



**Cleaning Up
Pakistan Mobile
Ecosystem**

DIRBS Impact Case Study



Device Identification Registration and Blocking System

March 2020



**Pakistan
Telecommunication
Authority**

DIRBS

Pakistan

Impact Case Study



DIRBS Subsystems



Device Verification Subsystem (DVS)

Provides a platform for public to check basic status of an IMEI and Authorized entity(s) to verify details of a mobile device.



Device Registration Subsystem (DRS)

Provides a platform for individuals and commercial importers/manufacturers to register device(s). DRS also provides interface for PTA to review registration requests and take appropriate action.



Lost & Stolen Device Subsystem (LSDS)

Provides a platform for PTA or its authorized entity to register a report for lost/stolen device(s) of an affected consumer.



Device Pairing Subsystem (DPS)

Provides an interface for PTA to generate new pairing codes and for MNOs to add IMSI information for pairs.



Secure File System (SFS)

Provides a secure interface for MNOs to upload device dumps for analysis and download lists to be implemented on their EIR.



DIRBS View (DV)

Provides a comprehensive report of the mobile devices across all networks. It provides a dashboard for PTA to understand the landscape of mobile device ecosystem in the country.



www.dirbs.pta.gov.pk

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Pakistan has the distinction of implementing the world's first open-source, full-fledged Device Identification, Registration and Blocking System (DIRBS)

DIRBS Timeline



Device Identification, Registration and Blocking System Introduction

A rising global trend in the awareness of Governments, Mobile Network Operators (MNOs), Original Equipment Manufacturers (OEMs), Distributors/Retailers, and Consumers about grey market devices and its negative impact has emerged. International organizations such as the International Telecommunications Union (ITU), GSM Association (GSMA), Mobile Manufacturers Forum

(MMF), Intellectual Property Owners Organization (IPO), the Organization for Economic Cooperation and Development (OECD), the World Customs Organization (WCO), companies such as Qualcomm, and other entities have been working to confront the menace of the grey market and its negative impact on the mobile ecosystem.

Such awareness has ignited various initiatives amongst which developing an open-source platform--Device Identification, Registration, and Blocking System (DIRBS)--is an important milestone.

Pakistan, as well as many other markets, has had significant issues with the grey market and counterfeit devices that impacted government, industry, end-users, and operators. At the government level, import duty tax evasion and public security risks from non-registered devices have been a paramount concern. From an industry perspective, counterfeit and grey market devices paved the way for unfair competition, resulting in lost sales, pricing pressure, and impact on brand equity. With counterfeit devices, consumers faced poor performance issues and potential health hazards, while network operators, one of the significant ecosystem stakeholders, experienced higher costs due to the adverse impact of substandard devices on network resources.

Pakistan has the distinction of implementing the world's first open-source full-fledged Device Identification, Registration, and Blocking System. DIRBS was by no means a small undertaking as it required establishing a regulatory framework, customization, and development of the DIRBS software and system to Pakistan's requirements, putting the necessary hardware to run the system, interfacing the system with external organizations, running an awareness campaign for businesses and consumers, and ensuring the delivery of DIRBS broader objectives.

Conceptualization of DIRBS project started in 2016 whereas design and development continued till end of 2017. Interfacing and integration with external stakeholders (Customs, Immigration, MNOs and Importers)

Continued till end of 2018 and the system became fully operational on 23rd April 2019. Well before blocking of non-compliant devices PTA also initiated an extensive awareness campaign for the public through print, electronic and social media.

The impact of DIRBS started to surface as the project came to fruition, the PTA gained a better understanding of the mobile device landscape; businesses became aware of commercial models for the future, and consumers realized the value of a legal mobile phone. Resultantly, there has been a sharp rise in import duty proceeds of mobile phones since the blocking of non-compliant devices started.

The menace of fake and fraudulent mobile devices in Pakistan and the need to eliminate them from the market has long been felt in Pakistan. The Government realized the importance of ensuring uses of legal mobile phones and elimination of fake and fraudulent devices from the market. This in view the GoP included enabling provisions in the Telecommunications Policy-2015. Pakistan Telecommunication Authority started to study and looked for a technical solution, and the effort resulted into conceptualization, design and implementation of the technical solution called Device Identification, Registration and Blocking System (DIRBS).

