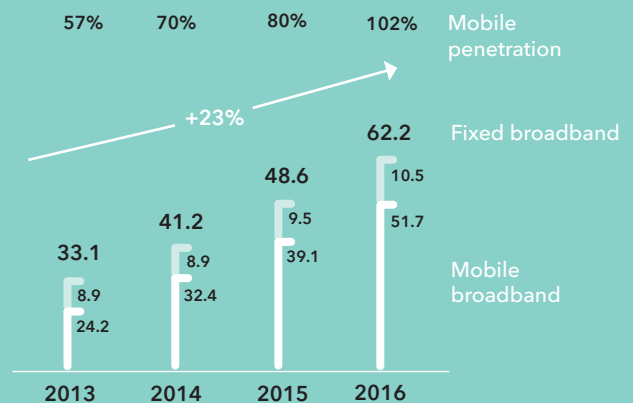
Mobile's rise in broadband subscribers and data traffic is driven by the increase in smartphone penetration with almost 13m smartphone sales per annum (2016)



More than 10 million Android smartphones are sold in Turkey in 2016, which is mostly driven by the affordable range of devices provided only by Android.

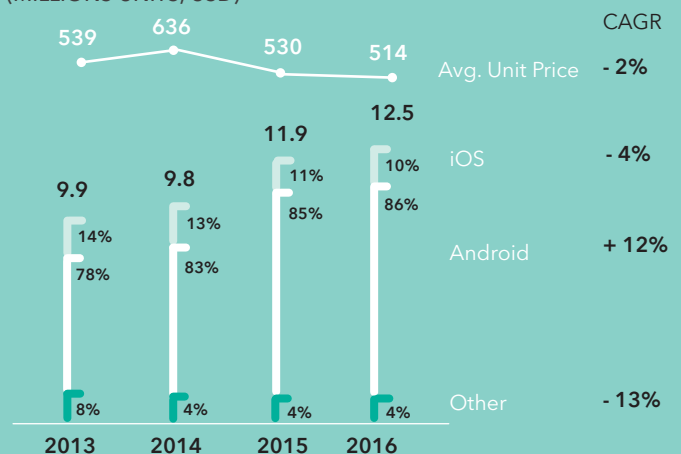
- Android offers smartphones almost as cheap as feature phones at TRY 599 (c.USD 200) c.70% of all smartphone sales are realized by devices cheaper than TRY 1,500. Almost all of these devices are Android - in a way Android makes it possible to reach smartphones, hence the Internet, and all things mobile and digital for Turkish consumers from every income level.
- As a natural result of the increase in smartphone penetration, internet usage now also originates from mobile devices. Around 50% of browser traffic (excluding apps) originates from mobile in Turkey's leading websites. According to SimilarWeb, 54% of Hurriyet.com.tr, 60% of Sahibinden.com and 57% of Hepsiburada.com's browser traffic are mobile.

BROADBAND INTERNET SUBSCRIBER BY TYPE, TURKEY, 2013-16 (MILLION)



Source: Euromonitor, IMF  
Exhibit 2: Broadband Subscribers in Turkey

SMARTPHONE SALES EVOLUTION BY CATEGORY, TURKEY, 2013-16 (MILLIONS UNITS, USD)



Source: Worldbank, Company Annual Reports (Turkcell & Turk Telekom), OC&C analysis

# III. Definition of the Android ecosystem

Public sources<sup>1</sup> define Android as “a mobile operating system developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets.” However, considering how Android shaped the whole communication world, this definition feels conservative at best. Android has exceeded being just an operating system and has now evolved to being **the backbone of a thriving ecosystem around businesses, for the benefit of consumers.** It is no easy task as this ecosystem is fueled and consistently supported by Android (exhaustively) as more and more players are introduced to this ecosystem.

Our Android ecosystem description has been developed to take into consideration local nuances, especially in how it defines the specific clusters of stakeholders and their interactions with Android.

## ANDROID ECOSYSTEM

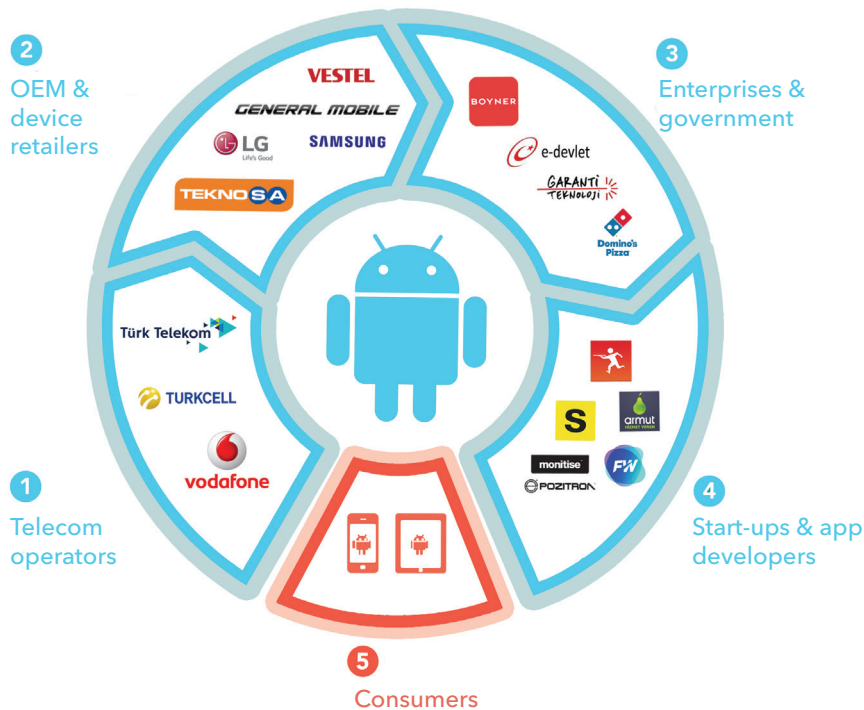


Exhibit 4. Android Ecosystem





## A. BUSINESS SEGMENT

Our definition of an ecosystem not only includes the key players but also their suppliers and service providers as there is obviously a symbiotic relationship between each players within this ecosystem. We share how we have defined and grouped key players within this ecosystem below, which has also formed the basis of our analysis.

### 1. TELECOM OPERATORS:

Telecom operators, i.e. mobile network operators and fixed broadband operators, are one of the main clusters of stakeholders across the mobile and Android ecosystem as they enable mobile services with core connectivity. Data traffic is the growth engine for telecom operators and Android plays a critical role in stimulating data consumption amongst consumers and businesses. As telecom operators grow while data services grow, suppliers also benefit from this ever-expanding industry

### 2. DEVICE MANUFACTURERS AND RETAILERS:

Device manufacturers are companies that produce mobile devices (locally and globally), while retailers make such devices available to Turkish consumers and businesses. Device retailers include electronic retailers, telecom operator dealers and dealers of device manufacturers.

Android brings a compatible and innovative operating system platform to device manufacturers. Manufacturers still (and indeed to a higher degree) invest in R&D but instead of trying to build a fully fledged (and very expensive operating system), they build structures on an existing open platform like Android focusing on creativity, innovation and differentiation. Availability of a fully functional, globally competitive operating system with very low integration efforts from both financial and technical perspectives support local manufacturing of smart devices, let them be smartphones, tablets or TVs.

As mobile content, data traffic and technologies evolve quite rapidly, consumers tend to purchase smart devices more frequently than before, which in turn support the growth of device manufacturers and retailers.

### 3. ENTERPRISES AND GOVERNMENT:

Industries which are predominantly brick-and-mortar (i.e. financial institutions, retailers, logistics etc.) and government entities (i.e. ministries, municipalities, etc.) invest on digital transformation and leverage the mobile channel to drive growth, innovation, effectiveness and efficiency in their operations and processes. Entities from every industry and also the government are transforming their traditional businesses to digital – sometimes directly to mobile.

Considering the low cost, efficient, effective and fast nature of mobile channels, as smart device penetration and mobile Internet access improves enterprises and government bodies are more motivated to transform their businesses into mobile channels.

Android accelerates this transformation of enterprises and government while providing the necessary level of efficiency and cost advantage.

### 4. START-UPS AND APP DEVELOPERS:

Start-ups in Android ecosystem are, as the name suggests, tech entrepreneurs at different stages of their business cycle. They are not necessarily mobile only, but have at least a mobile arm in their business.

App Developers on the other hand are all addressing (but not limited to) mobile platforms, developing apps for Android and other operating systems.

Android has supported the creation of a large user base from different socioeconomic segments for both tech entrepreneurs and app developers to market their products and is also continuously supporting these businesses on their development, marketing & sales and financing activities. Last but not the least, Android opens access to the world of the local app developers.



