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MOBILE OPERATING SYSTEM SUBSTITUTABILITY



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Executive Summary

The Indian smartphone market offers a broad spectrum of phones that vary in price, ranging from INR 10,000 to over INR 1 Lakh.

Buyers are interested to know whether there are any barriers and costs for switching from one smartphone operating system to another.

In this report, we examine in detail the supposed barriers and costs to switching smartphone operating systems. We find that important apps are equally available on both Android and iOS. We measure the time required to switch between smartphones running different operating systems, and find that switching from an iOS smartphone to an Android smartphone merely takes 1 hour and 8 minutes and switching from Android to an iOS device takes 2 hours and 5 minutes. Transfers using Google Photos and iCloud Photos are completed within 45 minutes.

And we find that the cost of switching operating systems, including the value of time, is only Rs.105 in case of iOS to Android and Rs. 194 in case of Android to iOS. This range is quite low compared to the price of phones or typical purchases by Indian households.

Our conclusion is that the costs of switching operating systems are low enough not to present a significant impediment to switching smartphone brands. Indian smartphone market allows for easy switching between operating systems – nearly free of cost and taking minimal time.

Users have the freedom to choose the device and operating system that suits their needs and are not locked into any specific operating system on account of costs or switching time.

The diffusion of smartphone prices in the Indian market is therefore the result of natural consumer preferences, rather than artificial barriers. MOBILE OPERATING SYSTEM SUBSTITUTABILITY

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Introduction

The advent of smartphones in India dates back to 2008 with the launch of the iPhone 3G and the HTC Dream¹. While the former was a product of Apple, a US-based company, the latter was introduced by HTC, a Taiwanbased firm. Since then, the Indian market has seen an influx of various smartphone brands, competing to provide customers with the latest, most cutting-edge, and feature-rich smartphones at the most affordable prices. With the increased availability of smartphones, the public has access to an array of apps that have transformed how they interact with the world. Initially, smartphones had limited market penetration in India, with only $2.75\%^2$ of the population using them until 2010. However, in the last decade, smartphones have become increasingly popular, with a market penetration of 54.23% in 2020³. This number is expected to grow to 87.68% by 2030. In 2017, India had 340 million smartphone users, and this number has now surged past 750 million in 2021⁴. With a rapidly growing market size and a large population. India is poised to become a key smartphone hub in the world.

¹https://economictimes.indiatimes.com/tech/hardware/firstandroid-phone-in-india-launched-today/articleshow/4689118. cms?from=mdr

² https://www.statista.com/statistics/1229799/india-smartphone-penetration-rate/

³ https://www.statista.com/statistics/1229799/india-smartphone-penetration-rate/

⁴ https://www2.deloitte.com/in/en/pages/technology-media-and-telecommunications/articles/tmt-predictions-2022.html

Since its introduction in India in 2008, the smartphone has undergone significant evolution. Continuous innovation has led to a wider range of apps available, longer battery life, improved computing power, more precise cameras, and the ability to interact with remote objects.

The Indian smartphone market is predominantly dominated by Chinese brands, followed by a single Korean brand, and lastly by some American brands in terms of market share. Xiaomi (21%), Vivo (15.9%), Oppo (11.9%), and Realme (14.5%) are among the most popular Chinese brands in India⁵. Samsung (18.1%) is the only popular Korean brand in India. Apple⁶ (4.5%) is an American brand, with presence in India. It is evident that Samsung and Xiaomi are the leading brands in the Indian smartphone industry.



India Smartphone Market share (Q3 2021 - Q4 2022)

⁵ https://www.idc.com/getdoc.jsp?containerId=prAP50300423

⁶ Counterpoint Research



Operating Systems in India

In terms of operating systems (OS), Android is by far the most popular OS in India. Some smartphone brands in India use the Android operating system, which has a dominant market share of 95.79%. In Q4 2022, the best-selling iPhone model was the iPhone 13, and the most popular Android phones were the Samsung Galaxy Ao4s, Samsung Galaxy M13, Redmi A1 (a product of Xiaomi), and Realme C35⁷.