This report discusses the impact of DIRBS on a broad spectrum of mobile phone ecosystem and beneficial outcomes. Pakistan Telecommunication Authority continues to push the system forward despite all challenges it faces from various directions as change is a complicated phenomenon to digest when so many stakeholders are involved. The impact of DIRBS is likely to be magnified in the future. Regulators around the world now want to emulate the PTA's initiative.

Stakeholders Challenges

GOVERNMENT

Revenue loss (non-payment of customs duties.)

Need of additional measures to ensure compliance with national regulations (import, sale, certification, IMEI Tempering etc.)

Danger to public security (phones with invalid IMEI or "no IMEI" number are potentially attractive for criminal activity and terrorism)

Quality of Service & Impact on Broadband Penetration

INDUSTRY

Losses for OEMs

Unfair competition

Loss of sales

Price may be affected

Copyright and trademark infringement, adverse effect on brand value and reputation

END USER

Low quality and reliability (performance degradation, high % of dropped calls, access failures, handover problems)

Potential hazard to health (use of hazardous substances, higher SAR, batteries explosion etc.)

Security and privacy issues (In cases of stolen or lost phone, it is difficult to track the phone with invalid IMEI or "no IMEI" number)

No Effective Verification Process (to check if the device bought by User is fake or genuine, legally imported or smuggled etc.)

OPERATOR

Lowering QoS of mobile telecommunication Services (loss in voice and data capacities, data transmit speeds, reduced coverage)

Potential interference problems

Regulatory Compliance Paradigm Shift: Positive Externalities

In spite of the existence of a well-defined regulatory process on type approval of mobile devices, outcome was not as expected. There was an abundance of fake mobile devices connected to the mobile networks. In the absence of Device Management System and the menace of non-compliant devices, there is no mechanism of knowing the precise nature and scale of penetration of such devices in the system. Realisation of a clean mobile phone market in Pakistan required a sophisticated technical solution backed by appropriate and empowering Regulations. Hence, new regulations titled "Mobile Device Identification, Registration & Blocking Regulations, 2017" in the light of Telecom Policy 2015 as well as Standard Operating Procedures were drafted and notified by the PTA. This set the ball rolling for the development and implementation of DIRBS.

Telecom Policy Policy & Regulatory Compliance

In the making of the IT Policy 2015, the Government of Pakistan, in consultation with the mobile ecosystem stakeholders, mandated that telecommunication laws and regulations shall enable the development of the sector, laying down obligations on mobile operators to safeguard end-users. In the ICT policy document, section 9 specifies broad regulations necessary to safeguard consumers, ensure the optimal functioning of networks, and meet the needs of changing technology and market environment. Subsection 9.6 has specific action items related to type approval and the use of quality mobile devices with valid and unique identifiers. The development of the DIRBS regulatory framework, its actual deployment, and implementation is a successful realization of all these government policy objectives that are specifically related to the mobile device ecosystem.

Digitization Beyond Regulation, A New Digital Pakistan

The essential element from a policy and regulatory aspect is the realization that the DIRBS is a step forward in making PTA an empowered regulator. The future regulatory environment does demand a regime that bases its regulatory decisions on informed and accurate data sets. For the first time, the PTA gained the ability to make industry-wide decisions based on actual data of its own and share it with the industry as well.

The use of informatics as opposed to legal recourse in the regulatory decision making, is a paradigm shift that shall prepare and empower PTA in meeting the challenges of an information society. It has also made PTA a more informed regulator that has better visibility on the mobile device ecosystem than the operators. The new approach shall also enable PTA to evaluate the true potential of spectrum bands and perform other functions required for a new Digital Pakistan.

Clause	Telecom Policy 2015 Mandate
9.6.1	Type Approval ✓
9.6.2	Blocking of Duplicate and Stolen Phones ✓
9.6.3	Development of Regulatory framework ✓
9.6.4 a	Ensuring Unique IMEI ✓
9.6.4 b	Ensuring GSMA complaint IMEIs ✓
9.6.4 d	Reporting of Stolen IMEI ✓
9.6.4 e	Blocking of Stolen IMEI ✓
9.6.4 f	Blocking of newly seen invalid IMEI(s) ✓
9.6.4 g	Blocked IMEI(s) should not be activated on network ✓



