



MOBILE INTERNET ECONOMY IN TURKEY

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EXECUTIVE SUMMARY

There are now maybe only a few sectors of the economy which have not been impacted by mobile technology, and smart devices in particular. Whether as a means to communicate, shop, test health, check crop growing conditions or any number of other applications, available benefits are myriad.

Contribution of the mobile economy (mobile internet economy, to be precise) to businesses and consumers are vast. This report, prepared by OC&C Strategy Consultants in collaboration with Google Turkey, is one that is most comprehensive and encompassing; and it provides a holistic view on this mobile technology integrated economy for an all-inclusive review and assessment. Although this report is focused on the Turkish market, a similar analysis can be made for any market in consideration to identify benefits as well as opportunities for further growth, utilizing the methodology developed for this analysis. A methodology which is based on a balanced data driven approach bringing together all critical elements of the entire mobile internet ecosystem (not just businesses or high-level determinants).

This report focuses on the effects of the mobile ecosystem on the Turkish economy, also with reference to developments in other countries. Demographic and economic factors suggest that the already considerable mobile economy has substantial room for even further growth in Turkey. [The broader economy is large and growing quicker than many of its peers.](#) 57% of the population is under 35 years old, making Turkey the 8th youngest population amongst benchmark countries. Although Internet and mobile penetration rates have been steadily increasing, there is still room for growth compared to similar economies. Turkey is also among the leaders of social media connectedness with 85% of internet users being active on various social media accounts, surpassing some other large markets such as UK, and France. These dynamics show that Internet and mobile penetration are growing rapidly, but there remains significant headroom with continuing investments on infrastructure and accessibility.

The Turkish market also meets three key criteria for continued expansion of mobile internet take up:

1. Mobile data costs (to users) are lower than benchmark country levels (in PPP terms)
2. Data transmission speed has improved markedly over the past 5 years and are now in line with the top end of global standards
3. Smartphone sales are high and have shown continued expansion - particularly driven by open-source systems enabling more affordable choices

As more and more people become smartphone or tablet users, the scale of mobile's impact on GDP will naturally increase. In 2015 with an estimated value of approximately TRY 36 bn, the mobile economy had generated 1.83% of total GDP directly in Turkey. This includes activities with mobile at their heart, such as device manufacture and retail, spend on mobile phone usage and dealers, infrastructure investment, mobile apps and their development, mCommerce and mobile advertising. When the contribution generated by this layer of the mobile economy is compared with other countries, Turkey is positioned with its developing market peers. While USA leads with its large content family of elements and Apple's dominant market share, China and Japan rank as 2nd and 3rd due to their application development activities and massive device & hardware production capacity. In countries where mobile contribution to economy is especially high, such as those discussed above, there is a move towards more innovative elements of the economy such as content and mCommerce from the more traditional "connection" family of elements. Future growth in Turkey is also largely expected to come from a rebalancing away from spend on traditional mobile usage and infrastructure, towards more advanced areas such as mCommerce and mobile advertising. [This reflects the shift of mobile's importance from being a purely communication method towards becoming something much more pervasive.](#)

Every organization directly involved in the mobile economy will also provide business to countless suppliers and service companies. Whether these include component producers for device manufacturers, cleaning companies or outsourced HR functions for App developers; the positive impact of the mobile economy spread far beyond those firms which may initially be identified to be more closely involved with mobile. These indirect effects contributed an additional 2.4% of GDP in 2015.

Outside of the mobile device value chain, there are a wide range of businesses who use mobile phones to improve their efficiency and interact with consumers in new ways. We define this as the 'Business Surplus' where SMEs are some of the largest beneficiaries. With mMarketplaces allowing them to access consumers both domestic and international, and social media boutiques with dedicated followers, they can gain access to an audience that they would never be able to afford to reach through traditional marketing efforts. [Such indirect effects \(apart from the ones mentioned above\) contributed an estimated 1.8% of GDP in 2015, pushing the overall contribution to GDP from the mobile economy to c.4.8% of total GDP with TRY 93.6 bn in 2015.](#)

In summary, while direct contribution adds up to 1.83% of total GDP, over 1.5 times larger contribution is driven by indirect effects. Direct and indirect mobile economy, in total, contributes to c.4.8% of total GDP. Based on these economic values created, mobile economy generated 584 000 jobs in 2015, 2.2% of total employment in Turkey.

Last but not least, consumers are the group which gain the most from the mobile economy. Consumers currently ascribe on average TRY 2,500 of benefits a year to owning a mobile phone. Internet connectivity contributes the largest portion of this, but voice/SMS as well as the device itself also have a major bearing. This is well above the TRY 600 they currently spend on devices and their operation each year, giving an effective 'profit' or 'consumer surpluses of TRY 1,900 per device owning consumer.

Our recent consumer survey has shown that 2 to 3 out of 5 device owners would give up dining out (39%), watching their favorite TV show (50% of females) or watching their favorite football club matches (48% of males) for 3 months in order to retain access to their connected mobile devices. 4% have indicated they would even give up seeing their friends or family in person - clearly video streaming has come a long way.

Having roughly doubled in size since 2010, the mobile economy is already on track for its influence to rise in Turkey especially with increasing smartphone penetration and spend through mobile. However, there are a few things that could be done to accelerate this growth. The IT skills base in Turkey is currently quite small relative to the size of the economy. Utilizing the planned smartboard and tablet computer distribution in schools and integrating standard curriculum programming classes in order to teach programming skills could address this over the coming decades. It may also be possible to develop programs which support inward migration of IT specialists. Though there are substantial funding available to support other areas of the mobile economy, such as market research and search engine subsidies for app developers, awareness about them is low. Given the continuation of the aforementioned support and better advertising to improve awareness, Turkey has no obstacles to becoming a global Mobile Economy powerhouse.

ENVIRONMENT FOR MOBILE INTERNET ADOPTION IN TURKEY

The mobile phone, and especially the smartphone, has become more ubiquitous and more influential with every upgrade of speed and breadth of mobile networks. It is a technology with almost no parallel that has empowered more industries since at least the birth of the internet and possibly the mass produced car. This is a world where a 5 by 3 inch block of plastic and metal can wake you up in the morning, direct you to work or order you a cab, video conference you in to meetings whilst you're on your way in, help you direct gifts to your mother, order lunch to the office and then set the heating to come on before you get home. It has become an indispensable part of the way that many people live their lives and will continue to have a far reaching impact on economies over the coming decades.

The majority of the population is now connected to the internet, either through fixed or mobile technology. Internet penetration grew from just 20% in 2010 to 62% in 2015. This rapid expansion has been driven largely by the increase in the number of internet connected mobile phones and the availability of 3G (now, 4,5G) due to strong investment in the market. Despite the swift growth, there is still a major opportunity to boost internet penetration even further. Although penetration is higher than similarly populated economies such as Mexico, markets such as Poland and Malaysia point to where Turkey could be in a few years' time.

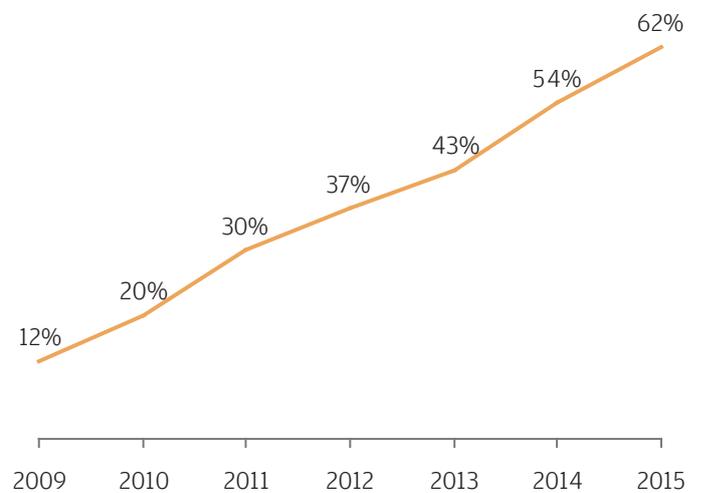
POPULATION BY AGE GROUP

	0-15	15-35	35+
Japan	13%	21%	66%
Germany	13%	23%	64%
Bulgaria	14%	24%	62%
France	18%	24%	57%
Netherlands	18%	24%	58%
Czech Rep	15%	25%	60%
UK	18%	26%	56%
USA	19%	27%	53%
Singapore	16%	28%	57%
Poland	15%	29%	55%
Thailand	19%	30%	50%
China	17%	32%	51%
Turkey	24%	33%	43%
Mexico	29%	34%	37%
Brazil	24%	35%	41%
KSA	30%	36%	34%
Malaysia	28%	37%	35%
South Africa	29%	38%	33%
Egypt	32%	38%	30%
UAE	19%	48%	33%

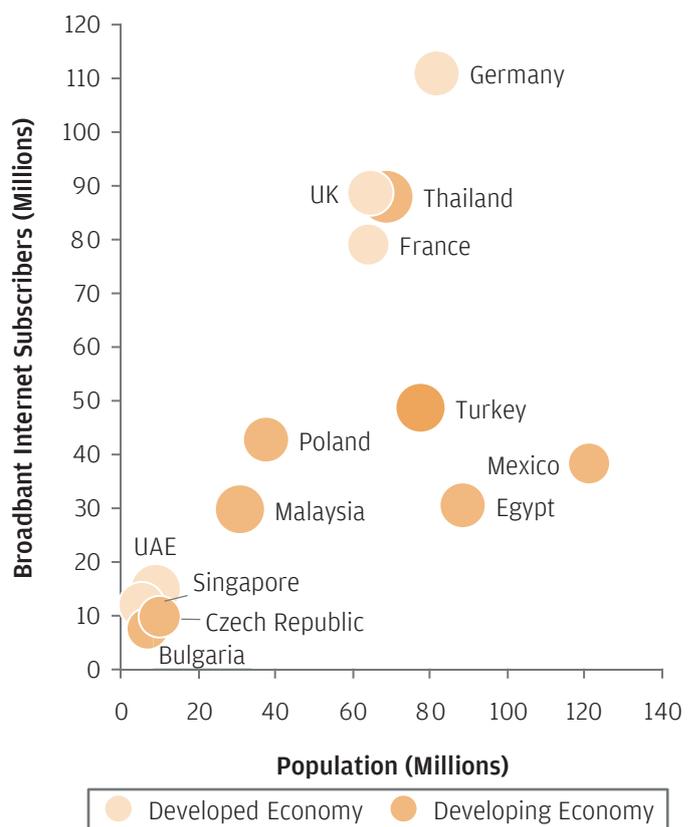
Turkey is very well positioned to reap the benefits of the mobile economy revolution. It is a large economy, the 18th largest in the world, which has experienced strong growth of 4.2% over the past 5 years that has been marked by slowdowns in other regions.

The young are often quicker to engage fully with technologies. 57% of the Turkish population is 35 or under. This ranks it 8th on youth population share among the 20 benchmark countries. This should provide additional tailwind as the Turkish mobile economy develops.

INTERNET BROADBAND PENETRATION



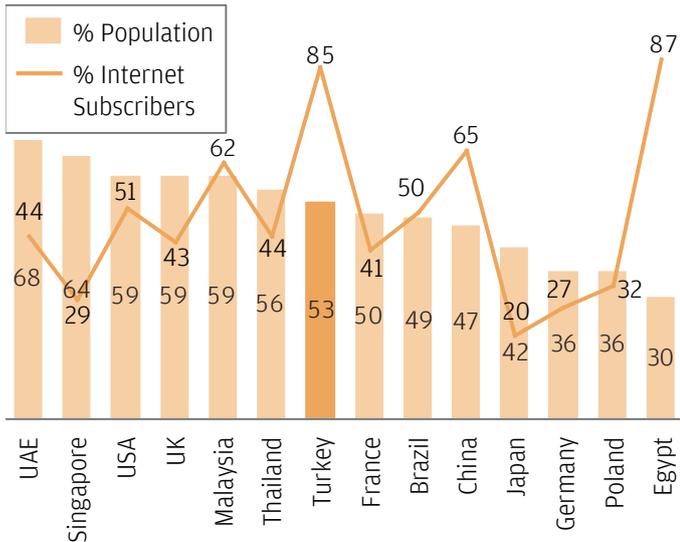
BROADBAND INTERNET SUBSCRIBERS VS POPULATION



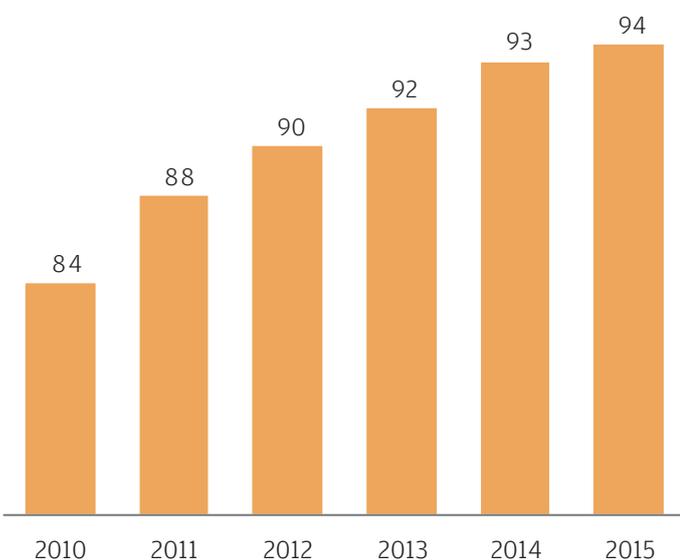
Turkey is amongst the global leaders in social media (e.g. Facebook, Instagram, V Kontakte, Tencent etc.) connectedness, with 85% of internet users actively engaging with this new sphere of human interaction. This may fall as later, more casual adopters participate in the internet for the first time, but remains high even as a proportion to total population. 53% of the country is on social media, surpassing even developed countries such as France at 50% and Japan at 42% and developing markets such as Brazil.