## B. CONSUMER SEGMENT

### 5. CONSUMERS:

Last but not the least, consumers are the ultimate beneficiaries of the Android ecosystem. For all demographics - regardless of age, gender, education, income level - an Android device which connects a person to the vast world of applications and Internet, is within reach thanks largely to Android. **This brings democratization in Internet and smart device access and closes the gap between different demographic segments.** Employer and employee, mother and teen child, wife and husband can choose from a variety of brands and models from different price ranges and varying capabilities, and they are all compatible with each other and provide almost the same user experience.

# IV. Macro-economic impact of the Android Ecosystem (business segment)

Key stakeholders of the Android ecosystem are the same stakeholders in the broader Mobile Internet Ecosystem. It is therefore crucial to understand the total impact generated by these players and then breakdown this impact to Android and non-Android.

## How Mobile Internet Economy

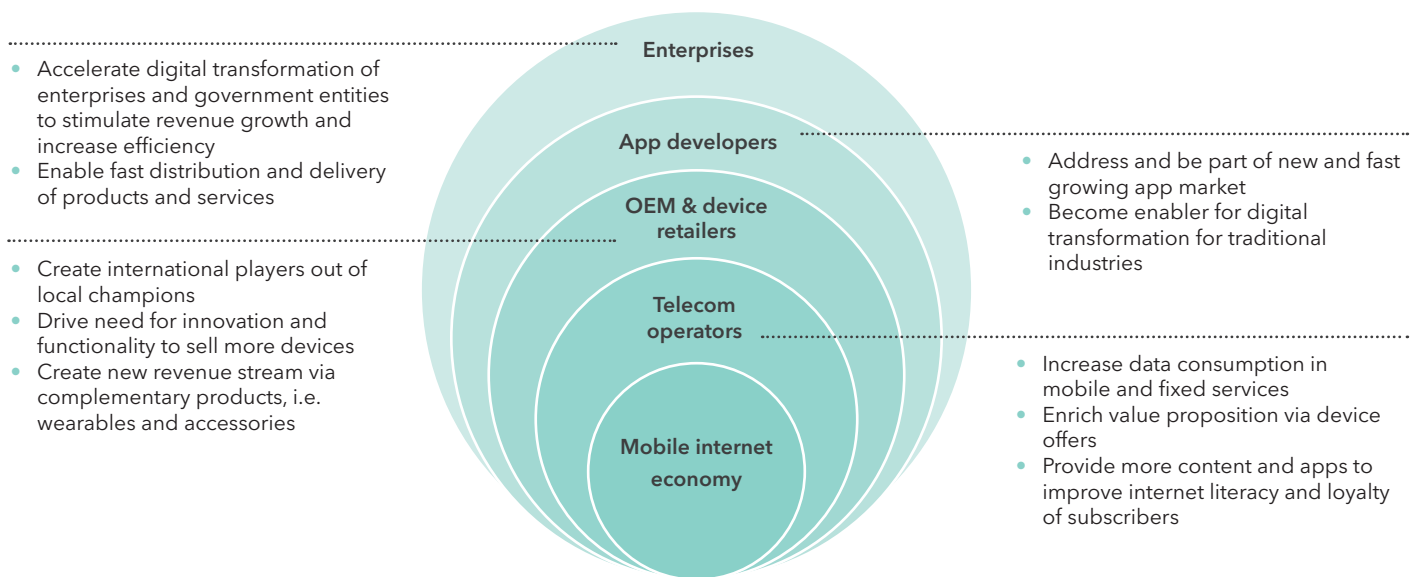


Exhibit 5. Mobile Internet Economy value drivers

## FINANCIAL IMPACT METHODOLOGY

Financial impact of the Mobile Internet Ecosystem in the Turkish economy is studied from a contribution to GDP perspective via following the production approach: GDP impact of the core and extended stakeholders of the ecosystem is calculated by estimating the gross value add by the key stakeholders (excluding government) in the ecosystem, revenues generated by the suppliers of these stakeholders and value gains (either efficiency or revenue) created by mobile transformation of traditional businesses.

Tax contribution is calculated separately for each stakeholder as different taxation is applied amongst such businesses. All taxes are taken into account for each cluster of stakeholders. Taxes applied to specific products such as TRT tax on devices are also considered in our calculations. Taxes paid and accounted within the operating expenses of companies are also taken into account while calculating gross profit and extended contribution of the stakeholders.

Share of Android in the value generated by the Mobile Internet Ecosystem for each stakeholder (excluding

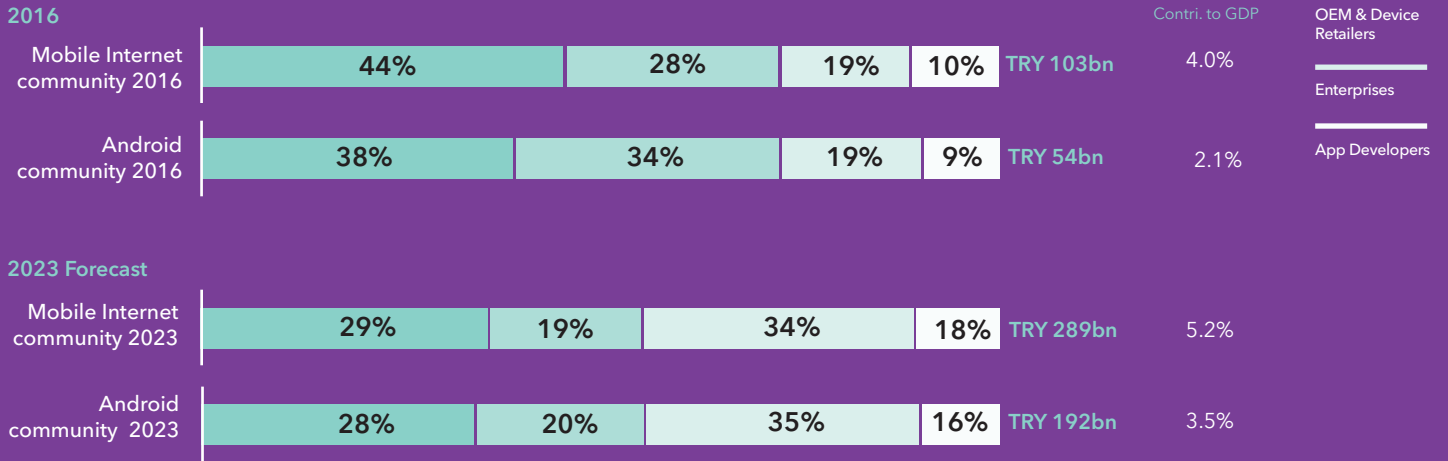
government) is calculated by identifying relevant business KPIs (device sales volume and value, data traffic, app and web visits, etc.) for each stakeholder and share of Android in these KPIs (Please refer to methodology section for more details).

Based on the aforementioned methodology, we estimate that TRY 103bn economic value has been created in 2016, which corresponds to 4% of the total GDP in Turkey by the entire Mobile Internet Ecosystem. 72% of this economy is driven by telecom operators and device manufacturers and retailers. Although all players are expected to grow with double digits, enterprises and app developers are expected to grow faster and increase their contribution to the economy faster.

Contribution of enterprises and app developers grow much higher, as this part of the ecosystem has just started to emerge.

Android's contribution share is substantial: Android alone has contributed 53% of the Mobile Internet Economy in 2016.

SIZE OF MOBILE INTERNET ECONOMY AND ANDROID ECOSYSTEM IN TURKEY, 2016  
(TRY Bn, %)



Source: OC&C analysis

Exhibit 6. Size of Mobile Internet and Android Economy in Turkey

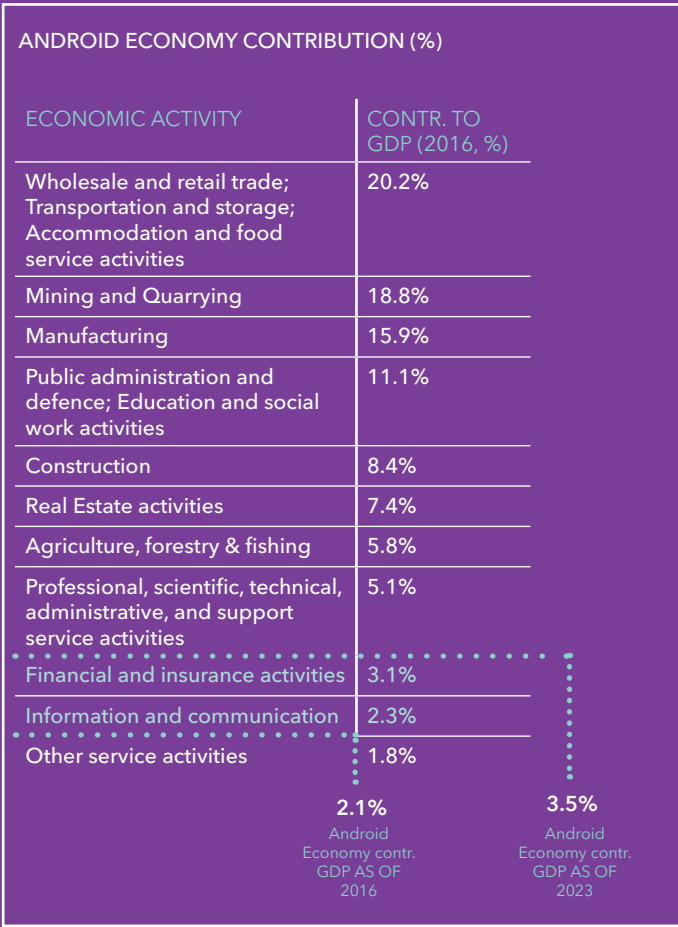
We expect the growth of Android Economy to be driven from improving penetration of smartphone and share of Android within smartphones, increasing the overall share of Android in data traffic, and selection of Android apps in the medium term.