**Major General, Amir Azeem Bajwa HI (M), (R)
Chairman PTA**

DIRBS was implemented with clear objectives to limit mobile devices brought into the country through informal / grey channels and eliminate non-standard mobile devices by establishing required controls at the network level. Implementation of DIRBS has fully met its conceived objectives. DIRBS is a unique project, first of its kind, which had evinced great interest from international telecom bodies like ITU and multiple other countries. Since, the implementation of the DIRBS, the import and use of fake, sub-standard and non-custom paid mobile devices

“PTA through DIRBS and other such initiatives plays its part in ensuring a fair and enabling regulatory regime as well as supporting the Digitization of Government initiatives, one of the essential steps for a Digital Pakistan.”

via informal channels have been very significantly curbed. As a result, Government revenue has increased manifold. The end of the grey market has allowed a level playing field for the industry to do legitimate business. With the implementation of DIRBS, a significant increase in the legal, commercial, and individual import of mobile phones has taken place. In the long term, this system gives more dividends toward the elimination of illegal phones. PTA through DIRBS and other such initiatives plays its part in ensuring a fair and enabling regulatory regime as well as supporting Digitization of Government initiatives, one of the essential steps for a Digital Pakistan.

Successful implementation of DIRBS has opened up avenues for mobile phone assembly / manufacturing in Pakistan and possibly export of mobile devices in the future.

DIRBS is an essential part of Digital Pakistan



**Dr. Khawar Siddique Khokhar
Member Compliance & Enforcement**

Successful implementation of DIRBS is a catalyst towards realizing Government's vision of Digital Pakistan. It has brought the mobile ecosystem at the cusp of digital revolution. It has curbed the import of mobile devices through informal channels and enabled the consumer to access devices based on international standards. The impact of DIRBS has been instrumental on Pakistani Telecom Industry. We have seen great reduction in non-standardized, duplicate and cloned devices on the Pakistani network due to DIRBS. It has also enabled blocking of lost/stolen devices contributing towards reduction in law and order situation. The system has also allowed level playing field for companies to do fair business and an increased local assembly of mobile devices in Pakistan. This has helped in technology related job creation and improved skill development of young engineers and technicians



**Mr. Muhammad Naveed
Member Finance**

DIRBS is a unique solution established after thorough analysis of local challenges and it has enabled to mitigate these challenges. DIRBS has brought in a paradigm shift in the Pakistan telecom market, particularly the SIM based device market. It has enabled PTA to stop illegal import of handsets and achieved financial gains to the national exchequer in the form of duties, which is unprecedented. It gave impetus to local handset manufacturing which created employment opportunities in the country apart from saving precious foreign exchange. We are confident that counterfeit and stolen devices do not exist or can ever be part of our networks. PTA is not only supporting the local industry in the form of incentives but also playing a role of mediator between the different stakeholders. The gain to national exchequer due to DIRBS can neither be undermined nor overshadowed. DIRBS will go a long way in reshaping our telecom sector and prove to be imperative in shaping our manufacturing industry.

World's 1st Open-source Device Management Platform



Digitisation through DIRBS

Pakistan has the distinction of implementing the world's first open-source full-fledged Device Identification, Registration, and Blocking System.

	Pre-DIRBS	Post-DIRBS
Ease of Doing Business	Consumers could not verify the status of mobile devices (Legally Imported, Counterfeit etc.)	Consumers can check the compliance status of the device using any method i.e.: Web Portal, Mobile App, SMS
	Manual process for mobile registration	Consumers can register their mobile device using multiple digital platforms i.e. through web portal, USSD code or by visiting nearest MNO franchisee
	Consumers required to visit multiple departments to complete application process	One window solution for applicants as Platform integrated with all stakeholders
	Individuals could not apply without internet connectivity	Pakistan is the first country in the world to introduce mobile device registration through USSD code (consumers can now apply for mobile registration through USSD code by dialling *8484#).
	"Mobile registration time consuming and tedious process (Process took at least 2-3 days)"	Process became fast and efficient through integration with other stakeholders and digitization.
	Paperwork Intensive process	Online and Digitised platform
	No processing after office hours or on public holidays	Round the clock availability of system
Performance Enhancement	IMEI verification done with GSMA-TAC data only.	Each IMEI is verified with multiple dataset i.e. GSMA/ Stolen/Duplicated/PTA Registered Devices during approval. Hence Data integrity, consistency and uniformity achieved.
	HR intensive mechanism that could hardly process few applications in a single day	Fully automated system which can process & validate innumerable applications.
	Whole data resided in emails and was much difficult to track for a record	Centralized National database of IMEIs & Devices
	There was no such database to support regulator decision making	Regulator is enabled to perform in-depth business analytics to support decisions
	Ineffective and manual IMEI validation process	IMEI auto validation process which performs all necessary checks as per the regulations
	No mechanism to detect blacklist violations	Violations are checked and highlighted enabling strict enforcement of Blacklist.
	Reporting process not available	System generated BI and KPI reports provide visibility and forecast of country wide mobile eco-system.
	No mechanism to detect duplications on the network	Effective duplication detection and mitigation