⁷ Feedback Advisory analysis of data collated from Data.ai



Switching between Operating Systems

The Indian smartphone market offers a broad spectrum of phones that vary in price, ranging from INR 10,000 to over INR 1 Lakh. Some users believe that the price difference is justified by the differences in smartphone qualities, such as a better battery, camera, processor, and display, or a more powerful operating system. Additionally, some users may be willing to pay a premium for certain smartphone brands. Buyers are interested to know whether there are any barriers and costs for switching from one smartphone operating system to another.

Conceptually, switching costs would have meant learning a new operating system, which can discourage users from leaving Google (Android OS) or Apple (iOS) due to familiarity with their distinct operating systems, as well a perceived notion on the inability to easily port all of their data, such as messages, call history, and photos. However, the more one investigates the "switching costs" as a reason, the more unlikely it seems to be true. One of the most obvious counters to this reason is that most smartphone users living in today's world are tech-savvy and are used to switching between different operating systems on various devices such as laptops, tablets, and smartphone.

Hence, the question now is to examine whether there are any artificial barriers preventing users from switching between smartphone brands. This study explores various parameters such as

POTENTIAL FACTORS PREVENTING SWITCHING BY CONSUMERS

01 Brand Loyalty & Satisfaction	02 App availability across Operating Systems
<i>03</i> The time taken to switch between smartphones	04 The cost of switching

Switching between smartphones involves transferring not only basic apps but also other data such as contacts, messages, mail applications, photos, call history, and videos. The time taken to switch between smartphones is compared to the typical hourly wages in India, and the actual cost of switching is calculated.

Furthermore, this study also identifies the most popular apps in both the iOS and Android operating systems and studies their overlap. By examining these parameters, this paper aims to determine if there are any significant artificial barriers that prevent users from switching between smartphone brands.

01 Brand Loyalty ප Satisfaction

Brand loyalty or brand retention cannot be correlated to high switching costs. Brand loyalty is largely associated to the product quality or the product satisfaction that a customer perceives from a brand.

YouGov⁸, a British market research and data analytics firm, conducted a global survey for uncovering loyalty in telco and, specifically, understand how consumers plan to approach their next cell and carrier review and explore the main reasons that will encourage them to switch or stick, covering 18 global markets of more than 19,000 respondents. According to this survey, India comes in second place globally in terms of consumers switching from their current cell phone brands to more desirable alternatives. The study found that 28% of surveyed Indians indicated that they would be open to changing their cell phone brands at the time of their next mobile phone purchase. The only country with a higher percentage was Indonesia, where 30% of participants surveyed expressed willingness to switch brands. The report also highlights that a third of urban Indians (33%) plan to upgrade their cell phone with the same brand. The decision to remain loyal to their current phone brand or switch to a new one is equally divided, with almost three out of ten (28%) considering each option.

This phenomenon can be seen in other markets as well. Consumers are reluctant to switch brands in daily products like tooth paste, where all brands are available at the same retail counter. Although the switching costs for toothpaste are negligible, most customers in India remain loyal to a specific brand. This can be evidenced by



⁸ https://business.yougov.com/content/43931-global-15-consumers-likelychange-their-cell-phone

analysing the Indian market share of different toothpaste brands over the years⁹.

The market shares of all the leading brands have mostly remained somewhat stable over such an extended period, and no market leader in the toothpaste industry having entirely collapsed. Additionally, the market has only seen the emergence of one new brand. Thus, the data indicates that brand retention rates can be high, even in industries with low switching costs, such as the toothpaste industry, especially in the Indian market.



⁹ https://in.dental-tribune.com/news/heres-the-analysis-of-toothpaste-market-in-india/

Market share (%) Volume-wise



On the other hand in established markets data suggests that brand retention rates can be high, even in industries with low switching costs, such as the toothpaste industry, especially in the Indian market. Here brand loyalty can be correlated to quality and consumer preference. Hence indicating limited structural barriers for switching.

02 App Availability

The availability of applications is a significant factor that could increase the cost of switching between different operating systems. The vast majority of smartphone users rely on a wide variety of applications for their daily tasks. If a specific application is only available on one operating system and not on the other, this could considerably increase the cost of switching. Additionally, many of the popular applications nowadays offer various benefits if users subscribe to them (e.g., Swiggy One, Dineout Passport). If these applications are not available on a particular operating system, it may discourage users from switching to that platform.