Therefore, Android Ecosystem standalone generates an economic value which has corresponded to 2.1% of GDP in 2016 and is expected to generate 3.5% of total Turkish GDP by 2023. This would make Android Economy in Turkey the 84th largest economy in the world in 2023 according to IMF figures.



Source: IMF, OC&C analysis

Exhibit 7. Comparison of Android Economy Size with GDP of Countries



Source: TURKSTAT, OC&C analysis

Exhibit 8. Comparison of Android Economy Size with Other Economic Activities

As of 2016, Android Economy is as large as any traditional/main economic activity in Turkish economy. By 2023, it will be even larger than the contribution from financial and insurance activities. Android and non-Android combined, total Mobile Internet Economy, on the other hand is expected to reach 5.2% of GDP by 2023 and contribute almost as much as the current agriculture & fishing industry does to the Turkish economy.



# V. Google and Android's extended support to Turkish enterprises

Android is more than an operating system for Turkish enterprises. Android not only supports businesses in every stage of their lifecycle, but also promotes innovation culture and digital transformation across the entire consumer and business landscapes.

## A ACREATE NEW REVENUE STREAMS

- Stimulating demand for device, data and content
- Support distribution by Google Play and new digital channels
- Features on national and international events



## D ACCELERATE DIGITAL TRANSFORMATION

- Higher smartphone penetration and internet literacy
- Efficiency and transparency in business & government
- Access to government and business services on smartphone
- Google technologies, standards, guidelines and technical support



## B CREATE INTERNATIONAL PLAYERS FROM LOCAL CHAMPIONS

- Reaching c.2 billion addressable Android market
- Featuring on Google Play
- Access to Google's international business network
- Publicity on international Google events
- Features on national and international events



## C BOOST INNOVATION CULTURE

- Independent Android developer groups
- Google mentors, experts and credits
- Publicly available APIs, libraries
- Public online technical discussion forums
- Priority on events and education programs



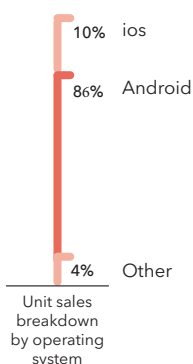
Exhibit 9. Google and Android's Contribution to Turkish Businesses

Google considers all ventures and enterprises in Turkey as business partners and supports the business ecosystem in multiple aspects. Google believes that as the Mobile Internet Economy and digital transformation across enterprises progress, more value and innovation will be created within the economy.

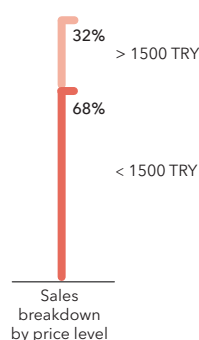
Google and Android invest in continuous efforts for enterprises to create new revenue streams, support local players in international markets, promote innovation culture within the society and accelerate digital transformation among various industries and public services.

### SMARTPHONE SALES AND PRICES

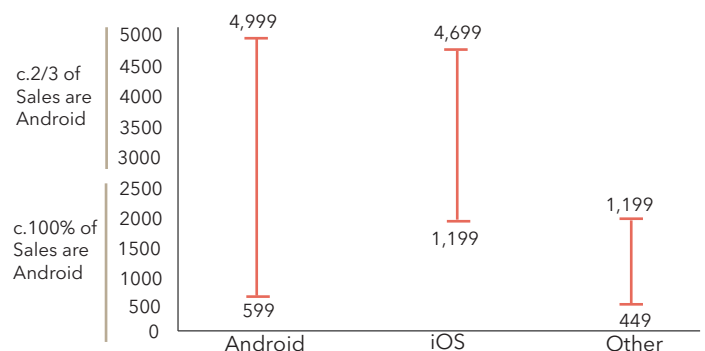
BREAKDOWN BY OS, 2016



BREAKDOWN BY PRICE RANGE, 2017



MOBILE PHONE PRICE RANGE, 2016 (TRY)



Source: Worldbank, Company Annual Reports (Turkcell & Turk Telekom), Desk Search on Mediamarkt, Euromonitor, TUIK, IMF, BTK, OC&C analysis

# A. Android creates new revenue streams

## I. ANDROID PLATFORM CREATES DEMAND FOR MORE FUNCTIONAL MOBILE DEVICES, WHICH DRIVES DEVICE SALES

A certain migration from feature phone to smartphone is evident, as smartphone penetration increase realized at 11pps during last year and 14pps the year before.

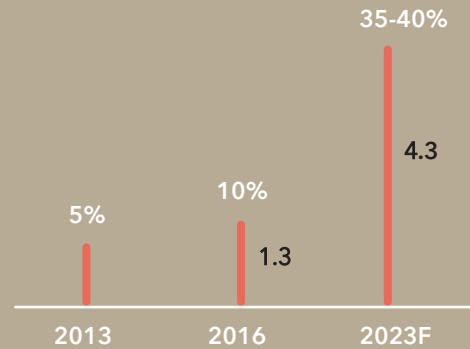
More than 10 million Android smartphones sold in Turkey (in 2016). Device prices start at TRY 599 (tax included) and go up to TRY 4,999 for Android while iOS device prices start at TRY 2,000 in major electronic retailers. Lowest priced Android devices are within feature phone price ranges, which is critical for feature to smartphone migration. As Android enables an extended set of configuration options for device manufacturers, an extended range of prices can be offered to consumers, dependent on device hardware. This has had a major impact especially for the consumer, enabling reach for every income segment and preference. Android also provides a good variety of smartphone options at a higher price range for consumers covering the whole price range of iOS offers in the affluent segment.

Each Android release brings further features and improvements. Although Android supports even the oldest devices (unlike its largest competitor), it promotes device manufacturers to further improve device specs and offer better and more advanced devices to the market. Increasing data usage and seeking more functionality amongst users then drive device manufacturers to be more innovative for new versions of their devices. Manufacturers, which do not need to invest in the operating system can then dedicate more time, resources and investments to hardware and other non-OS-related software improvements.

Both migration and increasing upgrade demand drives smartphone sales in Turkey. Device manufacturers enjoy increasing sales volumes and multiple local manufacturers are emerging, driven by this surge in demand and market growth. In 2016, 10% of smartphone unit sales are comprised by local manufacturers. In 2013, this number was only 5%. Turkey is amongst the 32 markets with local production of smartphones and one of the very few where the local players have reached scale and started to export their products to international markets.

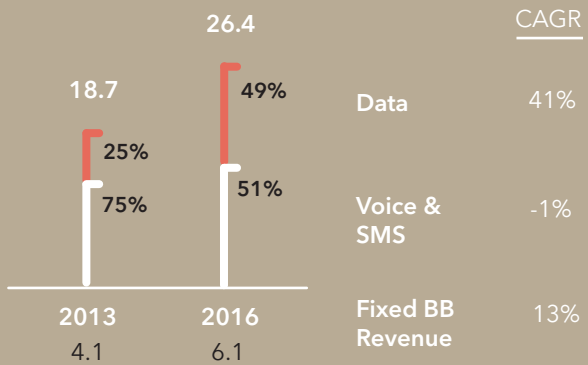
Without exception, all locally manufactured smartphones are Android. From Vestel to General Mobile, every local player sees Google as a key partner for their smartphone business and benefit from Android's vast capabilities.

SHARE OF LOCAL IN SMARTPHONE SALES (% OF DEVICES, MILLION UNITS)



Source: Euromonitor, MNO websites, Desk search, Sector interviews, OC&C analysis  
Exhibit 12. Share of Local Manufacturers in Smartphone Sales Units

MNO REVENUE, 2013-16 (BILLION TRY)



Source: BTK, MNO websites, OC&C analysis  
Exhibit 13. Mobile and Fixed Broadband Operator Revenues

## II. ANDROID DRIVES DATA CONSUMPTION WHICH DIRECTLY SUPPORTS MOBILE PENETRATION AND REVENUE GROWTH

Mobile penetration continues to increase globally where data traffic is the engine for growth. While voice and SMS revenues saturate and even decline, broadband data becomes the main contributor to top-line and bottom-line growth of mobile operators. High-speed data is now the most preferred connectivity service by consumers, and telecom operators align their strategy and investments around wireless data services and technology.