Digital Pakistan

2020

Promoting Ease of Doing Business
Performance Enhancement

Stopping Replica Mobiles

Harmonization of genuine mobile device business



The Pakistani market has traditionally been an open handset market since the early 90s i.e., instead of mobile network operators, the OEMs, distributors, and retailers controlled the import and distribution of mobile devices. This business model practiced in many countries takes the financial burden away from the operators, which helps them concentrate on the service part of the business. The outcome of this model, however, is that the regulator has little or no control of the handset base of the country. The regulation of such markets becomes even more challenging when the government does not possess the resources even if there is motivation to enforce regulations.

The absence of operators limited or virtually no role along with the vacuum produced due to the lack of resources of enforcement bodies resulted in establishing a burgeoning counterfeit market in Pakistan in the past decade. The mobile markets around the country not only bought and sold counterfeit mobile devices but unfortunately, accepted this as a genuine business practice. Replicas of most, devices especially the more expensive brands like Apple, Samsung, and Nokia were found in abundance.

DIRBS implementation was preceded by the PTA with a successful awareness campaign for all stakeholders through workshops, electronic, print, radio and social media advertisements. As a result, the business of counterfeit mobile devices has begun to fade out. Now, one has to make an effort to find a replica device in the market. There are two fundamental reasons for the demise of the counterfeit market in Pakistan. First, consumers' awareness and eventual blocking resulted in decreased appetite for counterfeit devices, resulting in less demand for such devices; and secondly, the merchants feared that any further stockpiling could result in an unsold inventory of such devices.



“As a result of a successful awareness campaign, the business of counterfeit mobile devices began to fade out. Now, one has to make an effort to find a replica device in the market.”

Mobile Market Stakeholders View

The stakeholders of the mobile market that includes Original Equipment Manufacturers (OEMs), Brands, Importers, Distributors and their Associations support PTA initiatives to curb grey market in Pakistan:

“We appreciate the efforts of PTA for implementing DIRBS successfully in Pakistan. In the last nine years, the market faced a considerable challenge due to unfair taxation and weak enforcement structure for mobile phones business in Pakistan that encouraged replica devices, illegal import and smuggling of phones, which provided a boost to the grey market. Before the implementation of DIRBS, the people and companies dealing in legal and original mobiles struggled to compete against replicas and smuggled phones in the market. It was almost impossible to sell the original product just because of the easy availability of replica phones at cheaper rates than a legitimate phone and that created obstacles in the growth of the mobile device industry as a whole in Pakistan.

“The mobile OEMs, importers and distributors of Pakistan, those who deal in original devices and use legal channels, whole-heartedly welcome DIRBS. The system has brought a very positive change in the growth of the legal mobile device economy in Pakistan. DIRBS also encourages companies who want to set up manufacturing and assembling of mobile phones in the country.”

“The mobile importers and distributors of Pakistan, those who use legal channels, whole-heartedly welcome DIRBS. The system has brought a very positive change in the growth of the legal mobile device economy in Pakistan.”

Mobile Market Association

Market Situation

Up till a year back, the commercial markets in large cities where mobile business for buying and selling was done there existed large shops and special plazas for replica phones. However, after the implementation of DIRBS, the market for buying and selling replica mobile phones is almost finished. The PTA's efforts made it possible to boost the business of genuine mobile phones in Pakistan.

It has been observed that Consumers appetite for replicas has almost died out, and now they demand original handsets with warranty. Therefore, the replica trade has also died down in the market. Earlier, unapproved mobile brands available in the market with fake warranties caused many problems for consumers and retailers, because of their low quality and illegality.

PTA has observed on the network side that there has been a 30% decline in the number of invalid IMEIs in the year 2019 as compared to previous year. This includes both Invalid Devices as well as SIM Boxes. This shift indicates that consumers who used invalid devices earlier took advantage of the Government providing

facilitation to consumers (explained later in the consumer facilitation section) and upgraded to valid mobile devices.