Mobile penetration across the entire population in Turkey is expanding. It has grown from 84% to 94% between 2010 and 2015. In other countries with more advanced mobile economies, this has breached 100% as people have multiple contracts or phones for personal use and business. Therefore, there remains headroom for further penetration growth, although not much.

SOCIAL MEDIA PENETRATION



MOBILE BROADBAND SUBSCRIBERS, MILLION, 2010-15



It is likely that smartphones, rather than feature phones, will eventually dominate the handset market as current feature phone users upgrade or as new people enter the market. Just 10% of the Turkish population had a smartphone in 2010. Introduction of more affordable smartphones made both internationally, and domestically (mainly using open source systems such as Android) has widened the reach and enabled the masses to gain from the mobile economy. MNO's in Turkey have all introduced their own branded affordable smartphones, along with local producers such as General Mobile and Vestel, who have succeeded in developing both entry and mid segment devices.

Thanks to these developments, there are now more smartphone owners than feature phone owners, with smartphones claiming 51% of the market in 2015. Out of all the smartphones sold in 2015, Android has reached to 80% market share.

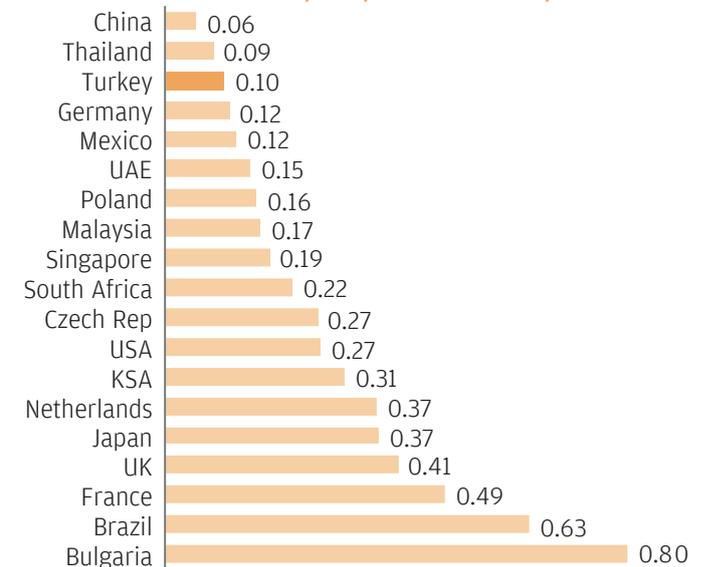
MOBILE INTERNET GROWTH DRIVERS

For the mobile economy to continue to blossom in any country, there are three major conditions that should be met - although other topics such as regulatory environment may also be critical to push development;

- 1. USAGE COSTS:**
The costs for mobile usage should be reasonable from a PPP adjusted perspective, especially for data.
- 2. INTERNET SPEED:**
The mobile internet should be fast enough to enable fluid (and, relevant) use.
- 3. SMARTPHONE PRICES:**
Smartphone prices should be reachable by the masses which would support high levels of penetration - Open source systems' contribution to "affordability" is considerable

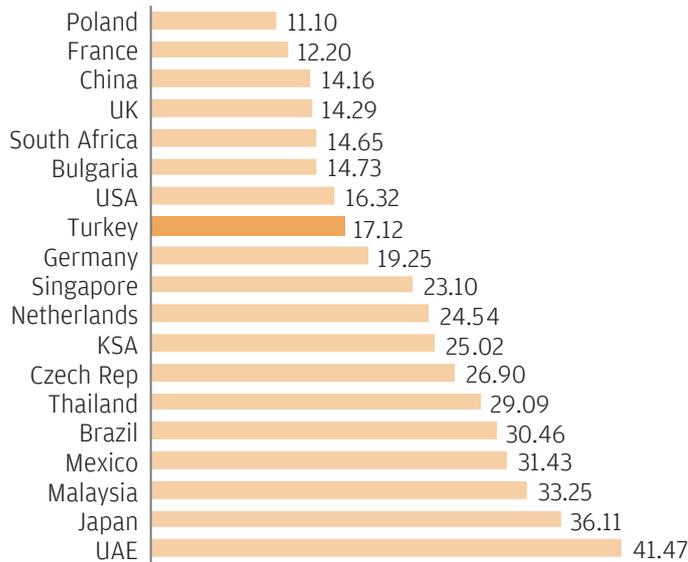
1. USAGE COSTS:
Calls are very affordable in Turkey on a per minute basis compared to other countries whether PPP adjusted or not. What costs \$0.10 PPP in Turkey would be \$0.17 in Malaysia, \$0.27 in the Czech Republic or even \$0.80 in Bulgaria. Only China and Thailand offer cheaper calls on a PPP basis (\$0.06 in China and \$0.09 in Thailand). Of developed economies, Germany offers the cheapest minutes, at \$0.12, still more expensive compared to the offerings in Turkey on a PPP basis.

COST OF ONE MINUTE CALL, USD, PPP ADJUSTED, 2014



The emergence of VoIP means that extortionate talk time minutes no longer prohibit voice based communication as long as data is cheap. Services such as Skype and WhatsApp enable mobile internet users to bypass MNO voice charges (to a large extent) and use their internet/data allowance, or Wi-Fi connection, instead. On this metric as well, Turkish products/services are priced competitively and below the average of benchmark countries. For example, a 1 GB data package costs \$17 in PPP terms in Turkey (\$9 in nominal terms) whereas the average cost of benchmark countries is \$23 in PPP terms (\$15 nominal). With mobile internet usage costs at an accessible level, the barriers for consumers and businesses to engage with the mobile economy are low.

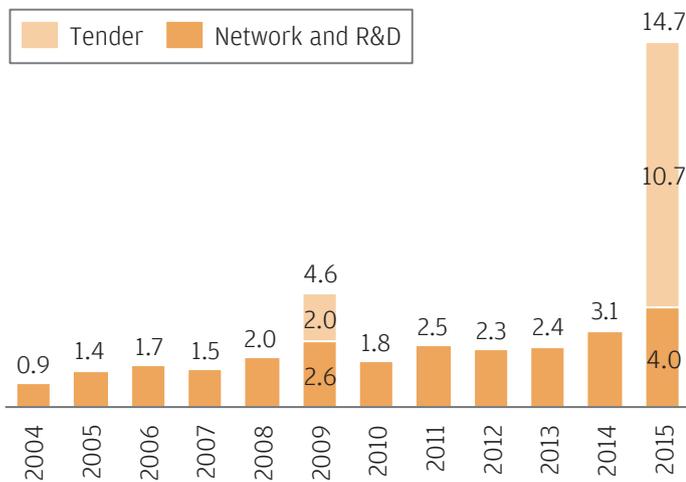
COST OF 1GB DATA PACKAGE, USD, PPP ADJUSTED, 2014



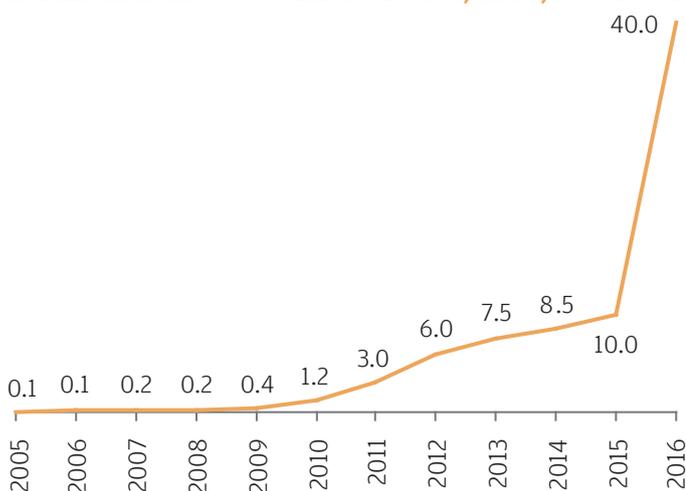
2. INTERNET SPEED:

Turkey has successfully kept up with developments in mobile network technology. There has been an upward trend in investments, with growth of 11% between 2005 and 2008 rising to 14% between 2010 and 2014. There are spikes in investments in 2009 and 2015 as parcels of new transmission spectrum are auctioned. The result of this has been rapid improvements in transmission speeds. 4.5G¹ has now hit the Turkish market, which makes engaging with more data intensive mobile activities, such as streaming, faster and reachable anywhere.

ANNUAL MOBILE INVESTMENTS EVOLUTION, TRY BN, 2005-15



MOBILE TRANSMISSION SPEED EVOLUTION, MBPS, 2005-16YTD

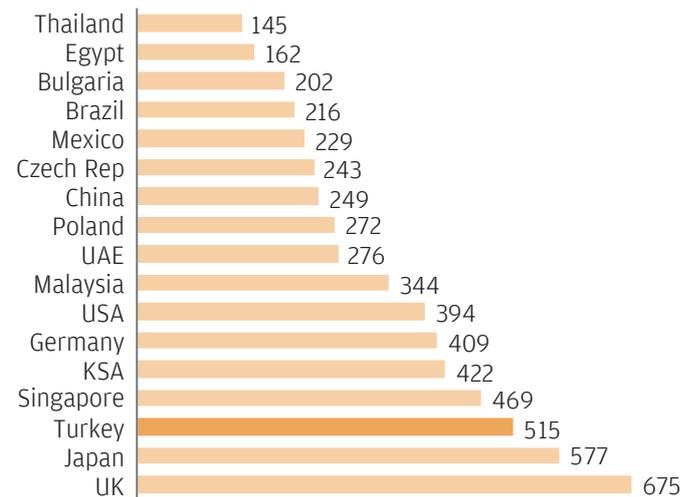


1. 4.5 is the terminology used to describe LTE-Advanced Pro

3. SMARTPHONE PRICES:

Smartphone sales continue to show strong growth despite the high average prices. Turkey is the 3rd most expensive country with an average price tag of USD 515 for a smartphone unit, compared to USD 200-300 range in the majority of the benchmark countries. However, thanks to domestic manufacturers, supported by Android open source software and cheaper international imports, there is now a wide range of smartphones at more affordable price points. So, even though Turkish consumers do seem to be opting for more expensive models, more affordable models are available such that this should not be a significant drag on mobile economy progress.

AVERAGE SMARTPHONE UNIT PRICE BY COUNTRY, USD, 2015



The implications of this broadening of the mobile user base in Turkey, and increase of mobile's impact on a range of economic sectors, will be explored further over subsequent sections of this report.

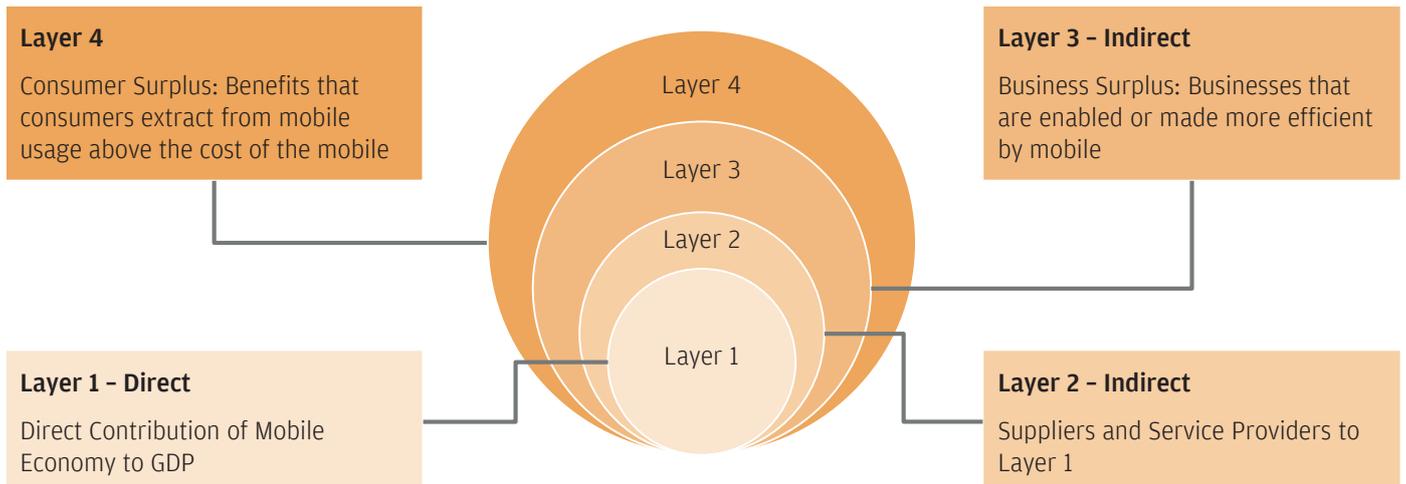
THE MOBILE ECOSYSTEM

Enabled by mobile internet, a significant mobile ecosystem is alive and prospering in Turkey, which includes everything from enterprises like MNOs, to SMEs such as app developers, down to SOHOs such as boutique jewellery designers with “mobile stores”. Consumers benefit substantially from the existence of this ecosystem. It provides them with new ways to interact socially, as part of their work or with other sectors of the economy. As mobile internet penetration and importance continue to grow, this system will only grow in complexity and sophistication .