The Turkish telecom market is following global trends and operators are enjoying fast growth in mobile data services - total market revenue growth is in double digits, thanks to fast growth in data revenues. Android, as an enabler of data traffic growth, already constitutes more than half of the total generated traffic and is expected to further increase share of traffic more than two thirds of the Ecosystem by 2023.

As a result of fast growth in data demand by consumers, all mobile players customized their tariffs, value propositions and strategy around data services since the introduction of 3G and later 4.5G technology. Our interviews with industry leaders verify that data is the main service which mobile operators can currently monetize in their value propositions. As a result, all operators are investigating to increase data consumption more and monetize accordingly.

Mobile operators have already realized that future market growth cannot rely on connectivity only services, therefore they focus on;

- i) structuring their device strategy - to improve smartphone penetration of the subscriber base; and
- ii) Improving availability of mobile content, i.e. apps, value added services and innovative services for their subscribers.

Both of these key focus areas are supported inherently by Android as it facilitates higher smartphone penetration, further app development and content creation. End visions of Turkish mobile operators and Android have a perfect alignment on these fronts.

Android also helps operators as a platform to provide services for the multi-play offers. For instance, operators are now able to provide their music - video - TV content services on smartphones via mobile apps on Android platform and create additional revenues from mobile payments in the Google Play Store.

### III. FAST GROWTH IN MOBILE INTERNET TRAFFIC DRIVEN BY ANDROID, SUPPORTS NOT ONLY MOBILE PLAYERS BUT ALSO FIXED OPERATORS

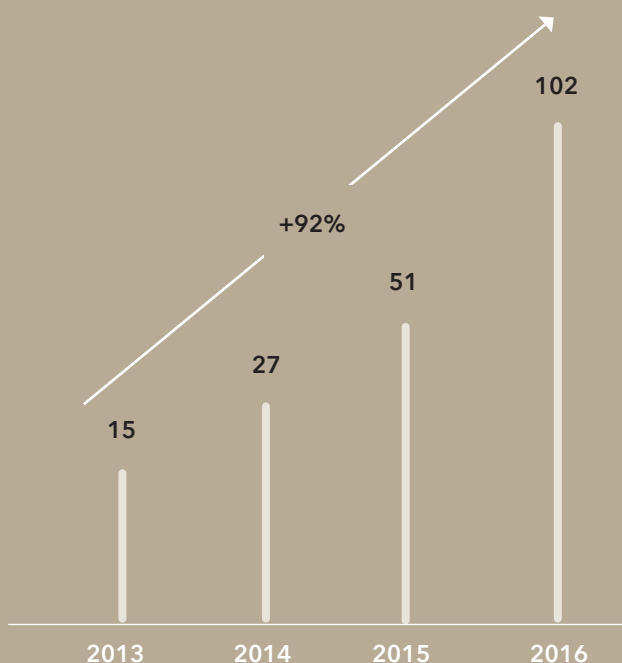
Mobile Internet traffic growth contributes to total fixed broadband traffic where mobile users frequently use WiFi.

There are more than 11 million fixed broadband subscribers in Turkey where all of the fixed subscribers also have a mobile connection. As fixed connections serve homes, business centers and public places, mobile subscribers using fixed internet services are a lot higher than the number of fixed connections. According to a research covering Turkey and other countries in the region, average Turkish mobile subscriber consumes x3 times more quota on fixed network compared to mobile data consumption.<sup>2</sup>

The home broadband market benefits largely from mobile data traffic as there are multiple mobile devices using mobile. As mobile devices provide customized content and convenient user experience to all members of the household, consumers tend to use their mobile devices more for internet connection and according to estimates of sector leaders more than 90% of the fixed data traffic at home is generated by mobile devices. Contribution of Android to home broadband traffic is directly proportional with its traffic share in the mobile network.

MOBILE AND FIXED BROADBAND DATA TRAFFIC EVOLUTION, 2013-2016 (PETABYTE)

MOBILE DATA TRAFFIC GROWTH



FIXED BROADBAND DATA TRAFFIC GROWTH

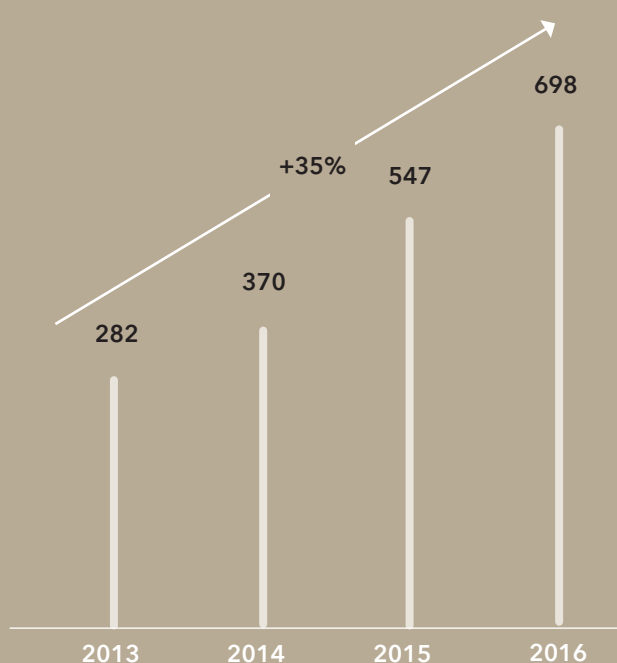


Exhibit 14. Mobile and Fixed Broadband Traffic in Turkey



#### IV. THANKS TO ANDROID, INCREASING SMARTPHONE PENETRATION AND DEMAND AT ALL INCOME LEVELS HELP TELECOM PLAYERS TO INCREASE REVENUE AND IMPROVE CUSTOMER RETENTION

In Turkey, a total of 12.5 million smartphones have been sold in 2016 and more than 60% of those smartphones are sold through the sales channels of telecom players. This figure alone shows how device offers and Android are critical for mobile operators and their dealers.

There are many device brands and thousands of device models made available by the significant contribution of Android devices in the market. Operators leverage this high variety of devices for customizing their commercial offers and improving their value proposition. Mobile operators also introduce their own branded devices both to increase the variety in their value propositions and grab a share in the device market with their brand.

**For own branded smartphones, operators prefer Android as Android provides compatibility, functionality and large addressable market to target.**

Also, thanks to Android, operators do not need to deal with developing an operating system which requires high R&D investment and know-how.

#### V. COMPLEMENTARY PRODUCTS FOR ANDROID DEVICES, SUCH AS PERIPHERALS AND ACCESSORIES, CREATE ANOTHER REVENUE STREAM FOR GROWTH OF MANUFACTURERS AND RETAILERS

Android enables a variety of choices of smartphones for consumers. Considering just the number of vendors developing devices on the the Android platform, number of smartphone models per vendor and different screen size or specs per model, corresponds to more than thousands of customized smartphone option for use of consumers. However, this is still not sufficient for consumers who continue to customize appearance,

functionality and experience of their smartphones via variety of peripherals and accessories. As a result, peripherals and accessories create another revenue stream for device manufacturers. On top of increasing device sales, device manufacturers and retailers enjoy increasing revenue on these complementary product segments.

Accessories have been a market and revenue stream for the mobile ecosystem since the early stages of the mobile industry and accelerated its growth as device variety increased. At the same time the need for more functional accessories has grown in line with increasing smartphone sales. Topline contribution of accessories is strongly correlated with the sales value of devices sold and is assumed to contribute as much as one-fifth of the sales value of devices sold. Although revenue contribution of accessories is lower than devices, accessories bring higher margin, especially for retailers and telecom dealers.

As a new complementary product segment, peripherals such as wearables and electronic components drive a more innovative revenue stream for device manufacturers. The peripheral segment started to grow as apps become more integrated to consumers' daily lives. Peripheral devices also started to change daily routines of consumers, i.e. how they work, how they exercise, how they eat, how they socialize, how they communicate etc.

Developing compatible peripherals to smartphones also create a favorable customer experience for consumers. Although the peripheral market is fast growing, contribution to overall device revenue is relatively small in 2016. Considering thousands of device options with Android ecosystem, Android creates a peripheral market full of options and potential for fast growth.