We analysed¹⁰ the top 200 free apps downloaded in India on App Store (iOS Application Store) and Play Store (Android Application Store) and found that there was only a 36% overlap between the two lists. This disparity may suggest a high cost of switching between operating systems due to the unavailability of certain apps. However, upon closer examination, we found that 196 out of the top 200 free apps on App Store were also present on Play Store. This means that if a user is using a particular app on one operating system, there is a high likelihood (98%) that the same app is also available on the other operating systems. Therefore, while popular apps may differ between the two operating systems, app availability is not a significant factor in determining the cost of switching between them on smartphones.

After analysing the availability of apps on the two major smartphone operating systems in India, we identified the top apps on both platforms and checked their availability on the other platform. We found that all of the identified apps, including Google Search App, Chrome, YouTube, Google Maps, Airtel Thanks, Vi Mobile Recharge, My Jio, Amazon, Flipkart, Gmail, Swiggy, Zomato, Instagram, Ola,

¹⁰ Feedback Advisory analysis of data collated from Data.ai

WhatsApp, Google Pay, Uber, Facebook, Snapchat, DigiLocker, Spotify, Paytm, PhonePe, Telegram, TrueCaller, Google Photos, Google Drive, YONO, HDFC One, and Prime Video were available on both the App Store and Play Store.

It is worth noting that many of these apps were only present in one of the lists of the top 200 apps, but were available on both operating systems. Furthermore, we specifically picked a wide variety of app segments, including Cab Booking, UPI, Banking, Music and Video Streaming, Social-Media, Web Browsers, E-Commerce platforms, Food Delivery apps, and Cloud Storage, to ensure a comprehensive analysis.

Based on our findings, we can confidently conclude that app availability does not affect the cost of switching between two different operating systems on smartphones in India.

Findings indicate that factors like app availability do not influence cost of switching between operating systems on smartphones. Most applications are available in both the operating systems.



03 Transferring Data Across Brands

Transferring data from one smartphone to another used to be a complicated and time-consuming process. It often involved manually copying files and data from one device to another or syncing them to a computer before transferring them to the new device. This process could take hours and require technical knowledge, which made it challenging for many users. However, with the development of new technologies and applications, data transfer has become much simpler and more accessible.

Today, many applications are available that can transfer data from one smartphone to another with ease. For example, to transfer data from an Android phone to an iPhone, the "to iOS" app available on the Play Store is a popular option in India. This app allows users to select the data they want to transfer, including apps, photos, videos, emails, and calendars. However, the user must log in to their accounts on all the different apps separately, but this process has become more straightforward as most users in India have linked all of their separate app accounts to their primary account, which is typically a Google account. This way, users only have to enter their user ID and password once. The "move to iOS" and similar apps discussed here are free for users.

Similarly, to transfer data from an iPhone to an Android phone, users can use the Google One app, which is available on the App Store. This app provides a seamless way to shift all the data from an iPhone to an Android phone. The app takes a backup of all the data that users want to transfer to cloud storage and then transfers it to the Android phone. This process is quick and efficient and requires minimal technical knowledge, making it accessible to a wide range of users.

It is pertinent to note that switching phones and still staying within the same OS also requires time and effort to transfer.



With the help of various applications, users can quickly and easily transfer their data, including calendars, apps, accounts, photos, videos, and emails. These applications have made the process of switching smartphones hassle-free and straightforward, allowing users to enjoy the benefits of new devices without losing any of their data. Please note, even switching phones but staying in the same OS still requires time and effort to transfer.

Certain features are core to the consumer experience on smartphones today. These include photos and videos, e-mail, calendar, contacts, video conferencing, and the ability to download apps. Below we outline how users can manually port their data from iPhone to Samsung and vice versa using the same or third-party services.