Our in-depth analysis has identified four main layers of the mobile ecosystem in Turkey - which are also relevant for any other market.:

1. Layer 1: Direct Contribution of Mobile Economy to GDP
2. Layer 2: Suppliers and Service Providers to Layer 1
3. Layer 3: Business Surplus: Businesses that are enabled or made more efficient by mobile
4. Layer 4: Consumer Surplus: Benefits which consumers extract from mobile device availability and usage, above the cost of that particular mobile device and usage

LAYERS OF THE MOBILE ECOSYSTEM



Previous studies in the market have generally only focussed on Layer 1 and/or Layer 4 or, on Layers 1 to 3, neglecting the “interconnectedness” of this ecosystem as well as the combined/scale benefits of the mobile internet economy. Here, we take a comprehensive look at the impact of the mobile economy, presenting what is probably the most detailed assessment of its kind for review.

I. Direct Contribution

A. Layer 1

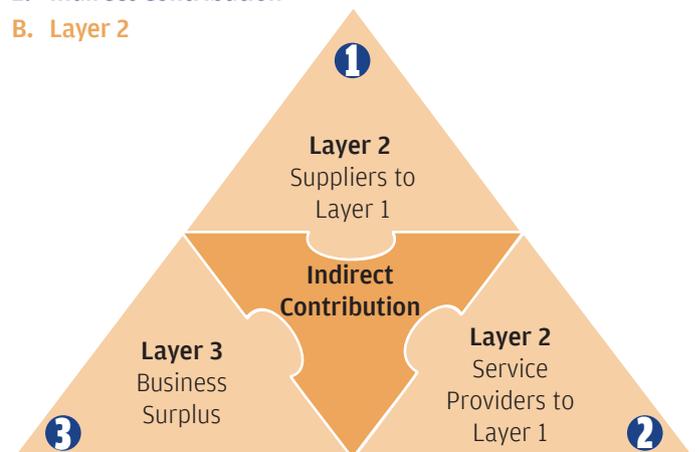
Layer 1 is calculated as the direct contribution of the mobile economy to GDP. Its value reflects the profits realized by industries that are core to the presence of mobile in Turkey. This means that the value added by these companies contributes directly to GDP. This layer is broken down into 3 different ‘families’ of elements, where an element is a step in the mobile ecosystem.

1. The device family of elements produces mobile devices and creates operating systems to ensure that they function, and finally delivers the completed device to customers. Device Manufacturers, OS Providers and Electronic Retailers are the main elements that belong to this family.
2. The connectivity family of elements is based on the connectedness of the device to the real world through voice, SMS or any other data access. Network & Infrastructure companies prepare the physical necessities for MNOs & ISPs to generate connectivity through their infrastructure and internal connectivity systems. Then, MNO Dealers are responsible to deliver these services through their stores with MNO SIM-cards or other connectivity devices. MNOs and ISPs then facilitate and manage the connection of the mobile device through their networks. A portion of ISP activity is included here because mobile devices can be connected to their service via Wi-Fi. Network & Infrastructure, MNOs & ISPs and MNO Dealers are included in this family.

3. The content family of elements relies heavily on Apps developed by Mobile App Developers and enriched by content providers and mCommerce companies. Content providers monetize their products through advertising, in-app purchases, subscriptions, or one-off free downloads. Meanwhile, mCommerce organizations may sell their services and products with the help of mobile. mCommerce, Content & Advertising, Game Developers, Content Providers, App Developers and App Stores belong to this family.

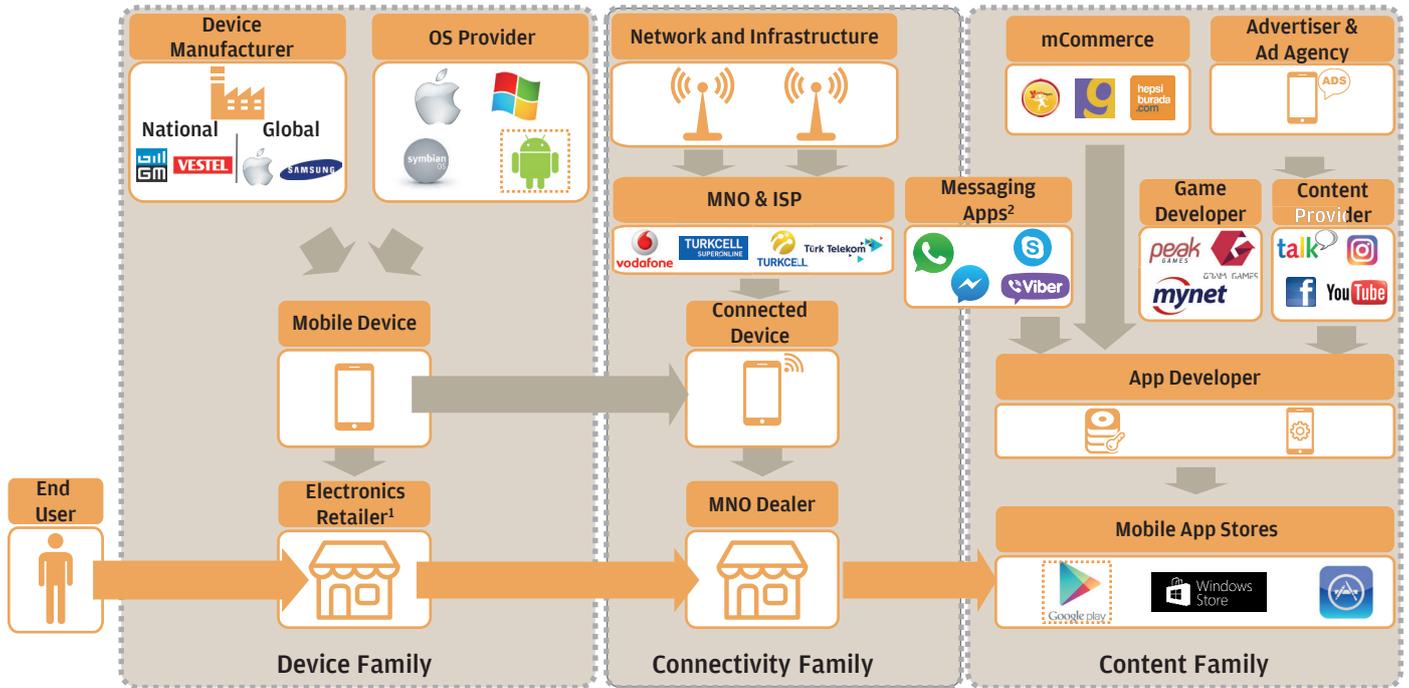
2. Indirect Contribution

B. Layer 2



Layer 2 forms part of the indirect contribution to the economy, consisting of the suppliers and service providers which serve Layer 1 companies. Suppliers provide the raw materials which are purchased and accounted as the COGS (cost of goods sold) of Layer 1 companies. Some of the sectors within this element solely exist to serve Layer 1 companies, thus suppliers have a symbiotic relationship with them; they are highly dependent on their presence and growth. SIM card providers, spare part manufacturers, etc. are just a few examples of such supplier companies.

THE CONTENT FAMILY



1. Covering all consumer electronics stores and MNO dealers selling devices
2. Considered as the online counterpart of SMS offered by MNOs

Service providers, on the other hand, benefit from the presence of core companies mainly by selling their services to them. This means that the portion of their revenue which is related to mobile is equal to some portion of the OPEX (operational expenses) of Layer 1 companies. They are less dependent on Layer 1 companies than suppliers as they can provide similar services to any other sector. Therefore, their overall performance is not highly susceptible to Layer 1's performance. Real estate companies, HR outsourcing firms, facilities services, etc. are just a few examples of service provider companies.

C. Layer 3 (Business Surplus)

Layer 3 forms the final part of the mobile internet economy indirect contribution to the overall economy. This includes the operational improvement gains and additional revenues generated by SMEs and Enterprises thanks to the existence of mobile devices. Although less obvious than Layer 1 and Layer 2, this layer provides a higher contribution to GDP as it factors in all of the additional benefits to business or government generated from all levels of the economy due to mobile use.

3. Consumer Surplus

D. Layer 4

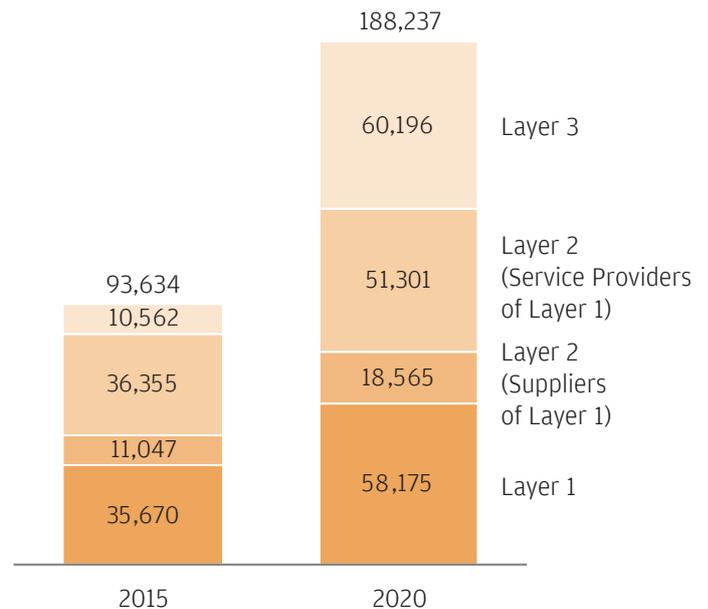
Layer 4 deals with the "consumer surplus". This is defined as the benefits received by consumers from the use of mobile devices and their connectivity, minus the total costs of owning a connected mobile phone. It can be thought of as the profit in 'welfare' terms that a mobile device user receives from owning one. This layer is also reflected in improvements in quality of life. The benefits that a consumer receives are divided into 3 areas: mobile internet, non-internet connectivity (Voice & SMS) and the device itself.

Encompassing all of the above, the total mobile economy is expected to show c. 15% p.a growth and reach to c. TRY 188 bn, generating 5.4% of total GDP by 2020.

Layer 4 (consumer surplus) is identified as the monetary value of mobile from a customer's perspective and, is valued to be TRY 141 bn in 2015. Consumers have valued mobile technologies they use at TRY 184 bn, a value that far exceeds cost of ownership, which is TRY 43 bn.

Based on these calculations, presence of mobile in Turkey contributed TRY c.94 bn to the economy, and TRY 141 bn to consumers in 2015.

MOBILE INTERNET ECONOMY, TRY MN, 2015-20F



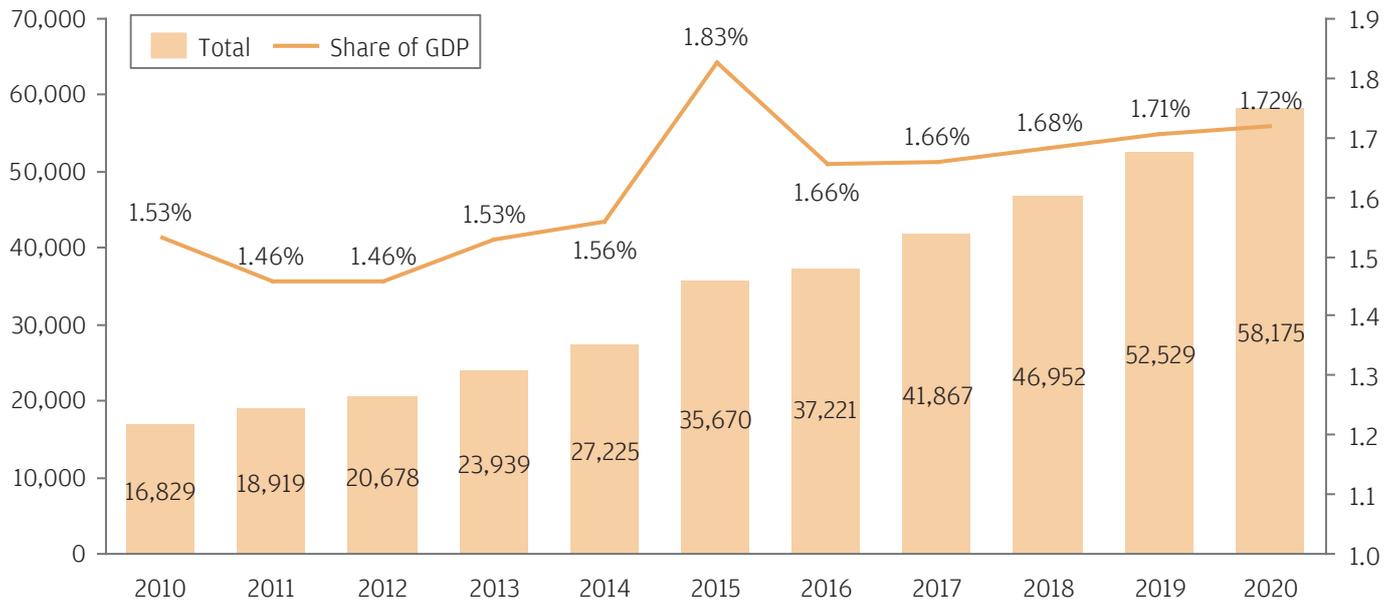
As explained above, Layers 1, 2, and 3 give us the total monetary value generated by the presence and use of mobile. In 2015, this monetary value was worth TRY c.94 bn, generating approx. 4.8% of the total GDP. The overall mobile contribution is expected to reach TRY 188 bn by 2020 with c.15% p.a growth.