## B. Android helps to create international players from local champions

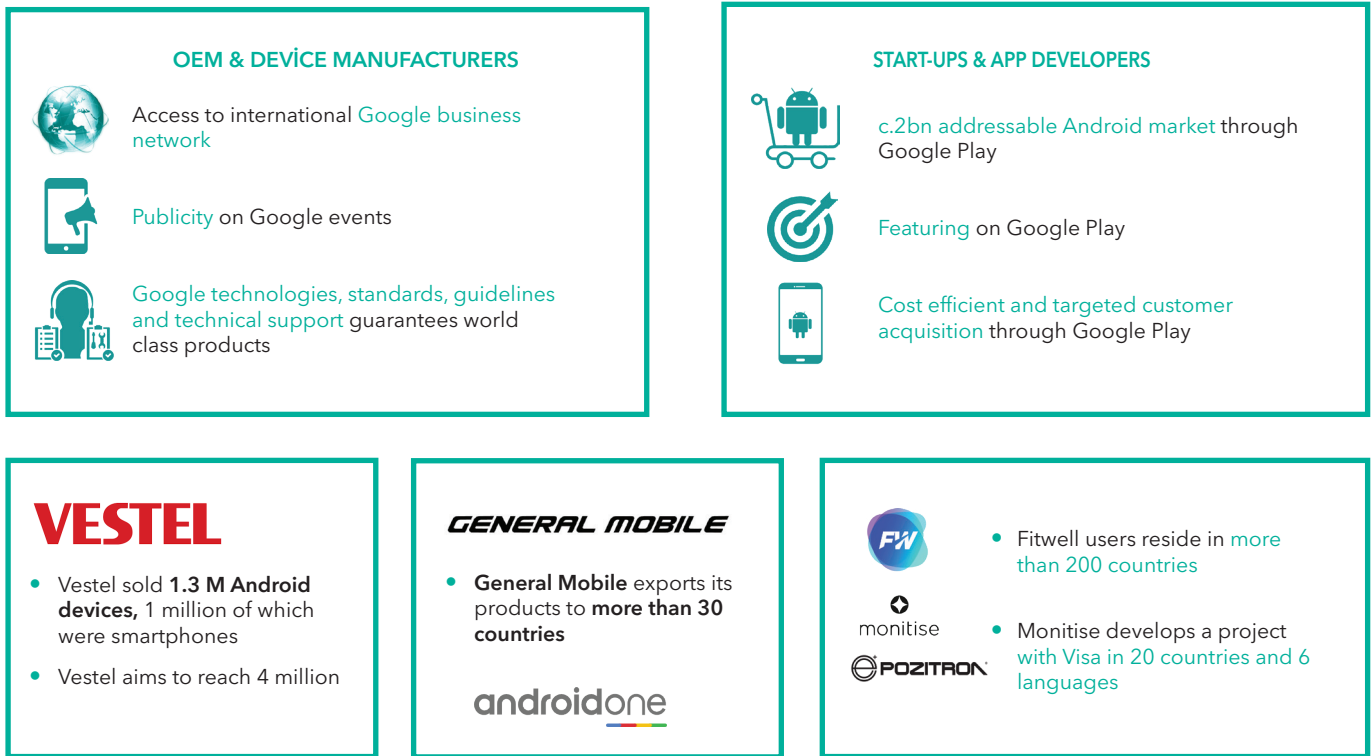


Exhibit 15. Android enabling Local Champions and internationalization

### I. ANDROID ENABLES LOCAL DEVICE MANUFACTURERS TO COMPETE WITH INTERNATIONAL PLAYERS

The fast growing local device market and differentiation opportunities through innovation also drive investment motivation of local enterprises to serve demand in multiple smartphone device markets. Local players, after reaching a certain level of scale, leverage their experience and start exploring export potential to international markets to become multinational players.

Operating systems are an inseparable part of smartphones and a critical component which end users consider either consciously or unconsciously while selecting their phone to purchase. Consumers seek apps and value added services on their smartphones. Also, compatibility and affordability are among the most important drivers of phone purchase decision. Without Android, the expectation of any local manufacturer willing to invest in developing an operating system compatible with majority of the hardware solutions while providing a seamless user experience would not be realistic.

Android solved this challenge and made it affordable for potential local smart device manufacturers to enter the market. In addition, Android, as an open source platform, created a user base corresponding to billions of customers who are served by c.3m apps - developed by millions of start-ups and developers all around the world. This market is easy to tap into for any local manufacturer that is willing to invest in mobile and develop a device fitting consumer needs and likes.

Turkey is one of these few markets with sizeable local manufacturers. Local manufacturers now comprise 10% of smartphone unit sales in Turkey. Yet as local smartphones are more affordable (lower in average unit sales value) than imported ones, their share in value is around 6% as of 2016. In an import-driven market like smartphones in Turkey, these local manufacturers also play an important part in closing the trade deficit where for 2023, local manufacturers of smart devices in Turkey is expected to have a positive 3.5% contribution to the trade deficit of the country, due to:

- Increasing share of mobile in local consumption
- Exporting locally manufactured devices across the globe

## CASE STUDY: GENERAL MOBILE

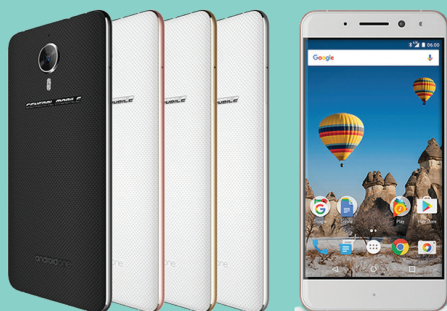
General Mobile is a Turkish smartphone and mobile device manufacturer founded in 2005. General Mobile started its collaboration with Android in 2008 with introducing the country's first local smartphone – consequently also being the first dual SIM Android based smartphone in the world. The company gained major market share with its Discovery line-up Android phones. General Mobile strengthened its collaboration with Google entering Android One project in 2014. General Mobile launched the first Android One smartphone in Turkey, and was also the first Android One product in Europe. General Manager of General Mobile, Muzaffer Gölcü says the "Android One project helps us develop our R&D and production capabilities, as well as sales, logistics and expanding our international strategy, completely."

With the help of Android One, General Mobile sold more than 1 million units with their first Android One smartphone GM 4G in a short time and won the Android Partner prize. Mr. Gölcü also stated that: "Our Android One devices get the latest updates on time for two years and monthly security updates that we provide the latest Android version and the most secure Android experience with high quality devices."

General Mobile has become a national champion, with their R&D smartphone factory in Turkey. After the phenomenal success in Android One program, General Mobile has started to sell smartphones to more than 30 countries. Mr Gölcü, summarizes the contribution of Android to his business, as follows:

"Android One collaboration enabled us to produce high quality Android smartphones thanks to Google standards and the latest Android updates. We also partnered with Google international business partners and strength of Android One to export our smartphones to 32 countries and we plan to reach 45 countries by the end of 2018. We plan to rank 2nd in the market by the end of 2019."

## GENERAL MOBILE



androidone

## CASE STUDY: VESTEL

One of the largest OEMs in Turkey, Vestel, has entered the smartphone business recently using the Android operating system. As an already established local manufacture of home appliances and electronics Vestel was already a contributor to exports. By building on Android capabilities, Vestel's relatively new smartphone, smart appliances and connected devices (IoT) initiatives are now added opportunities for narrowing down Turkey's trade deficit. Based on recent news, Vestel is targeting 3 million smartphone sales to international markets within 3 years which would contribute significantly to total export volume.

Customization ability (or, flexibility) and an enjoyable user experience are among the key values promoted by Vestel where Android stands out an obvious preference. In addition, Android supports further compatibility of other Vestel products with each other.



VESTEL

Google

## II. ANDROID PROVIDES A LARGE CUSTOMER BASE AND AN EFFICIENT DISTRIBUTION CHANNEL WITH ITS APPLICATION STORES (I.E. GOOGLE PLAY ETC.) BUT ALSO, SEVERAL OTHER OPPORTUNITIES FOR START-UPS AND APP DEVELOPERS TO ENHANCE THEIR BUSINESS

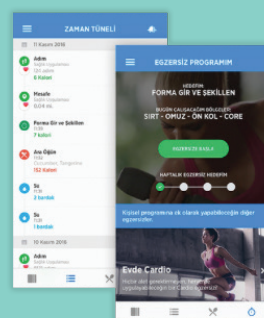
App developers were predominantly focused on the B2B segment, i.e. device manufacturers and telecom operators, before the large smartphone market. Now, app developers are “entrepreneurs” managing their direct relationship with the consumer and/or acting as developers from their business segment customers which include a multitude of businesses within finance, healthcare, retail, etc.

Although download figures are already in billions, growth in downloads continue to be in the double digits. Likewise, app revenues of developers are growing faster every year and are expected to exceed the TRY 1bn per annum threshold in 2018, if not in 2017.

Android as the operating platform with the largest customer base brings competitive benefits for local developers to become international players. Android’s main benefits for developers and start-ups are:

- Fast approval process in Play Store and fast time-to-market
- Google Play Store brings significant expansion opportunity for developers via providing a platform to distribute and market their products to 2bn Android users worldwide
- Unique in allowing users to install apps from third-party sources – not just from third party application stores, but also directly from a website, or as an email attachment, etc.
- Embedded tools and bots in the operating systems which enabled developers to deliver their apps with less time spent on coding and problem solving in a secure environment
- Education and know-how support to start-ups and developers
- Google Developer Groups – i.e. GDGs – created a suitable environment for developers and start-ups for networking and resourcing.