“Customer's appetite for replicas has almost died down and they now demand original handsets with warranty, therefore the trade in such mobile has also died down in the market.”

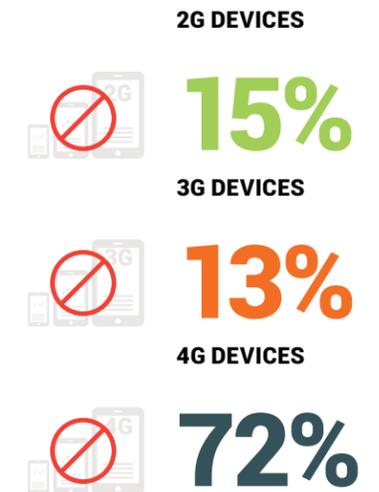
Lost and Stolen Building Consumer Confidence

Lost and stolen devices remain a crucial issue in many countries. In Pakistan, before the launch of DIRBS, in addition to PTA, the Citizen Police Liaison Committee (CPLC) in Karachi created a call centre for reporting lost and stolen devices. The need for this centre arose as street crimes became common in Karachi, mobile snatching being the most prevalent one. The downside of this crime got even graver with the stolen mobile phones used in other illegal activities

PTA holds a comprehensive database that includes list of IMEIs that are blocked. These IMEIs are of mobile phones, either snatched or stolen during the last decade. This list of 1.7 million IMEIs reported after verification has been placed in the PTA stolen Database and through the DIRBS put under observation if it ever appears on the network.

The PTA has also blocked 147,444 IMEIs reported stolen through DIRBS during the year 2019. The PTA is committed to zero tolerance to stolen devices on the networks and continues to block such devices. The PTA shares the stolen device list with MNOs on an hourly basis, so that the blocking of such mobile devices takes place as soon as they are reported. Previously, the PTA relied mainly on MNOs for compliance of its instruction. No audit mechanism was in place in case of violations by the MNOs. Resultantly, the public at large had little confidence that the devices would be blocked or returned to the owner if reported. Therefore, the number of reported devices has increased as consumers are now well-aware of the regulator commitment to the zero-tolerance policy.

PTA is facilitating mobile consumer to report the stolen mobile phones by following a very simple method. In order to report/block a stolen mobile device, the consumer can lodge a complaint with PTA by dialling the helpline number 0800-55055 or send an email to PTA at: complaint@pta.gov.pk. Additionally, consumer can also visit PTA headquarters or the nearest PTA zonal office.



Zero Tolerance Lost and Stolen Mobiles after DIRBS

ATTENTION MOBILE PHONE USERS

REPORT STOLEN MOBILE PHONES

How to Report Mobile Theft?

- If your mobile phone handset has been stolen/snatched or misplaced, you can lodge a complaint with PTA in the following ways to get it blocked:
 - Helpline: **0800-25625**
 - Email PTA at: imei@pta.gov.pk OR
 - Visit PTA Headquarters or nearest PTA Zonal office
- The complainant can also contact Citizens Police Liaison Committee (CPLC) helplines: **1102, 021-35662222 & 021-35682222** for lodging complaint of snatched / stolen / lost mobile phone.

What to Provide?

- All IMEIs of Stolen/lost Mobile Phone
- Mobile number (used in stolen/lost phone)
- Brand/model/color
- Name
- Father's name/Mother's name
- Contact number
- Date of incident
- CNIC number
- Address

How to Check Status of Phone?

The status of blocking can be checked after **16 working hours** of reporting in following ways:

- SMS:** Send 15-digit IMEI to **8484**
- Website:** <https://www.dirbs.pta.gov.pk/>
- Android App:** Check status of device via android application (DVS)

Once blocked, following status shall be displayed against the stolen IMEI search: **"Your mobile device(IMEI #) is blocked/Reported Stolen/Lost/Misused to PTA!"**

Notes:

- PTA's mandate is only limited to blocking of phone. In order to trace/track stolen phone, local police may be approached.
- False reporting is a criminal offence and will be dealt as per law.

IMEI of a mobile device can be found by dialing *06#. It can also be checked in the "settings" of mobile device. IMEI is also printed on the device box.