Layer 1 and Layer 2 have generated almost 90% of this contribution in 2015, with Layer 2 contributing slightly more than Layer 1, suggesting that presence of mobile not only feeds sectors directly mobile-related, but also creates additional revenues to sectors it collaborates with Layer 1 elements.

Layer 1 is expected to further continue strong growth and reach TRY 58 bn by 2020. Layer 2, despite having the most moderate growth between the Layers, will continue to generate the highest value. Although Layer 3 currently does not contribute as much as Layer 1 and 2 (in 2015); in the upcoming years indirect effects of the mobile economy will further ripen and generate 1/3rd of the total contribution by 2020.

I. DIRECT CONTRIBUTION

DIRECT MOBILE ECONOMY IMPACT ON GDP, TRY MN, % GDP



The first Layer to be examined is the one which will be most obviously associated with the mobile economy: the direct contribution. The direct contribution of the mobile economy to Turkey has grown substantially over the past few years, as mobile penetration increases, usage becomes more sophisticated and Turkish manufacturers start to engage in the value chain. In 'direct contribution', we include industries who are core to the mobile economy, and for whom mobile is a key pillar of their existence. Each industry is considered an 'element' of the ecosystem, with families of elements focused around the device itself, connecting the device to the outer world and the activities that can be performed with it.

Activities of the core participants in the mobile economy have more than doubled since 2010, growing at 13% a year from TRY c16.8 bn to an estimated TRY 35.7 bn by 2015. In 2015, the sale of 4.5G spectrum and related investments gave a one off uplift effect. The rate of growth is expected to decline slightly from 14% between 2010 and 2016 to 12% from 2016 to 2020. This is driven by the shift of growth drivers from expansion of the smartphone user base towards increased spend per user. Although smartphone penetration still has some way to go before it reaches the levels seen in other mobile economies, the initial period of rapid expansion of ownership is drawing to an end. Even so, almost TRY 60 bn is expected to be generated by the mobile economy by 2020 as data usage skyrockets and consumers rely ever more heavily on their phone to transact and be entertained.

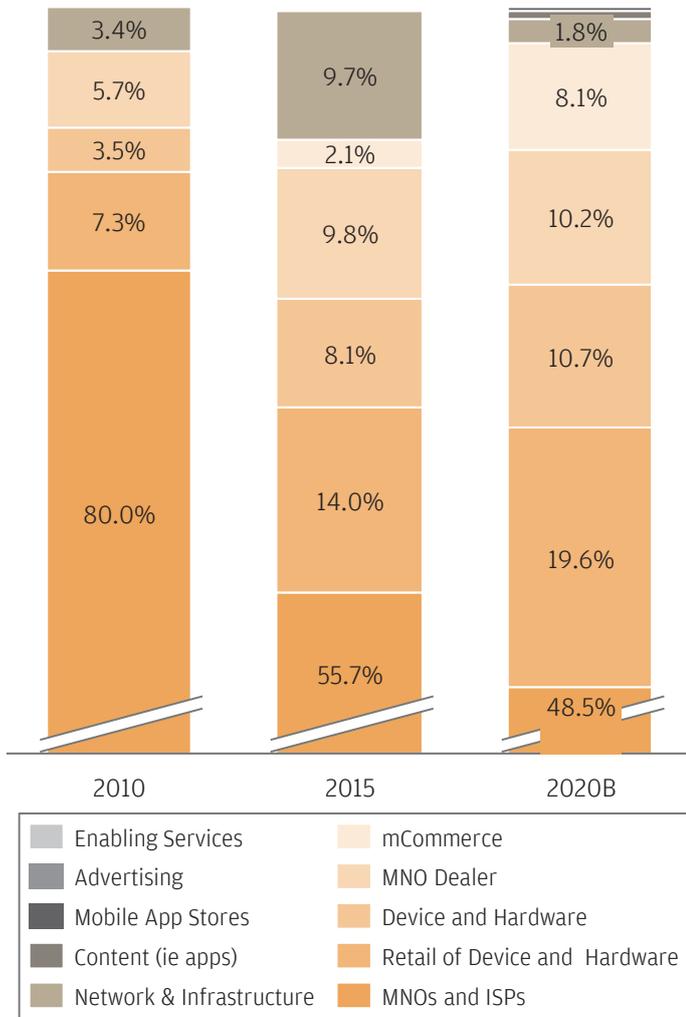
The direct mobile economy contributed an estimated 1.66% of Turkish GDP in 2016, up from 1.53% in 2010. Despite the forecasted continuation of strong growth in the Turkish economy, this share is expected to reach 1.72% by 2020.

In 2010 MNOs and ISPs dominated the mobile economy, generating TRY 13.5 bn. This was whilst the smartphone age was still in its infancy, and smartphone penetration in Turkey was low (10%). At this stage, users mainly utilized their devices for SMS and voice calls. Spend was therefore directed to producers of phones, their retailers, and predominantly the MNO/Dealer elements who were able to capture the majority of communication revenue.

In 2015, smartphone overtakes feature phones to become the most prominent phone type. VoIP and internet messenger services are eroding the MNO's traditional sources of voice and SMS revenue, although sales of data plans are making up some of the shortfall. Meanwhile, phones and mobile devices are playing an ever increasing role in the activities of businesses and consumers. They are not just using them to communicate, but to transact, advertise, receive their news and entertainment. Turkey has been successful in developing homegrown champions in mCommerce (e.g. Hepsiburada), food delivery (Yemeksepeti) and app based services (e.g. BiTaksi).

Currently at infancy stage, mCommerce is expected to continue its robust growth and become one of the key elements of the mobile economy. Turkey's home-grown brand Hepsiburada is the largest player in the online retail sector in Turkey, "providing access to 2 million products in 27 different categories—from computers to smart phones and tablets, from books to automobile accessories, from sports equipment to kitchen supplies and diapers." It is the most prominent e-commerce player in terms of revenues in the region that covers EEMEA and Russia. In recent years, Hepsiburada has shown tremendous growth in its mobile segment. The mobile app downloads has reached 5+ million as of June 2016. It is being used by over 1.4 million active users in a month, 87% increase over the previous year. Moreover, the application is the only e-commerce application that has received a five-star recommendation from users in the AppStore and is among the most frequently downloaded applications and is at the top in its own category. In terms of revenues, the platform's mobile revenues have increased three-fold. As stated by the company, "...35% of revenues are generated through mobile devices, of which 65% could be dedicated to Android users. In the future, we expect 130% y-o-y growth in iOS revenues compared to 95% in Android..." A similar trend could be seen in the website traffic as well. More than 70 per cent of weekend and holiday hepsiburada.com traffic and more than half of the orders placed belong to the use of the mobile site and mobile application. Of those, "75% of the mobile traffic has been driven by Android devices. In the future, we expect to see 120% y-o-y growth in iOS traffic, compared to 110% in Android."

SHARE OF DIRECT ECONOMY BY ELEMENT



Turkey has also been able to engage with the manufacturing side of the mobile economy. Vestel, Casper and General Mobile have all released smartphones. These are based on the Android operating system, which lowers barriers to entry substantially, allowing these players to direct investment towards hardware rather than software development. The smartphones are priced at more affordable level price points, which also help to expand participation in the mobile economy. The 'Device and Hardware' share of the mobile economy has grown from 6.6% with TL 580 mn (USD 385 mn) in 2010 to 14.2% with TL 2,884 mn (USD 1,056 mn) in 2015. This reflects the impact of more expensive smartphones such as those from Apple and Samsung claiming substantial share of the retail market, but also the output of Turkey's burgeoning smartphone manufacturing base.

General Mobile is a Turkish smartphone and mobile device manufacturer founded in 2005. Only two years after its foundation, the company gained major market share due to its dual sim card mobile phones. By 2014, it became the best-selling smartphone brand thanks to its Discovery line, which sold approx. 3 million units with an average of 150,000 pieces per month. In addition, the company has provided 1.5 million tablets to students, under the Turkish Governments Education Fatih project. Currently, it is the largest device manufacturer in Turkey and surrounding regions. "General Mobile and Google collaboration helped us develop our products in a shorter time frame. Google has provided us the latest Android version which put us in a leading position compared to our competitors. This collaboration not only helped our product development schedule but also meant better prices for the customer. Thanks to Android, we have never considered developing our own operating system, which would definitely require high levels of investment."

By 2020, mCommerce is expected to be a key part of the mobile economy, reaching TL 2,649 mn (USD 773 mn) claiming 0.84% impact on GDP.

E-commerce platform n11.com, which was established in June 2012 and met the consumers in April 2013, is a sales channel with business to consumer (B2C) concept. n11 is an online marketplace joint venture of Korea's leading e-commerce platform and digital content provider SK Planet Official and Turkish online commerce provider Do u Planet. n11.com, provides value propositions based on 'Trust and Convenience' to the customers and 'Support and Care' to the stores, leads the reshaping of e-commerce sector in Turkey with its innovative services. With its R&D studies performed in Teknokent located in Istanbul Technical University, contributes to the development of the sector and to the studies that will change the perception of the consumers regarding e-commerce. In the close of the year 2015, n11.com had 38,500 registered shops, 27 million registered items, nearly 6 million members and a total number of visits of 400 million, continues its studies with the vision to be the leader of e-commerce sector in Turkey and in the region.

In the past 3 years, the company has seen a significant mobilization both in its traffic and sales, both driven by IOS and Android devices. 60% of the website traffic was generated through mobile, the traffic generated through Android devices were 5 times more compared to iOS devices.

As occasions for mobile become more widespread, spend on mobile applications and by firms advertising to users is expected to grow but contribute only 1-1.5% between them. Enabling services, such as app development, are also expected to remain quite small, unless Turkey is able to develop apps with substantial international appeal. The forecasts currently assume that this will not happen by 2020, though. Domestic phone manufacturers are expected to continue increasing their share of the market, which accounts for the growth in the 'Device and Hardware' element.

Enabling service providers, who are expected to contribute more and more to mGDP, enjoy benefits of open source systems in terms of not only cost savings but also reduced time to market.

"Android's open source nature provides an effortless content developing process, due to already available coding material and documentation. In addition, the content review process is shorter, cutting down the time to market significantly. Cost savings in these processes as well as the existing user base benefit us tremendously."

Monitise MEA is a mobile-minded digital technology leader, powering businesses through digital transformation. Monitise MEA aims to drive business growth with end-to-end digital solutions and getting the innovation out of the labs into the market

The transition away from the connectivity family of elements towards those of content is typical of developing mobile economies. The most advanced, such as the USA, China, Japan and UK already see a substantial portion of retail revenues passing through the mobile channel. This gives a hint of the direction of travel that the Turkish mobile economy will undergo.

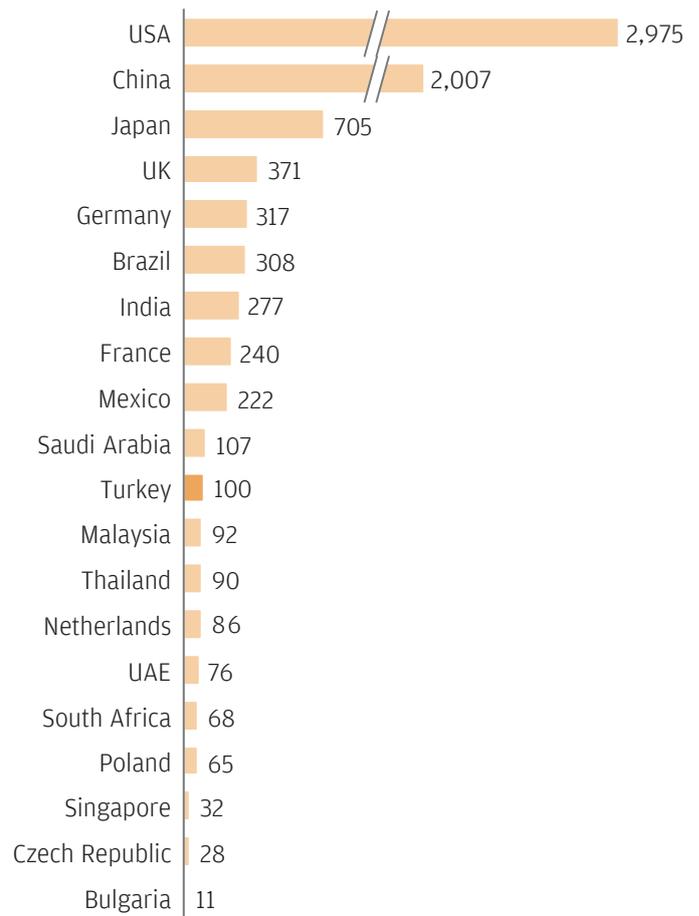
Based on the 2014 results, Turkey is towards the middle of developing countries when compared in terms of total value generated.

Unsurprisingly given its dominance of the content family of elements, as well as the high domestic market share of Apple, the mobile economy contributes more to GDP (as a percentage point) in the USA than any other benchmark country.

Two high tech South East Asian countries (China and Japan) come in 2nd and 3rd place, with different elements of the mobile ecosystem dominating. Malaysia has seen substantial investment in telecoms infrastructure, as the country prepares for more widespread smartphone usage and increases the capacity and speed of data usage. MNO revenue is also substantial, as with Turkey earlier in the decade. Singapore, meanwhile, already has very high smartphone penetration and advanced mobile behaviours such as mCommerce are contributing a relatively large amount to GDP.