## CASE STUDY: FITWELL



Fitwell, a Turkish grown, health and wellness app, has managed to reach 1.2 million active users from 240 countries with a team of 14 including developers. This notable success is mainly attributed to Fitwell’s visionary founder Barış Özaydınlı, who wanted to provide a personal trainer for those who need but cannot afford to get one at the local gym. Fitwell has been a successful endeavor not only in terms of financials and valuation but also the social impact created with a health and wellness app that changes people’s lives in terms of fitness and health.

Google partnership has been a critical enabler for Fitwell:

- Easy and immediate access to 2 billion Android devices and with Google Turkey’s support a chance to mass-market the app globally once featured “When we were featured on Google Play for the first time, in a single day we acquired 15 days’ worth of users.” says Mr Ozaydinli.
- Barış Özaydınlı says “In 2014, we integrated Google’s Fit platform to our application. Google supported us during the integration process as first health/fitness application in the region.” Fitwell utilizes the Google Fit platform to gather data from sensors and other apps, which enables Fitwell’s smart algorithm to provide real time coaching for its users
- Fitwell’s artificial intelligence powered algorithms also relies on data created by the fitness wearables, Android Wear app integration gives Fitwell access to rich data, and enables customers to use their wearable to control their workouts. Android’s Awareness API generates data which Fitwell uses to understand mood and setting of their user to personalize coaching advice for different circumstances. Fitwell utilizes Api.ai for its messaging and voice conversation bot, which enabled Fitwell to create voice activated coaching experience through Google Home and Google Assistant.

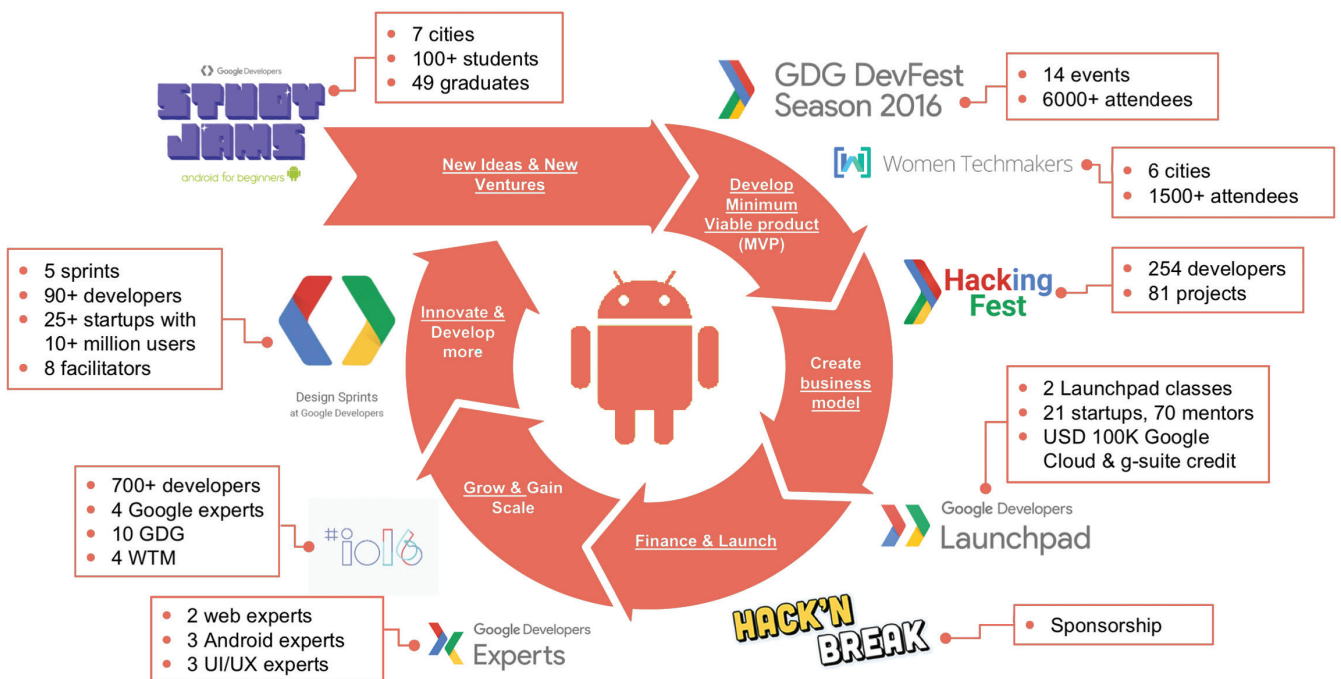
# C. Android boosts innovation culture in start-ups and new ventures

## I. GOOGLE CONTINUOUSLY SUPPORTS START-UPS & APP DEVELOPERS AT EVERY STAGE OF THEIR VENTURES

Google partners with Turkish start-ups to create an advanced, innovative and lucrative business environment for small, yet visionary entrepreneurs. Throughout the lifecycle of the businesses, Google supports start-ups and ventures with various events to foster growth in the developer and entrepreneur ecosystem.

Google has conducted hundreds of events for networking, training and mentorship purposes and reached thousands of developers from startups and enterprises through the whole development cycle:

### ANDROID IN BOOSTING INNOVATION CULTURE



1 DevFest, Women Techmakers, Hacking Fest, HACK'N Break, io, Design Sprints and Study Jams 2016 events, Launchpad 2017 events and Google experts as of 2017

Exhibit 16. Google Activities during 2016 to Support Innovation in Turkey

**1. New ideas and ventures:** Objective is to reach young talents at early stage of their business lifecycle and train them. Google conducts "Study Jams" and targeting to educate university students and graduates within these activities. GDG and Women Techmakers events also contribute to training of entrepreneurs and developers.

**2. Develop Minimum Viable product and create business model:** At this stage, Google conducts several events like Google Developer Groups, Women Techmakers, Hacking Fest and Launchpads to provide training, coaching and mentorship to start-ups and entrepreneurs

**3. Finance & Launch:** After developing minimum viable product and business model, start-ups get chance to introduce their ventures to strategic partners and also receive Google credits for Google platforms like G Suite, Google Cloud and Udacity

**4. Grow and gain scale:** Google facilitates distribution and advertising of new products of start-ups and developers via Google Play

**5. Innovate and develop more:** Google continues to provide technical support to established businesses and include them in networking and developer events.

---

At any given time, there are tens of start-ups that are supported by Google that have the potential to create a positive impact on society and the economy. One example is Scode, which has been supported by Google since their very early days. Scode's founder Kadir Can Kirkoyun was in high school when he founded the company. He says "... Google supports companies like us on a regular basis, if they see we are able to meet Google's user experience requirements but also share in the social responsibility aspect of doing business..."

Scode is an application which aims at teaching users the programming language through game playing. Mr. Kirkoyun realized the interest to learn programming from a large group of people (those especially younger) but where not everyone had the opportunity to get the necessary teaching. He decided to teach programming through games and won several start-up competitions with his endeavor.



Scode, whose main motive is to improve the developer network in Turkey, benefited substantially from a Google Launchpad event. At the Launchpad event, Scode received mentorship on product development, technology (coding), user experience, marketing and business development and also Google Cloud and AdWords credits.

Mr Kirkoyun explains the benefit received by attendees: "By far, Google Launchpad has been the most beneficial start-up event we have attended. At the end of the training week, we had a completely different product compared to the beginning of the week. We even met with our designer



in person for the first time (Scode's designer was living in another city and worked remotely). We received Google Cloud and Google AdWords credits which will be extremely helpful when we are launching internationally."

Google's support to Scode has not been limited to limited with Launchpad, as Scode is able to integrate with Google Classroom for distribution to schools, Google Education team has been guiding Scode for its success.

Now, Scode continues to develop its application and negotiates with private schools and the Ministry of Education to integrate Scode in curriculums. Besides Turkey, Scode is also targeting other countries for international expansion and already in negotiations with some emerging countries.

## II. A NEW AREA OF SOFTWARE DEVELOPMENT AND INNOVATION HAS EMERGED AS THE NEED FOR THIRD PARTY APP DEVELOPMENT CONTINUES TO INCREASE WITH THE DIGITAL TRANSFORMATION INITIATIVES OF ENTERPRISES AND GOVERNMENT

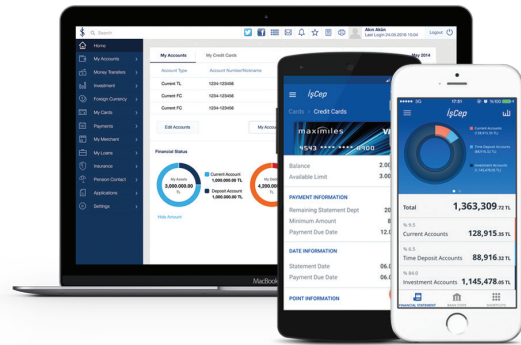
Digital transformation motivation is embraced by almost all sectors in Turkey. Most sectors are investing in digital channels, trying to increase revenue and efficiency in their business via mobility and mobile channels and targeting to provide a better experience for their customers. At the same time not all businesses undergoing digital transformation harbor the necessary technical know-how or capabilities within their organization.