One of the most commonly used features on smartphones today is the camera and photo library. In a few seconds, users are able to take pictures, save them, and share them with others. Before the smartphone, this required a separate camera and for users to upload pictures to a computer before sharing them via e-mail or to pay to have pictures developed before sharing copies.

iPhone users can manually move their photo library in several ways. First, if the user stores their videos and photos locally on their device, they can simply download an alternative service that is available on both iPhone and Samsung devices such as Google Photos. Once downloaded, the user then follows the on-screen prompts in these apps to move their media to these cloud services. Then, on their new device, the user would just need to log in to these apps to access the content.

If users rely on iCloud for storing their photos, they have the option to transfer their content to Google Photos automatically. iCloud provides for an option to move all the photos to Google photos by logging into iCloud. Another way to transfer the content is by downloading photos and videos in bulk from iCloud.com and uploading them to Google Photos. In case storage space is the main





reason for leaving or switching cloud services, backing up media to a computer can be a practical solution as computers typically offer more storage space than smartphones.

Google Takeout is a convenient method for users looking to switch from Samsung's Google Photos to iCloud on an iPhone. It allows users to download their photos entirely, which they can then upload to iCloud.com. Once signed into iCloud and with iCloud Photos enabled on their iPhone, the photos would be available. To transfer their videos from Google Photos to iCloud, users need to save their videos to their iPhone from Google Photos, with iCloud Photos enabled. If the photos and videos are stored locally on the Samsung device, users can move their photos and videos to the iPhone by first transferring them to their computer, and then to their iPhone.

When it comes to email, Gmail and Microsoft Outlook are wellliked alternatives to the iPhone's Mail app. As email is cloud-based, users only need to download the apps on their new device and sign in. These apps also support other email accounts, such as iCloud, Gmail, Outlook, and Yahoo. Additionally, Google Calendar and Microsoft Outlook provide alternative options on both iPhone and Samsung devices for Apple's Calendar app, including for users who rely on iCloud calendar.

Users can quickly transfer their contacts from iPhone to Samsung devices by exporting their contacts' vCards from iCloud.com, importing them at contacts.google.com, and signing in to their Google account on the new device. The same process can also be used for users moving to iPhone by exporting Google Contacts in vCard format, uploading them to iCloud.com, and signing into iCloud on their iPhone. If exporting from Google Contacts, users can also use Microsoft Outlook. It is worth noting that contacts take up a negligible amount of overall storage space.

In the context of video conferencing, it is worth noting that while FaceTime is a popular first party option to the Apple ecosystem, its market penetration in India remains low. As such, in India, popular video conferencing apps include Google Meet, Microsoft Teams, and Zoom. Some of the popular messaging apps like WhatsApp are also providing video calling options which are universal on both the operating systems

In India, we have also see that the Dealers and Authorised resellers of the mobile brands also double up as consultants in helping customers switch mobile phones. This service is provided free of cost by these dealers to their customers as a value add. Online e-commerce platforms like Amazon, Flipkart have also been a key channel through which consumers are buying the mobile phones. In the year 2022, they have edged past¹¹ the offline channel (Accounted for 53% of the overall sales). They also provide free mobile setup including mobile switching for consumers buying through their channel.

Cloud storage services provided by both operating systems enable seamless transfer of data from one cloud to another. Smartphone Dealers and Authorised resellers provide data transfer as a service free of cost for buyers. Thereby, saving time and simplifying the transition.

¹¹ https://www.idc.com/getdoc.jsp?containerId=prAP50300423



 Please inspect the device and accessories inside the box for any damages / missing items / defects at the time of delivery and service

Q.1 What is included in the phone-set-up service?

- Unboxing
- Demo of Settings, Camera, How to download Apps
- Phone set-up and data transfer from old phone to new (internet/Wi-Fi needs to be provided by the customer)
- SIM card set up (up to 2)
- Data card installation (if customer/phone model has data card)
- Contact Transfer
- Apps download/transfer. Internet/wifi needs to be provided by the customer
- Media files & other documents transfer
- SMS and Call-log transfer
- Screen-guard installation (This service will be provided ONLY if the customer has a screenguard present at the time of delivery. The service will NOT be rescheduled.)

¹² https://www.amazon.in/l/22827739031

04 Cost to Switch Smartphones

Prior to estimating the cost of manually switching smartphones, it is important to note that both Samsung and iPhone devices offer an option to easily transfer apps and data from an old Android or iPhone device during setup. This streamlined process can save users time and simplify the transition.