Turkey is ahead of comparable geographies such as Poland, suggesting that the Turkish mobile economy is already fairly advanced.

PRIVATE MOBILE ECONOMY OUTPUT¹, 2014, LAYER 1 ONLY, INDEXED TO 100=TURKEY



1. The private impact mentioned for Turkey in this section is different from the actual private impact calculated in Layer 1, since not all elements of mobile ecosystem have been possible to size at a multi-country level. Therefore; this comparison does not take the size of enabling services, content and advertising and app stores into consideration. This modelling combined international 3rd party data sources along with simplifying assumptions around margins that were drawn from the Turkish market.

II. & III. INDIRECT CONTRIBUTION

The impact of the mobile economy is not only evident within enterprises which provide an operational smartphone in the hands of consumers. It has an “ecosystem affect” for every company that supplies goods or services to those key elements of the value chain within the more obvious direct contribution layer. In fact, there are virtuous ripple effects on the broader economy in the form of increased business productivity and activity. As mobile becomes more widespread, these currently less evident benefits will be harder to ignore as their impact becomes larger on the way businesses operate. Therefore, we have factored these benefits as ‘indirect contribution’ into our mobile economy ecosystem.

As explained previously, the indirect contribution consists of two different layers: Layer 2 and Layer 3. Within Layer 2, we look at both suppliers and service providers as separate groups.

There are sectors/businesses which are solely created to supply the needs of the companies operating in Layer 1, such as spare part producers to serve device and hardware manufacturers, or SIM card producers to serve the MNO’s. They tend to have an offering that is more tailored to the needs of Layer 1 companies (e.g. private mobile tower operators, screen label manufacturers etc.) - they can be heavily reliant on the performance of elements of Layer 1. We classify this element of Layer 2 as ‘Suppliers of Layer 1’.

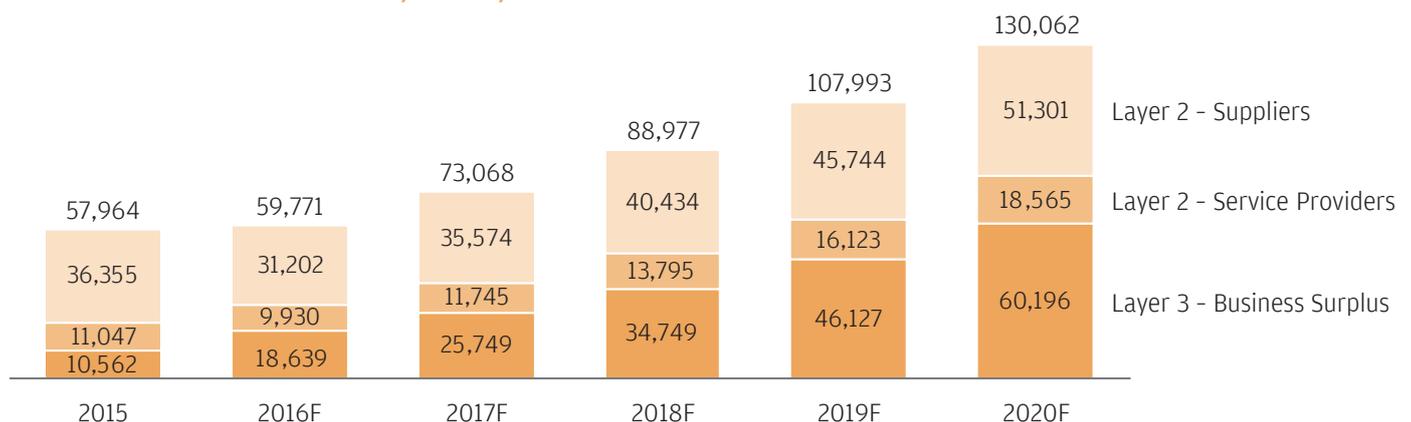
In addition, there are service provider companies that benefit from Layer 1 to a certain extent, but which are not as dependent on them as suppliers are. Examples include cleaning companies and real estate agencies. Their proposition is typically less tailored to a specific customer sector. This is defined as the ‘Services Providers of Layer 1’ element of Layer 2.

Lastly, mobile affects companies irrespective of their sector by providing substantial sales and operational benefits thanks to mobile handset and tablet use. These additional benefits are accounted for in Layer 3, the business surplus created through the use of mobile.

As of 2015, the total indirect contribution has generated approx. TRY 58 bn, with the largest contribution coming from suppliers of Layer 1 companies. However, over the next 5 years, Layer 3 will come to generate the largest share. This is expected to be driven by 2 main factors;

1. Elements of Layer 3 are currently in very early stages and growth levels of selected use cases are expected to reach up to 150%
2. Layer 2 is pegged to Layer 1 - which for the most part is more mature and experiences slower growth

INDIRECT CONTRIBUTION BY LAYERS, TRY MN, 2015-20F



Layer 2: Suppliers & Service Providers of Layer 1 Elements

Layer 2 is closely linked to Layer 1; its elements generate value through serving Layer 1 companies by supporting their operation. Since Layer 1’s growth is stagnating as some of the largest elements are reaching maturity, Layer 2’s growth is also expected to slow down in the future. Existing growth is forecast to come from the burgeoning Content & Advertising, mCommerce and App Store elements. This indicates that this layer of the mobile economy is becoming more sophisticated.

Layer 2 is divided into two different parts: suppliers and service providers of Layer 1 companies.

A. Suppliers of Layer 1 Companies

The supplier portion of Layer 2 is calculated by using the COGS of direct contribution elements. This layer generated TRY 36 bn in 2015, which is equal to 1.9% of the total GDP value and is expected to show 7% per annum growth to reach TRY 51 bn by 2020. Although it generates the biggest chunk of total indirect contribution in 2015, its growth is expected to slow down due to the maturity of Layer 1 elements.

The growth is mainly driven by the expansion of the suppliers to the Content & Advertising, Mobile App Stores and mCommerce elements of Layer 1.

1. Content & Advertising suppliers are the fastest growing element with 34% CAGR until 2020,
2. Despite its significant growth at 33% CAGR until 2020, Mobile App Store suppliers (app developers and content providers) are expected to constitute a small share of the GDP by 2020.
3. mCommerce is forecasted to show significant growth with a CAGR of 33%. With more mCommerce sales, providers such as those who make the goods themselves (e.g. clothing) or packaging will also feel a boost.

B. Service Providers of Layer 1 Companies

Similarly, the service provider portion of Layer 2 is calculated by using the OPEX of Layer 1 elements. This generated TRY 11 bn in 2015, which is equal to 0.6% of total GDP value and is expected to show 11% per annum growth to reach TRY 19 bn by 2020.

Growth is mainly driven by mCommerce and Content & Advertising service providers. Service providers of mCommerce companies in particular are expected to experience significant tailwinds from the growth of this customer segment, with an expected 46% rate of growth between 2015 and 2020.

As long as mobile plays the substantial and increasing role that it does in the Turkish economy, we can be certain that the Layer 2 indirect contribution will increase in line with it.

Layer 3: Business Surplus

Layer 3, the business surplus, has generated TRY c.11 bn in 2015 and is expected to grow c.42% p.a to reach TRY c.60 bn by 2020, contributing c. 1.8% of total GDP by 2020. It is expected to grow much faster than Layer 2, as its components today are during the very early stages of their development and just started to reach a wider audience.

1. For instance, mLoyalty is expected to be the fastest growing indirect contribution bucket with a 2015-2020 CAGR of 110%. This nascent sector is seen as having considerable potential to increase consumer take up. mLoyalty eliminates the 'forgotten loyalty card' problem enabling both a higher sense of benefit for consumers and rate of information capture for the businesses.
2. A 36% CAGR for mPos is expected to be delivered as a result of the increasing number of mPos devices installed and the growing reliance on card payments, especially in the food and grocery deliveries sector.
3. Smart Metering is expected to expand at 55% per year. Like much of Europe, Turkey is expected to see a growing adoption of smart meters.
4. Organized SME Services' 39% CAGR is expected to result from increasing take up of these platforms by SMEs, and boosting the number of tasks per SMEs driven by increased consumer usage

It is important to note that activities within Layer 3 has been successfully supporting the growth of SMEs from various sectors, mainly by bringing them together, increasing their visibility and providing access to a larger audience.

The mobile network operators in Turkey have established agriculture clubs - enrollment based tariff and support clubs - to offer customized benefits for their customers which are employed in this sector. Some solutions/support items that are offered by these unions are informative SMS's about disinfestation, fertilization and weather reports, an agriculture call center, government grants and support, free land insurance, GSM-based alarm systems, etc. In 2015, Turkcell has announced that the collective savings realized by its 1.5 million members through these benefits were amounted to TRY 200 mn. This means that the presence of such clubs and the benefits they provide generate considerable value to the overall economy through savings made by their members.

A number of SME aggregation platforms have been introduced in recent years, in which the idea is to act as "middle men" between consumers and a fragmented array of providers. They collaborate with SMEs or individual providers to deliver products and services to consumers, typically following a sales commission model. These support platforms vary and include;

1. Private driving or taxi apps match available drivers in a certain area with a customer base. Instead of being idle, the driver gets a customer through the app and generates revenues in a far more efficient way than they would be able to do alone. Moreover, it enables drivers to accept different modes of payments such as mobile wallets and credit cards. This attracts additional customers who would normally avoid taking a vehicle as they are carrying no cash. In 2015, these services have provided SMEs with TRY 105 mn of additional revenues and are expected to show 31% per annum growth to reach TRY 402 mn by 2020

2. Food delivery platforms that collaborate with restaurants, service delivery platforms that collaborate with handymen, flower delivery platforms that collaborate with florists are only some examples that could be given for these organized SME businesses outside of driving. In 2015, these platforms have helped SMEs to generate TRY 762 mn of additional revenues, and this contribution will go up to TRY 4 bn by 2020.

Yemeksepeti, the largest food delivery platform in Turkey that currently makes up for the 99% of this market, serves 64 cities with approximately 14,000 restaurants. In the past few years, the company has made vast investments to its mobile interface due to the increasing number of orders made through online devices. The share of mobile orders have reached to 65% in 2015, and is expected to reach to 75% by 2020. Considering that the company processes 130-150k orders each day, presence of the mobile platform brings in a significant number of business to the company, consequently to the SME's that are fulfilling these orders.

In addition to joining such platforms, many SMEs have created a reflection of their physical boutiques on various social media platforms, where they can showcase their brand and drive user engagement. Whether by tweeting product usage advice, instagramming photos of their new window display, or actively messaging with consumers on Facebook, social media is a cost effective way of garnering a flock of devoted customers. It can be a powerful and personalizable form of advertising, and bring a real uplift to in-store traffic. In 2015, social media boutiques generated TRY 200 mn of incremental income, which is expected to increase to TRY 550 mn by 2020.

A small apparel boutique located in Istanbul has opened its first social media account in May 2013. Though the initial aim was to set up an online display to attract more customers to the store, the boutique soon after started fulfilling orders through the account based on customer requests. Since then, the share of social media sales has reached 40%, and the company now ships out approx. 1000 packages each month. Moreover, 2 new stores were opened to enable more followers to visit the physical stores. Therefore, the boutique not only gained a new sales channel by opening a social media boutique, but also expanded the existing one - all driven by the availability and use of mobile internet.

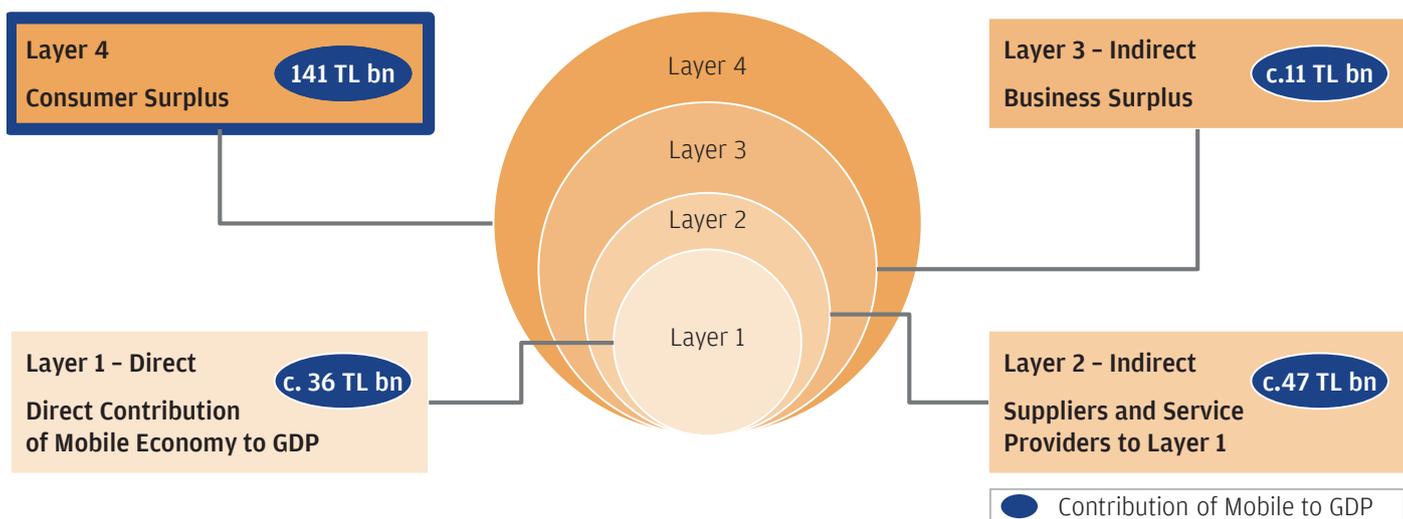
Layer 3 is the area of the mobile economy which has seen a real level of innovation in recent years. People are finding new ways to innovate business models and improve their businesses on a regular basis.