Open source, by definition, flourishes with its members and users sharing their experience and know-how with each other. Android as an open source platform, enables endless opportunities for know-how transfer online through thousands of Android developers. Android obviously does not stop there and provides a dedicated Developer Relations and Support team which developers can go-to even for the slightest issues they may encounter with the system. Experienced developers and companies do not need everyday support from Android as Android sets standards and creates guidelines that are easy to follow for flawless app development. The Android developer ecosystem has become self-sufficient and a living organism that organize events, and writes about Android online to disseminate knowledge back to ecosystem.

**The Android developer ecosystem plays a crucial part in Turkey's digital transformation** as they either in-house or as outsource parties touch almost each and every industry. Some third party app developers have even succeeded in extending internationally such as Monitise.

## III. TELECOM OPERATORS ARE MORE MOTIVATED TO INVEST IN LOCAL CONTENT ON ANDROID WITH INCREASING MOBILE USAGE

Fast growth in app revenue and strong attraction of consumers to mobile apps motivate telecom players to focus on content and development. As is the case in other markets, most mobile operators in Turkey have started to bundle apps (such as free Turkcell TV+, Turk Telekom Music use), value added services and local content with their offers and even started to create their own content. On their own branded Android devices, operators preload their content and increase the attractiveness of their value proposition.



monitise

Monitise is one of the most successful digital technology providers in Turkey. Monitise is within the top 20 software exporting companies in Turkey and can develop scalable projects, one of which is a mobile project with Visa in more than 20 countries in 6 languages.

Monitise, previously known as Pozitron, is a home-grown digital technology provider founded by 3 colleagues, 2 of whom are brothers. Pozitron has developed some of the most downloaded apps in Turkey for leading enterprises, such as İş Bankası and Turkish Airlines. Not surprisingly Pozitron has attracted foreign investment and in 2014 was acquired by Monitise for USD 100m.

This acquisition is mainly driven by Pozitron's scale and high growth prospect. Both are fostered by Android, which have contributed to success due to its impact on;

- High smartphone penetration in Turkey
- Clear guidelines, trainings and know-how transfer to developers, and
- Google's continuous investment to Turkish developer and startup landscape

Monitise's Head of Business Development & Marketing, Tanya Neseliler quotes "If we were to develop applications in a market dominated by just a single platform, we wouldn't be able to grow as fast as we did as the smartphone penetration would likely to be lower due to OS/Device monopoly."

# D. Android accelerates digital transformation of enterprises and government

I. AS SMARTPHONES HAVE PENETRATED VARIOUS CONSUMER SEGMENTS THANKS TO ANDROID, MOBILE HAS BECOME THE MAIN CHANNEL FOR MANY INDUSTRIES, SUCH AS FINANCIAL INSTITUTIONS AND RETAILERS

Digital transformation has been the focus of enterprises for cost saving, efficiency, diversification of sales channels and alternative revenue streams. Financial services is one of the most successful industries in digital transformation in Turkey. Mobile plays a crucial role in the digital transformation of finance and banking industry as more than two thirds of 30M banking customers are now mobile and the majority of the digital transactions are realized on mobile devices.

According to our sector interviews, more than half of mobile transactions are driven by Android and the mobile channel has become the main delivery channel for banks in Turkey. Financial services can be provided in mobile channels quickly and conveniently while security also plays an enormous role in these numbers. As mobile makes it possible to reach even the unbanked population, there is also a hidden benefit of mobile financial services - which is improving banked population.

Android has contributed to this via increasing internet literacy, providing technology and knowledge support, fast growth in smartphone penetration and improving innovation culture within the society.

Garanti Teknoloji as a major technology solutions developer company, providing technology solutions to its sister companies, including Garanti Bank. Garanti Bank has been among the early adopters of digital transformation with this vision: "We should welcome our customers on digital platforms and provide all the necessary tools to enable them make all their non-cash transactions on mobile platforms." Though its history dates even farther, Garanti Teknoloji, started developing first its mobile services in 2004 with SMS banking. Now Garanti Teknoloji develops mobile applications used by their 4.7M mobile customers which makes mobile the biggest channel for banking transactions and sales. Total customers using digital channels is around 5.6 million and 3.2 million of these customers use only mobile - meaning in terms of users mobile has already exceeded Internet banking. Özge Çağlar, business unit manager at Garanti Teknoloji, also dedicates this to Android: "Digital transformation has always been our priority, and Android facilitated our efforts with increasing mobile penetration."

Independence and variety of development and hardware options are essential for developing versatile and efficient applications to meet dynamic customer and technical demands in a timely manner. As explained earlier in this report, Android's open source culture creates developer groups, forums and online sources where developers can discuss problems they face and share possible solutions with each other.

Android devices represents a wide range of products produced by many different manufacturers. As device manufacturers do not need any permission using Android, companies innovate different features on their products which enables mobile application developers to innovate as well.

Garanti Teknoloji utilizes Google Play comments to perfect their applications and thanks to Google Play's interface they can directly interact with their customers. "Customer comments on Google Play is extremely valuable for us to understand problems and demand. We can instantly answer customer comments and solve their problems, so we use Google Play as a customer service as well."

Garanti Teknoloji takes part in both parts of this ecosystem; benefiting and supporting others. All mobile developer teams in Garanti Teknoloji attend Google - backed developer events like DevFest and WTM and rely on developer forums to solve their problems. One of the members of the mobile development team, Elf Boncuk (Google Developer Expert on Android) also gives support to the community by helping to organize Google Developer Group's



Istanbul meetups and giving technical talks. They find talent in these events and hire as they have access to an extended developer network.

Garanti Teknoloji also give back to this ecosystem. In 2015, Garanti Bank organized a banking focused HACKATHON with the help of Google Developer Group. In their own words: "Android's developer ecosystem has been a valuable source for us to acquire new talent and solve our problems quickly. We give back to ecosystem by sponsoring, supporting and actively participating events."





Garanti Teknoloji takes full advantage of device innovations to provide their customers with cutting-edge products on several platforms:

- Google Glass
- Navigation apps (embedded)
- Wearables

According to Garanti Teknoloji: "Android's open platform enables us to innovate on new features and provides us more channels to reach our customers."



Mobile has also become a solid channel for many industries. Android mobile apps of enterprises are downloaded by millions of subscribers and used actively in their daily life. The figure below shows a non-exhaustive example of how many times Android apps are downloaded by subscribers for some industry examples.

For instance, more than one third of website traffic and one fifth of revenue of a major ecommerce website is driven by Android devices in Turkey.

Marketplace portals have also similar KPIs driven by Android. For instance, 22% revenue of Hepsiburada is driven by Android in Turkey. Also, 75% of the mobile

traffic is originated by Android devices. Another leader marketplace portal, Yemeksepeti, which is focusing on food delivery is receiving 40% of the orders from Android devices.

## II. GOVERNMENT AND PUBLIC SERVICES LEVERAGE ANDROID TO REACH MILLIONS OF TURKISH CITIZENS

Government and public services are actively using mobile channel to serve millions of citizens. Citizens of Turkey enjoy and frequently use the mobile channel in public services in many verticals, i.e. from education to health, transportation to tax, smart cities to smart hospitals.

The Turkish government continuously invests in digital transformation and especially the mobile channel, almost in all public services. eGovernment portal provides hundreds of services under many ministries. Also, local municipalities and public services invest on mobile channels to increase access to public services, improve serving residents and increasing efficiency in public services. As 83% of broadband subscribers are mobile, access to the government's digital services can only be driven by mobile. This is also evident in Google Play download figures of public mobile apps.

Smartphone and mobile internet usage starts from pre-school ages. Smartphones penetrated to almost all age groups and demographic segments of the society thanks to affordable Android devices. In other words, by enabling mobile penetration to all income level consumers in Turkey, Android plays a critical role in democratizing access to information, government services and creating equal chance for digital literacy.

MOBILE AND FIXED BROADBAND DATA TRAFFIC EVOLUTION, 2013-2016 (PETABYTE)

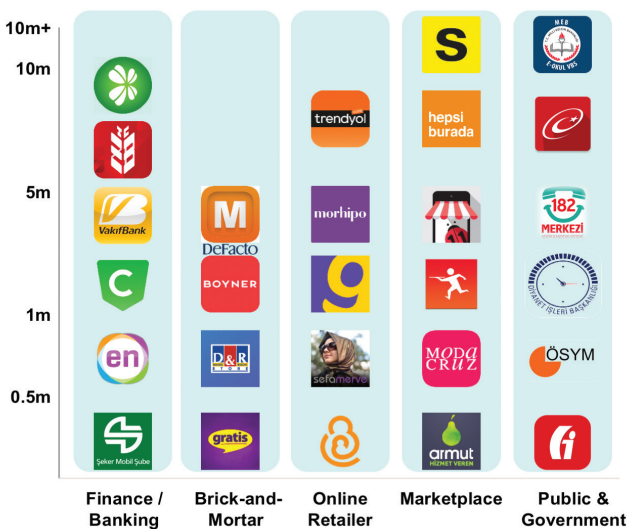


Exhibit 17. Android Mobile App Downloads in Google Play



Exhibit 18. Android Mobile App Downloads in Google Play for Public Services

# VII. Appendix

## A. Market sizing methodology

The contribution of the mobile internet ecosystem to the Turkish economy is calculated from GDP contribution point of view. Production methodology, which is one of the most used methods in GDP calculation is used to determine the value add of the mobile internet ecosystem within total Turkish GDP. After calculation of mobile the internet economy's contribution to Turkish GDP, share of Android is calculated according to business KPIs and metrics that are identified during sector interviews while also using publicly available sector reports and news.