Pakistan Telecommunication Authority
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Legal Business Healthy Growth despite Challenges

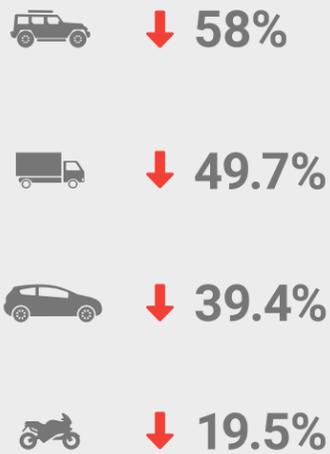
The major motivation for a country or a regulator to adopt DIRBS is the positive outcomes associated with the system. Besides fulfilling the regulatory obligations, the government and the PTA are focused on ensuring elimination of mobile phones related crimes and frauds, consumer satisfaction and a healthy the subscriber growth.

Against the Tide Device Growth in times of Demand Contraction

During the last year or so, especially till October 2019, the country was going through tough and challenging economic times. In this period, other consumer goods that correlate with the mobile device industry faced demand contraction. For example, in the auto industry during the 1st Quarter of the fiscal year 2019, car sales plunged by 39.4 %, truck sales drop by 49.7%, jeep sales dropped 58%, and two-wheelers 19.5%.

During last year as other sectors showed negative growth, the legal import of mobile devices increased from 17.2 million to 28m in the current year, an exponential jump of almost 62.7%. The increase in legal imports of mobile devices in a period of economic hardship is phenomenal, especially considering that the cost of devices jumped by over 40% due to the devaluation of Pakistan rupee and increased device costs due to taxes/customs processing. Perhaps this is the most visible change due to DIRBS as both businesses and individual consumers showed confidence in the system and avoided the alternative use of illegal mobile devices.

Demand Contraction



Legal Mobile Imports



Revenue Realisation Logarithmic Expansion

Naturally, as the number of legal devices increased, one of the most critical indicators for the Government was the surge in the realization of duties and taxes from the import of these devices.

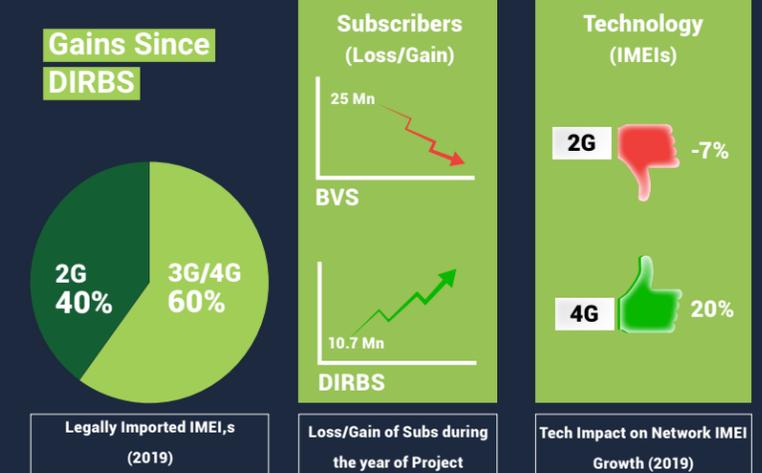
The taxes/duties collected from individual consumers rose to Rs. 4.14 Bn during the period 15th January 2019 to 12th February 2020, this was an untapped area and no revenue was collected before DIRBS implementation. On the commercial import side, the revenue of Rs. 22 Bn during last fiscal year 2018-19 rose to 28.3 Bn in just first six months of fiscal year 2019-20. According to FBR this figure is expected to rise to Rs. 56 Bn by year end, a phenomenal increase of almost 154%, during a period of economic crisis.



Technology Adoption 4G Gains

The efforts to clean up the system by DIRBS also have a powerful impact on technology adoption. During the period from January 2019 to December 2019, the overall 2G IMEI population decreased by 7%, whereas 4G increased by 20% on the network side. The increase in 4G based IMEIs on the network defied the widespread perception that due to higher prices in high-end devices, the population of 4G devices would decrease. Since the beginning of January 2019, as the amnesty period to register non-compliant devices ended, 60% of the device IMEIs imported via the legal channel had 3G/4G, and less 40% Device IMEIs are 2G.

The PTA had in 2013-14 launched a Biometric Verification System (BVS) to ensure that all subscriptions on the mobile network are genuine. During the implementation, the PTA blocked more than 25 million SIMs due to fake identity, resulting in negative dive of the subscriber base.