The overall indirect contribution surpassed the scale of the direct contribution of the mobile economy years ago. The growth of the indirect contribution will mainly be driven by Layer 3, as new business lines and structures continue to emerge and blossom.

IV. CONSUMER SURPLUS

Aside from the impact of the mobile ecosystem on industry, the mobile economy has also affected consumers. In order to understand just how important mobile technologies are in consumers' lives, we have employed two methodologies to explore this topic: one that quantifies this in TRY terms based upon a highly rigorous survey methodology; the other gains an understanding of this importance in qualitative terms. Both are drawn from a survey of 1,029 people.

SIZE OF TURKISH MOBILE ECONOMY, 2015



The total net value that a consumer places on their access to the mobile economy is calculated as follows:

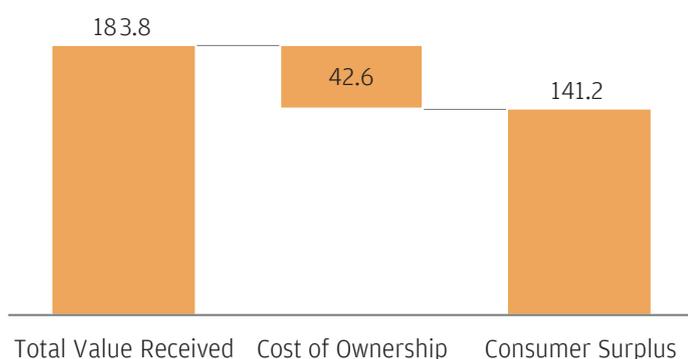
- Total value assigned to mobile
- Minus costs of mobile ownership

The total value assigned is calculated in a granular manner across three buckets:

1. The mobile internet (all benefits enabled by 3G/4G and Wi-Fi connections)
2. Offline connectivity (eg Voice and SMS features)
3. The device itself (all benefits provided by other features of mobile devices eg brand name, screen size, camera etc)

This is obviously not something that you can ask a consumer directly - the thought process is too complex. So, we utilized 'conjoint analysis' methodology in order to tease out the true value that a consumer places on their interactions with the mobile economy. We surveyed over 1,000 people and asked an array of questions that explore the trade-offs they would make between aspects of mobile device usage and cash prizes. This enables us to explore the consumer's hierarchy of mobile economy related

TOTAL CONSUMER SURPLUS, TRY BN



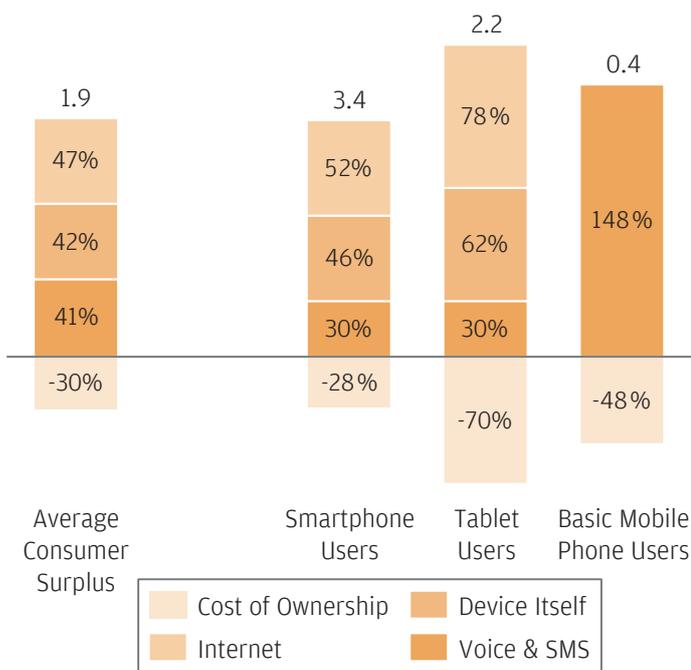
We find that it is the consumer who is the real winner among the layers of the mobile ecosystem, despite the far ranging impact on business due to mobile devices and their value chain. Our analysis finds that consumers claim 60% of the benefits of the whole mobile economy - TRY 141.2 bn in total over the year 2015-16.

needs as well as how this translates into monetary values. We also ask a long list of questions in order to comprehensively calculate all costs stemming from owning and using mobile devices - device costs, connectivity costs, and other mobile-related purchases.

From this, we find that although the average Turkish consumer spends TRY 0.6 k on mobile devices and usage over a period of one year, this enables them to derive TRY 2.5 k of benefits. That provides them with a consumer surplus of TRY 1.9 k - over three times as large as the costs of ownership. At a population and penetration level, this translates into TRY 183.8 bn of total benefits accrued at a cost of TRY 42.6 bn. Much of this TRY 42.6 bn will feature in the direct contribution of the mobile economy to GDP. This results in an aggregate consumer surplus of TRY 141.2 bn across the economy.

Consumers derive value from a variety of aspects of their mobile device - there is not one clear feature that is the source of all benefits. Internet is the leading benefit, contributing 47% of the consumer surplus, but the device itself and voice & SMS are not far behind with 42% and 41% contributed respectively. The level of value extracted by the device itself by consumers is perhaps the most surprising. This may be resulted from the owners' tendency of using the device as a 'status symbol'. A status symbol is an object that indicates the owner's social or economic status. Although a basic and an affordable smartphone would be sufficient enough to derive similar benefits, most people look up to owning an advanced device. For higher-income segments, it is all about being able to show one's status. On the other hand, for other income levels, it is the desire to be like the rich. Therefore, people save up their salaries or use bank loans to upgrade to a "better-viewed" phone. The reason why smartphones are the perfect status symbol is that, they are affordable with enough dedication, unlike less affordable luxury status symbols such as cars or houses. This means that the value received from device is expected to be high, until people are less fascinated with their smartphones.

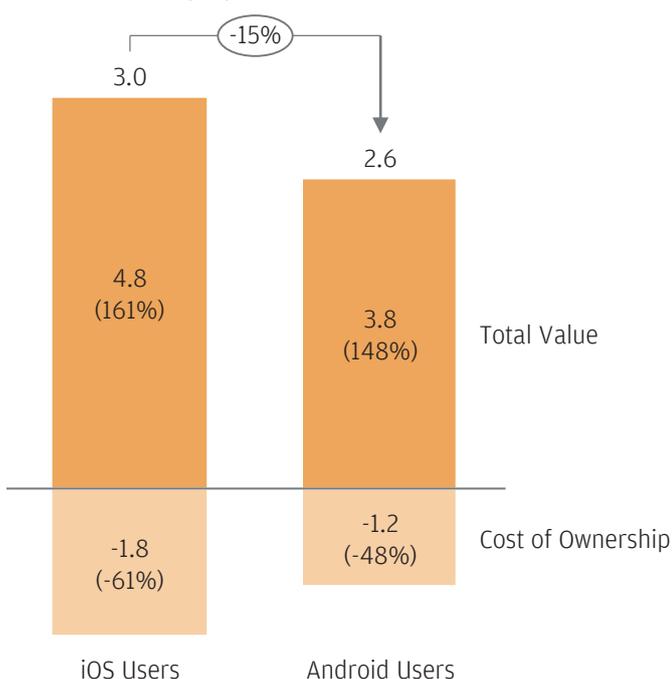
AVERAGE ANNUAL CONSUMER SURPLUS BY MOBILE DEVICE TYPE AND BENEFIT TYPE, %, TRY K



This picture varies markedly when you compare these results by device type. Around half of Turkish consumers own feature phones. These cannot connect to the internet, and typically have a more basic and functional design, with the device itself having a limited number of features. The voice & SMS services therefore contribute the entirety of the consumer surplus.

Comparing smartphones and tablets, we see smartphones providing the most substantial consumer surplus. This is largely driven by availability and the stronger benefits that voice & SMS bring on a smartphone, and from more substantial device related benefits. Internet, therefore, contributes the majority of tablet benefits, and the largest minority of smartphone gains.

AVERAGE CONSUMER SURPLUS BY OPERATING SYSTEM, IOS VS ANDROID, %, TRY K



Smartphone and feature phones currently take about an equal share of the market. However, forecasts suggest that smartphones will increasingly dominate the market over the coming years. This would therefore increase internet's share of consumer surplus for the average user at a national level.

Android users derive a more substantial 'consumer surplus margin' than those with iOS devices. An android device generates 3.1 times as much benefit as it costs to own. This compares to 2.6 times for the more expensive iOS devices. iOS products do generate a larger surplus in absolute terms but the investment required to access one are more substantial. The results reflect the high level of brand equity in Apple products, with the 'device' contributing the same level of benefits as the 'internet' for iOS users.

Consumers were also asked to indicate the importance of their mobile phone in a qualitative sense. The results highlight the indispensable part of life that mobile technologies have become. For a substantial minority of consumers, retaining mobile device usage trumps recreational activities such as dining out (39% would give up), watching a favourite TV show (50% of females) or watching the football matches of a favourite team (48% of males). 19% state they would even give up their weekly day-off from work

QUALITATIVE VALUATION OF MOBILE TECHNOLOGIES % OF RESPONDENTS WHO WERE WILLING TO GIVE UP ACTIVITY TO CONTINUE TO USE THEIR MOBILE DEVICES



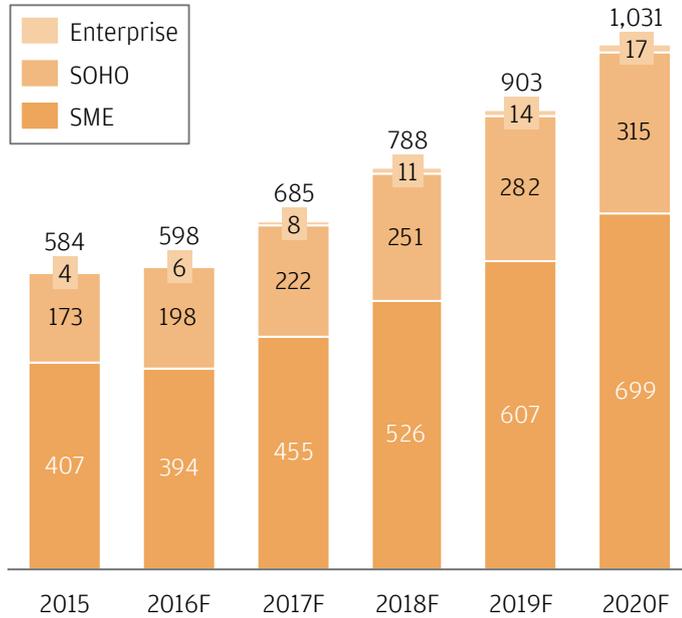
Some people would forsake basic necessities in order to keep hold of their mobile device. 4% would sacrifice half of their monthly salary, showing that the benefits of mobile devices stretch way above the calculated average consumer surplus for some users. Mobile devices have even overtaken human contact in importance for a small minority, with 4% willing to not see their family or friends in person in exchange for retaining access to their mobile device.

As the mobile economy develops in sophistication in Turkey, with innovation and increased adoption bringing a mobile element into more and more activities, we must assume that the benefits that consumers derive from their devices will increase. Smartphones or tablets will become the de facto point of interaction with retailers, transportation systems, loved ones, colleagues, media, entertainment content, shared economy services, restaurants and any number of other areas of people's lives in the future. When the mobile device becomes the enabler of so much of someone's day to day activities, it is no surprise that consumers will sacrifice much to keep hold of it.

MOBILE ECONOMY AND EMPLOYMENT

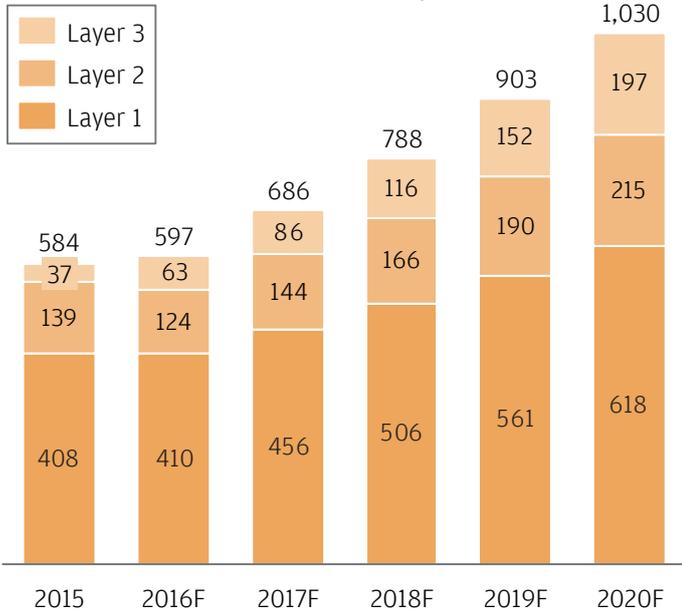
In 2015, the mobile economy generated c. 4.8% of total GDP, a contribution that is equal to c. TRY 94 bn. This output produced a considerable impact on the jobs market. Based on this value generated, the mobile ecosystem has provided jobs to 584 000 people, of which 70% were in enterprises.

NUMBER OF JOBS CREATED, 000, 2015-20F



More than 447 000 new jobs are expected to be created over the next 4 years, which translates into 12% per annum growth, bringing the total number of jobs created to more than 1 mn by 2020.