For users looking to migrate from an iOS device to Samsung, the Google One app can be downloaded on the iPhone and used to back up contacts to Google Contacts, calendar events to Google Calendar, and photos and videos to Google Photos. Once signed in to their Google account on the Samsung device, users can easily access their data.

Similarly, users can transfer data from a Samsung device to an iPhone by using the Move to iOS app. This app allows for the transfer of contacts, messages, photos, videos, email accounts, and calendar data. This is also free of cost.

When evaluating the feasibility and potential burden of switching costs, it's important to consider how often consumers replace their smartphones. In India, the average lifespan of a smartphone is approximately 3 years¹³ in the urban market. However, it's worth noting that the lifespan of smartphones can vary across different brands. These variations in lifespan may be an important factor to consider when deciding on a smartphone brand.

In this study, we examined the cost of manually switching between an iPhone 11 and a Samsung Galaxy S22, including the opportunity cost of time switching. To do this, we compiled a basket of commonly



¹³ https://www2.deloitte.com/in/en/pages/technology-media-and-telecommunications/articles/tmt-predictions-2022.html



used apps across various industries, including Cab Booking, UPI, Banking, Music and Video Streaming, Social-Media, Web Browsers, E-Commerce platforms, Food Delivery apps, and Cloud Storage.

For switching of photos in the phones, we have backed up the photos on Google Photos from the original device. We have not downloaded the photos on the new device. Our assumptions for this study included a 3,000-picture library and 30 minutes of video.

To further get an exact amount related to switching costs, we have extracted the median hourly wage in India. The median hourly wage in India is INR 93¹⁴. The amount of time taken to switch from an Android to an iOS device is approximately 2 hours and 5 minutes. Comparing the amount of time with the median hourly wage we get the cost of switching as ~INR 194. Similarly, switching from an iOS to Android took 1 hour and 8 minutes, which amounted to ~INR 105. Clearly, the time taken for the actual transfer of data and thus the cost of switching contributed by the time factor is also very low. A video also was recorded to demonstrate the same. In the video, the entire transfer was done using the Google Photos and iCloud photos, which is a relatively faster method of transferring and in both transfers the time was approximately 45 minutes.

A video also was recorded to demonstrate the same. In the video, the entire transfer was done using the Google Photos and iCloud photos, which is a relatively faster method of transferring and in both transfers the time was approximately 45 minutes.

It is important to note that a lot of the 45minutes to 1.25 hours transfer time doesn't require active user attention / manual work.

¹⁴ https://dge.gov.in/dge/sites/default/files/2023-03/AnnualReportPLFS2021-22F_0.pdf (Page 62, Statement 17. Monthly wage converted to hourly wage. 25 working days and 8 hours in a day, used for conversion)

PRICE AND TIME TO SWITCH between the Operating Systems

Apps / Services	iOs	Android
Photos and Videos	Free 4GB to Google Photos in 01 minutes and 27 seconds Total time for photos and videos 41 mins 24 secs	Free Using iCloud, free-INR 75/ month depending on needs. 4GB to Google Photos for photos and videos 1 hour 45 mins 25 secs.
Contacts	Free	Free
Facebook	Free	Free
Instagram	Free	Free
Twitter	Free	Free
Spotify	Free	Free
Netflix	Free	Free
Messages	Free	Free
Amazon	Free	Free
BookMyShow	Free	Free
inShorts	Free	Free
Swiggy	Free	Free
Zomato	Free	Free
Gpay	Free	Free
Flipkart	Free	Free
Disney+hotstar	Free	Free
Zee5	Free	Free
Yono SBI	Free	Free
Google photos	Free	Free
Adobe Scan	Free	Free
MakeMyTrip	Free	Free
Telegram	Free	Free
DigiLocker	Free	Free