The mobile ecosystem has been broken up into four main stakeholders:

- » Telecom operators
  - Mobile network operators
  - Fixed broadband service providers
  - Network infrastructure providers
- » Device manufacturers & retailers
  - Local & international device manufacturers
  - Electronic retailers
  - Sales channel of telecom operators
- » Enterprises and government
  - Traditional industries
  - Government entities
- » Start-ups and app developers
  - Start-ups & entrepreneurs
  - Software developers

The contribution that each element makes to GDP is calculated bottom up using a model that combines 3rd party market research data, inputs from interviews with key market participants and the financials of major players in the industry. The gross margins of leading players in each stakeholder group are used in order to estimate the 'value added' by that element, relative to its revenue. Correlations with key variables, 3rd party projections and historical performance are then used by the model to create forecasts for the mobile economy through to 2023. Taxation rates are applied where appropriate to spending, and benchmarks within elements are used in order to estimate average profitability as well.

These metrics vary from stakeholder to stakeholder; for instance, share of data traffic is used to calculate contribution of Android within fast growing telecom data revenues, while for device manufacturers and retailers different KPIs are utilized such as number of devices sold and average price per device. For enterprises and developers, share of Android revenue within total revenue of the venture is identified based on inputs from sector reports, interviews and publicly available data.

SOURCES AND METHODOLOGY USED FOR SIZING MOBILE INTERNET AND ANDROID ECONOMY

|                               | Category                   | Sources   | Methodology   |
|-------------------------------|----------------------------|---|---|
| Macro & Industrial Statistics | Macro Data                 | IMF, Worldbank, UN, Euromonitor, TURKSTAT (For Turkey Data), ITU, BTK (ICTA) & BMI  | <ul style="list-style-type: none"> <li>Macro and Industrial Statistics data are used directly from the sources indicated</li> </ul>   |
|                               | Industrial Statistics      |   |   |
| Mobile Internet Economy       |                            |   | <ul style="list-style-type: none"> <li>The methodology used in the paper "Mobile Internet Economy in Turkey" - a joint work of Google Turkey and OC&amp;C Istanbul in 2016 – is followed for sizing Mobile Internet Economy</li> <li>Mobile Internet economy is analysed through 4 main pillars. The value created by these enterprises contributes to GDP.</li> <li>This value is calculated either through the gross profit of directly contributing companies or revenues of indirectly contributing companies</li> <li>Detailed description of the methods and sources used is available from this link: <a href="http://www.ocstrategy.com/en-us/insights/mno/mobile-internet-economy-turkey">http://www.ocstrategy.com/en-us/insights/mno/mobile-internet-economy-turkey</a></li> </ul> |
| Android Economy               | Telecom Operators          | BTK, Annual company reports, Interviews, OC&C analysis  | <ul style="list-style-type: none"> <li>The impact of Android on telecom operators based on the weighted average of Android shares in mobile data and voice traffic</li> <li>Android effect on fixed broadband calculated through the share of fixed broadband traffic created by Android devices – considering different consumption trends of different customer types (corporate vs individual)</li> </ul>  |
|                               | OEM & Device Retailers     | Euromonitor, Interviews, Company announcements, News websites, Desk search, OC&C analysis                                   | <ul style="list-style-type: none"> <li>The impact of Android on retailers is calculated considering the share of Android mobile phone sales value within the value of all mobile phone sales</li> <li>The Android effect on device manufacturers is calculated considering the share of local producers in Turkey</li> </ul>  |
|                               | Start-ups & App Developers | Euromonitor, Statista, Interviews, Annual company reports, Company announcements, News websites, Desk search, OC&C v        | <ul style="list-style-type: none"> <li>Android share in start-ups sized through Android share in mobile data traffic or Android share in m-commerce (e.g. For social media boutiques)</li> <li>Android share on App Developers calculated through the ratio between Google Play revenues and App Store revenues (based on data collected from interviews)</li> </ul>  |
|                               | Enterprises & Government   | Euromonitor, Statista, Interviews, Annual company reports, Company announcements, News websites, Desk search, OC&C analysis | <ul style="list-style-type: none"> <li>Android share in mobile data traffic considered for sizing the impact of Android on enterprises and government</li> </ul>  |

Exhibit 34 . Sources and Methodology Used for Sizing Mobile Internet and Android Economy

SOURCES AND METHODOLOGY USED IN PRODUCTION METHODOLOGY

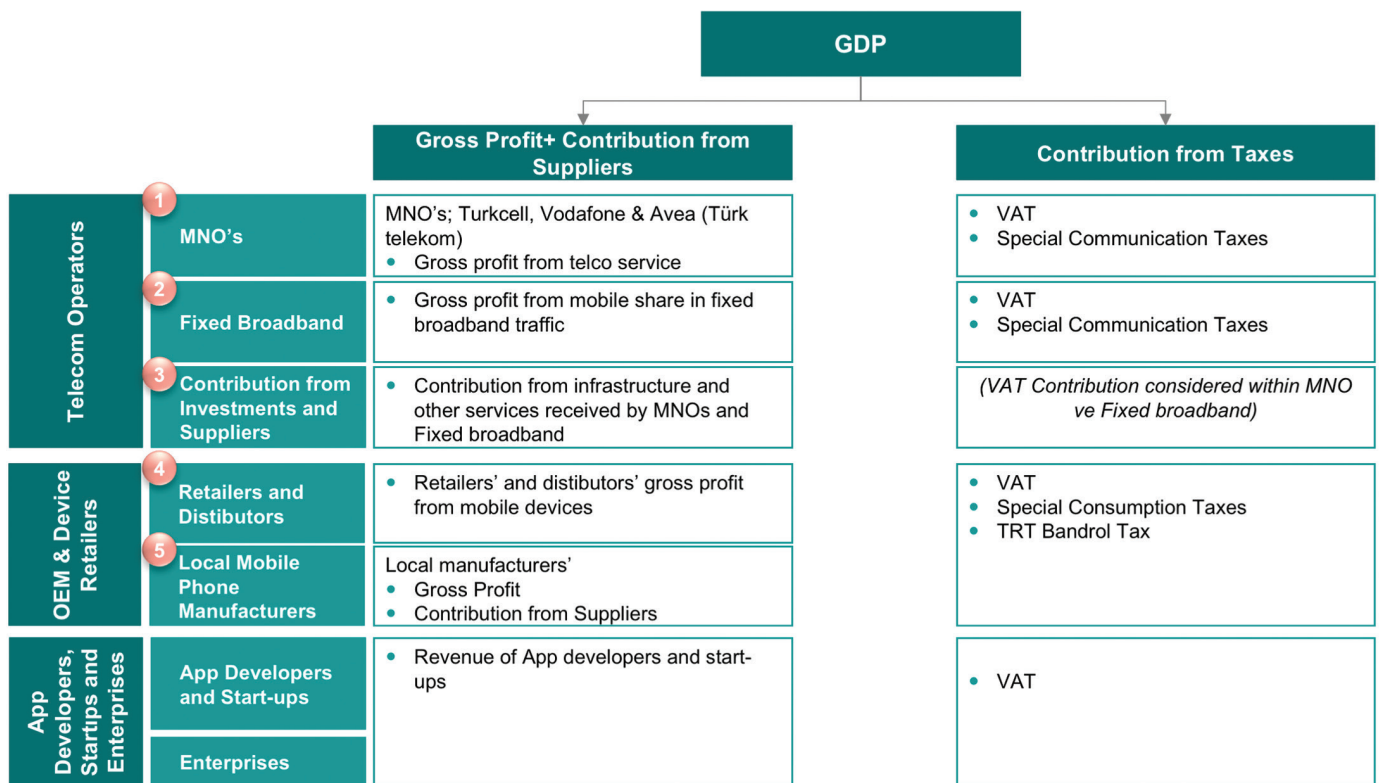


Exhibit 35. Sources and Methodology Used for Sizing Mobile Internet and Android Economy

## Offices

[www.occstrategy.com](http://www.occstrategy.com)

Belo Horizonte

Hong Kong

Istanbul

London

Munich

New York

Paris

São Paulo

Shanghai

Warsaw



**OC&C**  
Strategy consultants

© OC&C Strategy Consultants 2018.  
Trademarks and logos are registered trademarks  
of OC&C Strategy Consultants and its licensors