NUMBER OF JOBS CREATED BY LAYERS, 2015-20F



Layer 1: Most of these jobs (over 400 000) are coming from Layer 1 - the direct contribution to the mobile economy.

1. MNOs and MNO Dealers generated 74% of the jobs created, due to their size and prominence in Turkey.
2. Although they are currently very small, the number of jobs in Content & Advertising and eCommerce is expected to grow quickly as they hire more staff to meet booming demand.

Layer 2: As, for example, eCommerce companies do more and more trade, they will also need to spend more on marketing agencies, more on packaging and of course buy or produce a greater quantity of the products that they sell. All of this extra spend will be a boom for the companies in Layer 2 which are suppliers to them, or provide them with services. They will have to bring on more staff to meet the demand of their Layer 1 customers, and this is true of all elements in Layer 1. The growth of Layer 1 is forecast to add another 76 000 jobs to the 139 000 that are already being supported in Layer 2 by the mobile economy. A few elements stand out:

1. As a raw material intensive sector, Device & Hardware firms in Layer 1 have an especially large impact on job creation in Layer 2, for example in plastic manufacturers or in firms that produce electronic parts. This led to 26 000 jobs, which makes it a valuable sector for employment.
2. Most of the jobs created by MNOs and MNO Dealers are in Layer 1, they create 65 000 jobs in Layer 2 compared to 301 000 jobs created in Layer 1.
3. Network & Infrastructure is another important sector for job creation in Layer 2 as, like Device & Hardware, it is material and service intensive.

Layer 3: Layer 3 currently has a fairly small impact on employment, with the whole Layer producing only slightly more jobs than Device & Hardware does in Layer 2. It generated 37 000 jobs in 2015. However, as the adoption and use of mobile technology becomes more widespread, the sales/productivity impact of Layer 3 is expected to show a multiplier effect. We will see the creation of new areas of activity within Layer 3 as businesses innovate, while increasing the value of the ones that are currently present. Therefore, although it currently creates the fewest jobs, it is expected to catch up with the other layers quickly: it is the fastest growing Layer with 40% per annum growth. It is forecast to reach approx. 200 000 jobs by 2020, taking it from being less than a tenth the size of Layer 1 to being nearly a third of the size, and bringing it a year or two away from overtaking Layer 2 in terms of job creation.

The mobile economy is highly productive, with a typical worker producing over twice as much as an employee in the rest of the economy. For instance, while the average employee contributed TRY 184k to the economy in 2015, workers in other sectors produced TRY 72k. This disparity is expected to continue through to 2020.

Growing the mobile economy more quickly should be a priority. As the total mobile contribution to GDP increases, more and more workers will be brought in to the mobile economy. This would reap strong benefits on Turkey's jobs market. There are a number of areas of policy that the state could address in order to help maximise further growth.

POLICY IMPROVEMENTS TO SUPPORT THE MOBILE ECONOMY

As discussed over the preceding sections, the prospects for the continued growth of the Turkish mobile economy are very positive. The ecosystem is already fairly advanced, and trends in usage, transmission quality and prices look likely to support further growth. There are a few opportunities to help further accelerate the impact that mobile could have on the Turkish economy.

1. Increasing digital literacy:

As is the case in many EU countries, Tech companies often lament the shortage of quality IT and development skills available. The EU recently estimated that there could be as many as 825,000 unfilled IT vacancies by 2020. If this is the case in any mobile ecosystem, it can have two possible effects. First, it could slow down or halt entirely the movement of international tech businesses into that country. For a business to headquarter or adapt their product for the market in question, they are likely to require at least some local talent. Second, a lack of talent could restrict the emergence of national mobile economy champions or perhaps even “unicorns” with export potential. Even if the ideas and the entrepreneurial drive are there, there needs to be a strong community of other successful businesses all supported by a strong base of IT/developer skills. Without this, their idea either won't be able to flourish, or will have to move overseas to do so.

There is a risk that Turkey's IT skills base is currently not strong enough to compete with those offered in other mobile economies, and that this could slow down growth in the future. ICT Specialists make up 1.1% of Turkish employees. This is small relative to countries at a similar stage of development; it is less than half that seen in Poland, at 2.4%, and far behind the Czech Republic at 3.5%. In absolute terms, the employee base is at least larger than the Czech Republics but there remains a question over whether Turkey can become a mobile economy powerhouse without boosting its IT skills base.

Fortunately, the Turkish government has been addressing this in the education system. In 2010, the “Movement to Increase Opportunities and Technology” project was initiated. This substantial investment, largely through Turkish manufacturers, is placing smartboards in classrooms and giving tablet computers to students from year 5-12 and their teachers. Introducing technology as a key interface between students and educational materials will naturally increase their IT literacy and familiarity. The nature of tablet based learning will also enable a far more personalised learning program to be developed for the individual student across a range of subjects.

2. Coding:

IT familiarity are not, however, the only skills required in order to foster a strong mobile economy. Whilst the ability to use technology is critical, the ability to create it is what will really influence the conditions for growth. Here, a lack of good programming skills is what can act as the bottleneck. The Istanbul Metropolitan Municipality recently conducted a pilot project that took over 3,000 7-12 year olds through an introductory programming course. It only contained 4 days of coding but was intended more to give a taste of what is possible with these skills. This was the first publically funded program of its kind in the country, and its success bodes well for similar efforts to be made elsewhere.

A number of other countries, some within the EU, are leading the way in incorporating programming skills into the curriculum as well. In the UK, the IT curriculum was overhauled in 2014. Education Secretary outlined the aims in a speech that year:

“ICT used to focus purely on computer literacy – teaching pupils, over and over again, how to word-process, how to work a spreadsheet, how to use programs already creaking into obsolescence; about as much use as teaching children to send a telex or travel in a zeppelin.

Our new curriculum teaches children computer science, information technology and digital literacy: teaching them how to code, and how to create their own programs; not just how to work a computer, but how a computer works and how to make it work for you.”

The changes apply to ages 5-14, with the curriculum now focusses around the introductory programming language “Scratch” in Primary schools.. Children are also taught about how to think in algorithms by being introduced to the concept through more accessible means, like a recipe. Students are then introduced more complex languages in Secondary schools.

Similarly, countries such as Poland have brought coding into Secondary schools. There are also plans there to extend the subject into Primary school as well.

As the rollout of the aforementioned projects continues, Turkey becomes the ideal place to train future young programmers. With tablets in hand to develop, test and play with their creations, and smartboards in classrooms to share their work, the tech enabled classrooms of Turkey would be engaging places to teach coding. It would take a decade or two for these skills to hit the jobs market, but a clear commitment to the more creative side of IT skills would be a signal of the future direction of travel which may also attract overseas tech businesses and professionals.

3. Government grants for export and tax breaks:

Government grants and tax breaks can be another way to encourage both domestic talent and attract overseas businesses. Availability of grants can make the difference between someone dropping an app idea because it is too risky, or running with it because the support is there and the initial risk is mitigated.

In Turkey, there is an extensive array of support packages already available. Many of them focus around internationalising technology businesses, such as games. The Turkish domestic population is large, so developing apps specifically tailored to this market is tempting. However, for the Turkish mobile economy to really thrive, exports need to play their part. Some countries, such as Estonia, have such a small domestic market that they naturally need to think internationally to achieve reasonable returns. These grants in Turkey should help ease the internationalization process. Already available Public contributions for search engine costs, conference attendance, market reports and consulting also enable start-ups and more established businesses to go through the discovery process around a new idea or market.

4. Advertising the presence of government grants:

With regards to the utilization of existing contributions and support, a potential lack of awareness of schemes can be a concern, easily addressable. Many of the mobile economy stakeholders that were interviewed as part of this report were surprised to learn of the range of already available support that would be applicable to their businesses. In order for Turkey to create an attractive narrative around the strength of its mobile economy, it needs to publicize this funding front and centre. Not only may this support domestic firms and start-ups, but may also help to bring international firms large or small to Turkish shores.

5. Continued tax support for stimulating data use:

On the consumer side, there are similar policy efforts that should support innovation in the mobile sector. There is a special consumption tax levied on communication spend (calls, SMS, data). For voice and SMS, this tax rate is set at 25%. However, for data, this is set at 5%. This asymmetry helps to incentivise the 'internet led' generation of communication methods, such as VoIP and messenger services such as WhatsApp and Facebook, over the more traditional 'network led' ones. Favouring the use of mobile phones for internet services in this way should stimulate the adoption of internet connected phones.

Developments in the device sector should also enable easier access to the mobile economy for consumers. Handset costs remain relatively high by international standards but the budget segment has been boosted in recent years. Imports have had an effect, but domestic manufacturers such as Vestel, Casper and General Mobile (which arise thanks to open source systems) have gained a growing share of the market, leveraging their brand equity in the Turkish market, low-cost manufacturing opportunities, existing supplier relationships, and understanding of local tastes. For instance, General Mobile developed a budget smartphone, Android 1, at a TRY 699 price point. Similarly, Turkcell launched a series of smartphones over a 2 year time span under its T series, which each device was marketed between 600-800 TL. The device itself remains an important statement for Turkish consumers, where high end Apple and Samsung products are highly desirable, even if unattainable for some. The combination of the accessible price point and the link with highly regarded brands such as Turkcell and GM should make it an appealing proposition for this type of brand led consumer, which help bring more into the smartphone segment. This does not directly relate to government policy, but it is encouraging that domestic suppliers are filling gaps in the smartphone market.

CONCLUSION

Turkey has the potential to become a regional leader and a considerable market in the mobile field. Unlike many countries in Europe or the Middle East, it has a well-established domestic consumer electronics manufacturing base and, software required to convert this electronics knowhow into smartphones or tablets is already available “for free” within the open source platforms, such as Android, Blackberry, Linux, etc. [This is enabling Turkey to produce locally tailored products at a relatively low price point, maximising Turkish take up of smartphone or tablet devices.](#)

This study has discovered that consumers place significant value on their mobile devices – almost three times above the costs of ownership on average. If it is easier to participate in the mobile economy, the positive welfare effects of device ownership will broaden across the population.

As consumer engagement with the mobile economy continues to increase at a rapid pace (smartphone share of mobile phones grew from 10% in 2010 to 51% by 2015) the scale of the market available through mobile devices will grow in step. A virtuous circle can be created for the mobile economy, where more services and business models adapt to take advantage of the mobile phone. As the number of ways to utilize mobile devices increases, consumers will increasingly look first to their phones or tablets when they want to accomplish something. This increases the audience on mobile devices further, making migration to mobile platforms even more attractive for established businesses and entrepreneurs.

[Turkey has already shown itself capable of producing national champions in well-established mobile / fixed internet verticals \(eg Hepsiburada for mCommerce, Yemeksepeti for food and BiTaksi for transport\).](#) The next aim should be to develop something in hardware or software that can be marketed globally.

In this study, we have also identified two major areas where policy improvements could lead to faster growth in the mobile economy today and put it on a more sustainable footing in the future.

[Firstly, the IT skills base in Turkey is currently weaker than in a number of other major mobile economy markets.](#) If Turkey is going to produce the next Uber, it needs to have the developers there to turn entrepreneurial ideas into reality, and respond as it scales. The ongoing government and educational programs will support children in becoming ‘technology natives’ – these students are likely to go on to make heavy use of mobile devices in their post-school lives, just as they are in the classroom. However, familiarity with using the technology is not enough to start creating hardware or software. Turkey could follow countries such as the UK who have introduced coding and algorithms as a key part of the ICT curriculum in schools. The effect would not be immediate but would allow Turkey to benefit from the next wave of technologies when they come in 10-20 years.

[Secondly, the more that Turkey can do to de-risk the early entrepreneurial pursuits, or of R&D in more established companies, the more likely Turkey will be to produce the next tech “unicorn” business.](#) Risk is healthy to provide businesses with drive, but if the costs of exploring an idea are too heavy, it may be dropped entirely, along with the potential to boost the Turkish mobile economy. The good news is, Turkey already has a raft of grants and subsidies available to help aid market research, developing an online presence etc. The problem is that awareness of these programs is very low. A more concerted awareness campaign would let people know what is available, and may spark the next great mobile business.

APPENDIX

Direct Contribution Methodology

Turkey – Detailed Method

Two methods have been employed to size the direct contribution of the mobile economy to GDP. A bottom up methodology has been used as the primary method, but a top down method has been used as a sense check, and in order to place a ceiling on possible bottom up values.

The mobile ecosystem has been broken up into a set of elements, which can be grouped into families:

- Device family of Elements
 - Device and Hardware Manufacture
 - Device Retail
 - Operating Systems
- Connectivity family of Elements
 - Network & Infrastructure (Mobile & Broadband)
 - MNOs
- Content family of Elements
 - Mobile App Stores
- Enabling Services (eg App Developers)
 - Mobile Advertising
 - mCommerce
 - Apps

The contribution that each element makes to GDP is then 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 element 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 2020. Taxation rates are applied where appropriate to spending, and benchmarks within elements are used in order to estimate average profitability and tax rates in order to add corporate income tax as well.

Approaching the problem top down, the national statistics agency provided Production Value by NACE code. These production value figures were scaled to be representative of GDP at a section level. Elements sized using the bottom up method were then allocated to NACE codes. Typically, the NACE codes would include non-relevant economic activity as well as activity relevant to the mobile economy. “Manufacture of Consumer Electronics” would, for example, include mobile phones and tablets but also TV etc. The top down sizing exercise therefore places a ceiling on values calculated using the bottom up method. Bottom up values were tested against the ceilings to see whether the implied ‘mobile share’ of the NACE code was reasonable.