Apps / Services	iOs	Android
Zoom	Free	Free
Ola	Free	Free
Rapido	Free	Free
Zepto	Free	Free
Airtel Thanks	Free	Free
Truecaller	Free	Free
Google Sheets	Free	Free
Google Calender	Free	Free
Whatsapp	Free	Free
EasemyTrip	Free	Free
Amazon Music	Free	Free
VLC Media player	Free	Free
MX Player	Free	Free
Google Search	Free	Preloaded
Chrome	Free	Preloaded
YouTube	Free	Preloaded
Gmail	Free	Preloaded
Google Meet	Free	Preloaded
Youtube Music	Free	Preloaded
Google Drive	Free	Preloaded
Google Maps	Free	Preloaded
Time to Download Apps	17 minutes	13 minutes
Time to Bootup New	05 minutes 10 seconds	o6 minutes 17 seconds
Subtotal Cost and Time	01 hrs 8 minutes 07 seconds	2 hrs 5 minutes 42 seconds
One-time Cost to	INR 105.4	INR 193.8

Our estimates are conservative, as there are more userfriendly options for transferring data than manual porting. For instance, users can take advantage of smartphone apps to copy and transfer their data across devices, or they can opt for automatic data transfer by using Google Photos to transfer their photos and videos to the cloud and then sign in on their new device. We acknowledge that the time required to switch smartphones can vary depending on the device's processor and internet speed. Our estimates are based on using the mobile data for the transfer, but we recognize that there may be alternative methods to calculate the total cost.

To put these results into perspective, we have listed down some of the average spending of an Indian on his daily needs:



Category	Average Spend
Healthcare 15 (Spend on ailments not involving hospitalization)	INR 636
Groceries 16 (excluding fruits, vegetables, and animal protein)	INR 2,144 Monthly
Dining 17 out	INR 2,500 Monthly
Clothing and footwear 18	INR 385 Monthly
Cost of Switching from iOS to Android	INR 105 (INR 4 Monthly)
Cost of Switching from Android to iOS	INR 194 (INR 8 Monthly)

The time taken for the actual transfer of data and the cost of switching contributed by the time factor is very low. It amounts to a negligible cost when compared to the cost of a smartphone. INR 152 (INR 5 monthly) in case of iOS to Android and INR 194 (INR 8 Monthly) in case of Android to iOS.



 $^{^{15}\,}https://www.mospi.gov.in/sites/default/files/publication_reports/KI_Health_{75}th_Final.pdf$

¹⁶ Kantar Research

¹⁷ Survey by the National Restaurant Association of India (NRAI)

¹⁸ National Statistic Office (NSO)

Conclusion

As the role of smartphones becomes more and more crucial in our lives, it is important that users can switch to an operating system of their choice according to their needs. Depending on the smartphone one is looking to buy, users often spend as high as INR 1.25 lakhs on a single mobile phone and are interested to know whether there are any barriers and costs for switching from one smartphone operating system to another.

However, as we have proved during this entire paper, that is not the case and there are no noticeable barriers that prevent a user from switching the operating system he/she uses or the brand of mobile This is especially true for India and users can easily switch between operating systems such as Android and iOS, as shown in this report.

To prove this, we have examined the apps available on both operating systems, we have also examined how to transfer data from one device to another such as photos, contacts, videos and apps.

Moreover, to accurately get an idea about the opportunity of time lost in switching smartphones, we have done the transfer ourselves using some of the less automated methods and calculated the time taken. They are less than even one hour's median wage in India. Also, unlike other markets, India has a unique dealer and e-commerce channel which is willing to help consumers do the switch without any additional charge. This helps, the non-tech savvy customer or even rural market who find the above detailed methodology difficult. Hence, we can confidently say that presently there are no barriers that prevent a user from switching operating systems in a smartphone in India.



- *O1* There are no barriers that prevent users from switching operating systems in a smartphone in India.
- **O2** Service of switching provided free of cost by dealers and authorized resellers as a value add.

03 If one were to calculate the cost of switching

- Android to iOS = 2 hrs 5 mins and ~INR 194.
- iOS to Android = $1 \text{ hr } 8 \text{ mins and } \sim \text{INR } 105$.
- Transfer time: ~ 45 minutes.

04 Other key findings

- Common apps including YouTube, Gmail, Amazon, Ola, Zoom, DigiLocker, Flipkart, HotStar– can be transferred for free.
- App availability does not affect the cost of switching between two different operating systems on smartphones in India.





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