Based on the past experience the MNOs also feared losing subscribers with the implementation of DIRBS. However, these fears proved ill-founded as MNOs added 10 million new subscribers to their networks in the year 2018-19. During the half year of fiscal year 2019-20, there has been an addition of over 4.17 Mn subscribers and an increase of 10.78 Mn Subscribers during the entire year between fiscal year 2018-19 against the previous year. The Blocking of the IMEIs by DIRBS had virtually no negative impact on the subscriber base of the MNOs as illegal device users either registered their devices or switched to legal devices, resulting in the growth of legal mobile devices and increased revenue collection.

Local Assembly

Implementation of DIRBS also created a level playing field for establishment of local assembly plants for mobile device assembly that enabled local job creation. Recently, some of these local entities have started to assemble 4G smart phones in Pakistan which is an encouraging step towards digitization and building an affordable eco system.

5.2Mn
Devices

3,000
Jobs

9
Companies

2018

11.7Mn
Devices

8,000
Jobs

14
Companies

2019

Consumer Facilitation

From the onset of the DIRBS planning and implementation, it was decided by the PTA that the interest of the mobile consumers shall be of utmost importance and safeguarded at all costs. Therefore, PTA ran an awareness campaign, provided amnesty to existing subscribers, established an online and customer friendly registration system, created customer contact points, and automated verification systems.

Awareness

For any system like DIRBS to succeed, customer awareness is a crucial factor. The PTA embarked upon an integrated awareness program that consisted of B2B (Business to Business) and B2C (Business to Consumer) awareness strategy.

The B2B strategy included workshops for OEMs, Distributors/Retailors, MNOs, PTA staff, and other stakeholders such as customs authorities, involving multiple cities. B2C awareness is an ongoing process that started before the launch of DIRBS, using social media, electronic, print, TV, and radio in which OEMs and MNOs also played their part.



Forward Thinking

A total of 100 million IMEIs were paired (Pairing means an IMEI is pegged to another unique identifier such as IMSI or MSISDN) through DIRBS of which 38.8 million had a valid GSMA Identifier, but were duplicated and 61.7 million were not valid identifiers. The MNOs and consumers twice requested and were granted extensions of the deadline for pairing.

These IMEIs have been allowed to work until the lifetime of the mobile device. The objective of pairing was to provide relief to existing consumers who did not have the opportunity to verify their devices during the purchasing process. Automatic pairing of the mobile phones lessened MNOs' concerns of losing customers, and consumers' worries of losing access. While the non-valid devices paired with an IMSI would work till the lifetime of the device, it would not work if the paired IMSI is changed. This was done to ensure the phasing out of sub-standard devices. On the other hand pairing of a valid IMEI paired due to duplication would be re-paired by PTA if so required.

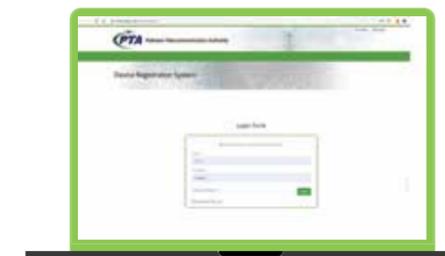
Consumers are provided ample time and opportunity without blocking so they can register their mobile devices without visiting any office

Ease of Registration

The most important aspect for a Device Registration System is that it is designed to provide consumers an opportunity and ample time to register their mobile devices even if all the credentials of the mobile device are not in order, and they can register without visiting any office. This is mainly due to the fact that if for any reason a consumer cannot latch onto the system for registration, it could cause a consumer inconvenience and would overload the customer services infrastructure for such a system. The DIRBS system is integrated with all the relevant government departments to ease up the process for consumers and they don't have to visit multiple offices. Consumers can register their mobile devices by using multiple platforms including web portal, USSD platform and by visiting nearest cellular operator franchisees. Every individual consumer can register up to five mobile devices in a calendar year as per Government regulations. For bulk importers and local assemblers, a dedicated web portal is available where they can register their devices.

Web Portal

Generally, consumer's choice will be to visit the regulator web site therefore DIRBS web portal (<https://dirbs.pta.gov.pk/drs>) is a user friendly and one window operation for registration for both Individual consumers and commercial users as one window operation without visiting any office.