It is important to note that there is a double count of OPEX of Layer 1 elements; meaning that a portion of our market size may be attributed to this double count. In Layer 1, we build our model based on the gross profit of the elements of this layer. We used this particular approach based on the methodology Turkish Statistical Institute uses to calculate the Turkish GDP. In Layer 2, we take OPEX of Layer 1 elements into account to calculate the contribution of service providers. This OPEX, however, is already included in the gross profit we use in Layer 1. Therefore this metric is double counted in our results.

Multi-Country Method

A variety of multi-country 3rd party sources have been used in order to size elements of the direct contribution to GDP across benchmark countries. It has not been possible to size all elements of the mobile economy across all countries, so the following elements are included in this analysis:

- Device & Hardware
- Network & Infrastructure (mobile only)
- Mobile Services
- Content & Ads
- mCommerce

Results are scaled for each country based upon the ratio between the value of the detailed direct contribution and multi-country direct contribution for Turkey.

Indirect Contribution Methodology

The indirect contribution created by mobile is broken down to two different layers, Layer 2 and Layer 3, as shown in Figure 1.

Layer 2 accounts for revenues generated by companies that provide products and services to direct contribution elements. From a methodological perspective, this means that the CAPEX of the Layer 1 elements are equal to the revenues of the Layer 2 suppliers. Similarly, OPEX of Layer 1 companies are equal to the revenues of the Layer 2 service providers.

Layer 3, on the other hand is less tangible compared to Layer 2, as it accounts for the sales/operational improvement gains of enterprises and SME’s benefiting from such technology and/or application availability. Since it is not possible to assign a value to those benefits from company income statements, the value of this layer is estimated through the value of several use cases.

The use cases listed under Figure 2 are selected based on their substantial impact both on SMEs and Enterprises and their prevalence in the mobile ecosystem. For sales improvement cases such as Organized SME sales and Social Media Boutiques, where the enhancements are clearly made in terms of sales improvement, we have calculated the total mobile revenues generated through sector interviews for main companies operating in that element, and calculated the total market value based on the market share of the interviewed companies. For efficiency improvement cases such as Vehicle Tracking services and Agricultural Support Services, we have identified savings per applicable units (per vehicle, per farmer) through sector interviews with various companies and made an assumption based on the results. We have then estimated the whole market based on the number of units available.

It is clear that the selected use cases could only represent a certain share of the total indirect contribution. In order to identify the represented share, we have identified new use cases including mBanking, iDetailing, and other m2m services. Through interviews we have generated the current revenues these buckets generate, although with a lower confidence level, which is why these haven’t been added into our main use cases. Based on the relative value of these use cases, and the possibility of the presence of other value generating segments, we have determined that the sized use cases contributed 55% of the market, bringing the total indirect contribution to TRY 11.9 bn.

FIGURE 1: INDIRECT CONTRIBUTION ELEMENTS BY LAYERS

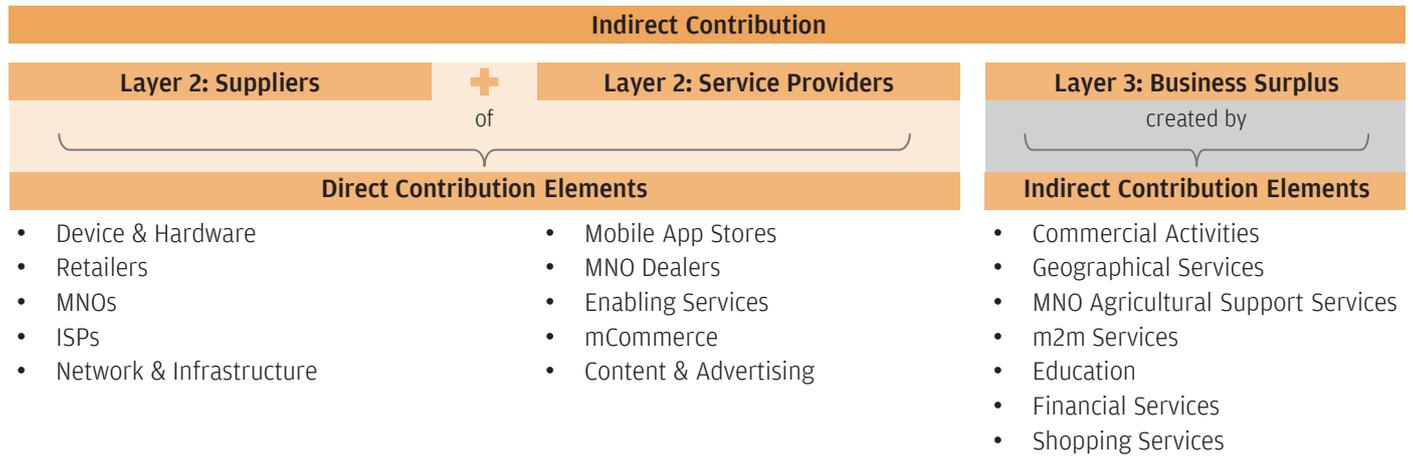
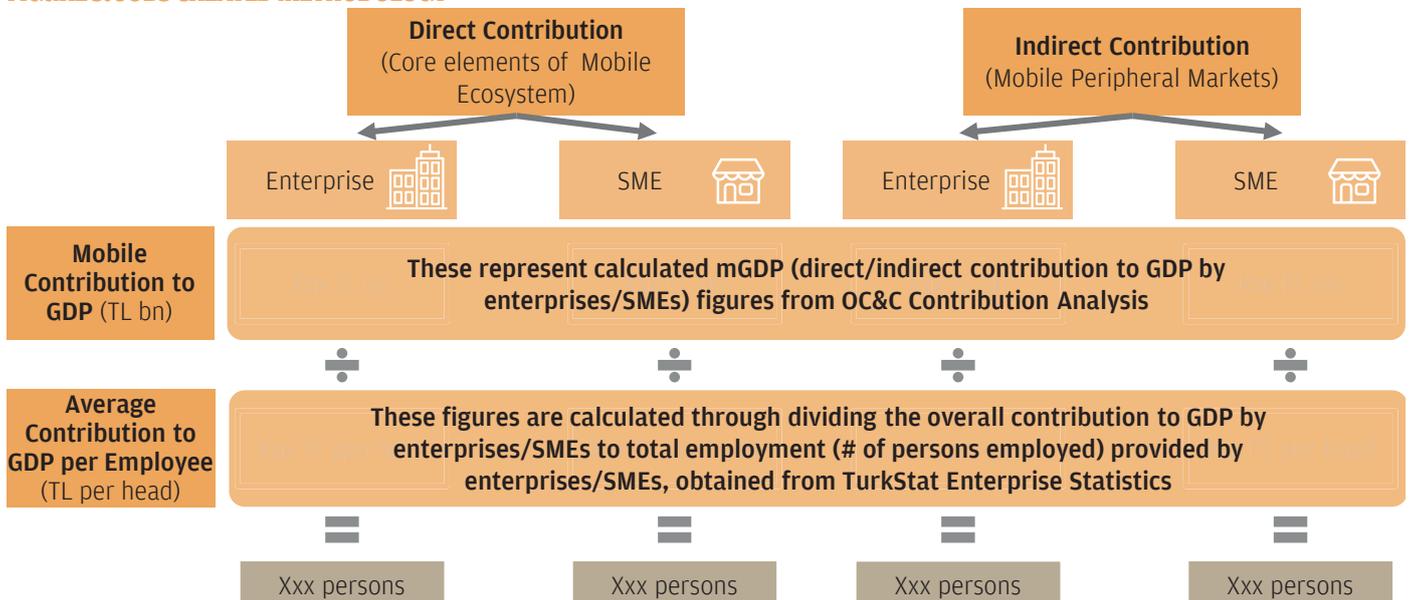


FIGURE 2: SELECTED USE CASES OF LAYER 3

Category	Element	Explanation
Commercial Activities	Organized SME Services	Platforms that group service provider SME's under specific task groups and provide them with a larger audience looking to hire their services
	Social Media Boutiques	Traditional boutiques operate like an online store by posting pictures of their products, communicate with customers through mobile phones and receive payments through online banking
	m-Marketplace ¹	Platforms that allow SME's to establish an online store and sell their products to a larger group of customers using the given platform's name and reliability
Geographical Services	m-Geo	Platforms that enable drivers to find customers during their idle time and to accept different mode of payments such as mobile wallet and credit card. Private driver services hired through these platforms are recorded which benefits the economy through tax gains
MNO Agricultural Support Services	m-Agriculture	Service bundles offered by MNO's to benefit farmers through various offerings such as free insurance, informative SMS about disinfestation, fertilization, weather reports, government grants and support for farmers; an agricultural call center, GSM based alarm system that secures the transformers (trafo), etc
Basic m2m Services	Vehicle Tracking	Services that help users to optimize their fleet/vehicle performance and to obtain higher efficiency through engine idle monitoring, fuel consumption measurements, etc.
	Smart Meters	Services that allow service owners to realize cost-savings in electricity use by preventing illegal use and other losses
Education	m-Learning	Replacing paper content with tablets and smart boards in schools; realizing cost-savings on stationary and educational materials costs
Financial Services	mPos	Transactions that are completed through mobile POS devices
Shopping Services	mLoyalty	Platforms that encourage customer interaction and spending by matching them with customized product and campaign offers according to their preferences, shopping habits and expectations

FIGURE 3: JOBS CREATED METHODOLOGY



Consumer Surplus Methodology

The consumer surplus results are derived based upon a rigorous CAWI (computer aided web interviewing) consumer survey. We have confidently ensured that the 1,029 people who completed the survey accurately represent the Turkish mobile population in demographic terms (Age, Gender, socioeconomic status). The survey was divided into quantitative and qualitative elements. The quantitative element was used to size the value of the consumer surplus, whilst the qualitative section tested the trade-offs people would make in order to retain usage of their mobile device.

In order to calculate the consumer surplus, both the costs and benefits of mobile usage must be sized. Cost related questions were broken down into:

- Device Costs
 - Aggregation of all mobile device purchases (e.g. mobile phones and tablets)
 - Average lifetime is assumed to be 36 months
 - Device costs are isolated in contracted sales
- Connectivity Costs
 - Total amount paid to GSM operators through use of connectivity services
 - Monthly plan for post-paid customers, average TL instalments for pre-paid customers
 - Any additional internet package purchases
 - Division of Wi-Fi costs attributable to mobile devices in proportion to GB consumption
- Other Mobile Service Costs
 - One-off application purchases
 - In-app purchases (e.g. extra coins)
 - Subscribed services (e.g. online music)
 - One-off service purchases (e.g. mp3 downloads)

The benefits are sized primarily using adaptive choice-based conjoint analysis. Different levels of mobile-related attributes (ie the device itself, internet, voice/SMS) are determined and combined with relative cash prize levels. For example, these could include the option to switch their current device for an unbranded one, halving the internet usage available, having no voice/SMS, an 80TL cash prize etc. Respondents are shown 2-3 options in various configurations and they are asked to pick their most desired option. They see c20 screens, which vary based upon the respondent's initial answers. The choice-based questions terminate once the true value of each attribute are obtained. Ie, the survey is adaptive, reacting to the respondent in order to extract the required information.

If the choice-based conjoint analysis fails to reach a conclusive result for one or more of the attributes, the respondent is asked directly about its value. For example, to test the value placed on mobile internet they would be asked "How much would you need to be paid to give up internet access via mobile devices?"

By subtracting the total amount paid from total value attached to all mobile technologies used, the consumer surplus is calculated.

We use Turkey level SES segmentations and device ownership splits by SES in order to scale up the survey results to be representative at a national level.

For the qualitative analysis, the respondents were given a random list of trade-offs ranging from basic necessities (e.g. half of their salary) to luxuries (e.g. dining out) to observe what they would give up to keep using their mobile devices. They were asked:

"Which of the following things would you give up for the next 3 months rather than give up personal use of all your mobile devices (mobile/smart phone and tablets)?"

- Half of your monthly salary
- Seeing your families and friends in person
- Your weekly day-off
- Dining out
- Going on a vacation
- Going apparel shopping (females only)
- Watching your favorite TV show (females only)
- Doing exercise (males only)
- Watching your favorite football club's games (males only)

Jobs Created Methodology

Mobile's indirect contribution to economy is the total revenues generated by the elements categorized under Layer 2 and Layer 3. For Layer 2, our assumption is that the COGS and the OPEX of Layer 1 elements would be equal to the total revenues of Layer 2. For Layer 3, it was the more accurate option to estimate the total size of the market based on the revenues of the market leader rather than their gross profit, as their gross profit could significantly differ from smaller players. Therefore indirect contribution was calculated solely based on the revenues that is generated by the selected elements. On the other hand, direct contribution is calculated from the total gross profit of the elements categorized under Layer 1 as the total revenues generated were publicly available and that the elements had only handful of companies with very similar gross profit margins. Therefore, we were able to calculate gross profits for this section accurately. On top of this calculation, we have assigned an average business size class to each element regardless of their contribution type based on sector averages, selected from SOHO, SME, Blended, Enterprise.

Every year, the Turkish Statistical Institute publishes Enterprise Statistics to give insights on the structure of the businesses and various revenue metrics. For the direct contribution, an average "factor costs per employee" is calculated by business size class. For indirect contribution, the relevant metric is "revenue per employee".

Dividing the value of each element by the corresponding per employee contribution yields the number of employees needed to create the given value of each element. Please refer to Figure 3 for the visual representation of this methodology.

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