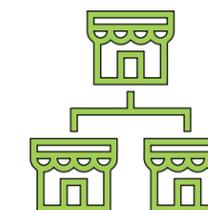
USSD Platform

In Pakistan most consumers do not have access to internet, therefore PTA has developed the World's first mobile registration facility through USSD platform. This platform facilitates all such individual consumers who do not have internet facility and would like to register their mobile devices. Individual can dial *8484# to start the registration process.



Franchisees

Individuals can also avail registration facility by visiting their nearest mobile network franchisees. This platform is also USSD based which enables the franchisees to facilitate individuals who do not have internet access. The facility is also useful for those franchisees who do not have broadband internet facilities.

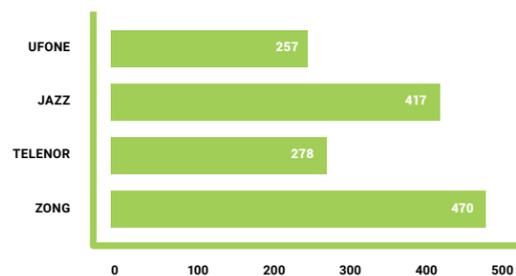




3 different types of touch points provide support to consumers on DIRBS registration related queries

Customer Contact Points

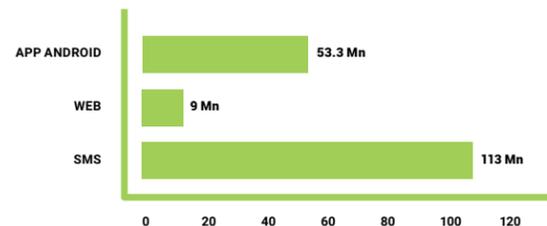
Creating awareness is a vital element to ensure that consumers understand if there is any action to be taken at their end. Additionally, various touch points are established for customer service in case consumers need assistance. PTA initially established customer contact points at its premises and gradually shifted this activity to mobile network operators' franchises. MNOs in Pakistan have now 1,422 contact points that provide support to consumers on DIRBS registration related queries.



The PTA has also established a customised USSD (Unstructured Supplementary Service Data)-based registration and reporting system. The PTA provided extensive training to MNOs staff so that they could address queries from consumers. A complaint management system receives consumers' complaints directly, whereas the MNO contact centres have a unique help desk for DIRBS related issues.

Verification Facilities & Tools

As part of the DIRBS service, Device Verification System availability is an essential first step towards the implementation of any device management system. Verification is primarily because consumers, as well as commercial entities, need to know the legal status of the devices they have or want to buy, sell or exchange.



In a country like Pakistan, where majority consumers still have feature phones, as explained in the previous section PTA developed an SMS based solution through short code 8484 as well as web and app-based system for verification as well registration of devices. SMS/USSD based verification/registration-based systems remains the most popular mediums. 113 million people used SMS to verify the legal status of mobile devices, whereas over 53.3 million used PTA's Android App, and 9 million used the PTA website for device verification status till 30th December, 2019.

Last Resort Blocking Devices

A famous Chinese proverb states: "You don't get scared unless you see your coffin". The PTA DIRBS implementation has gone through a very long and well-thought process where consumers and businesses had ample opportunities for registration of illegal devices, such as awareness campaigns, providing amnesty by pairing devices, and extending amnesty deadlines time and again. Additionally, the processes and tools of registration has been made user-friendly so that both businesses and consumers do not feel any inconvenience, even if their mobile devices were not registered. However, even then, as PTA started blocking those mobile devices, there was a straightforward way of unblocking, once the reason for blocking of such devices was addressed.

Since, the deadline for auto pairing ended on the 1st of January 2019, blocking of unregistered and illegal devices was to start from the 15th of January. However, the measure was delayed until April 2019 to give users one last chance before their devices were blocked. Before blocking any mobile device, the system sent a notification to the user for such an action. Till 31st December 2019, almost 53 million mobile IMEIs have been blocked. 30.7 million of these blocked IMEIs were GSMA valid but were blocked mainly because majority were SIM boxes and some of them unpaid custom duty/tax. These IMEIs if they belong to mobile devices could be registered using DIRBS anytime. The PTA unblocked 1.9 Mn of these IMEIs as the consumers completed their registration by paying required taxes/duties. The facility for registration of such mobile devices is not time-bound. 15 million IMEIs that do not have valid identifiers and are mainly fake IMEI are not permitted to operate as per the regulatory framework.

53 Million

| Total Blocked IMEIs
IMEIs that are blocked by DIRBS.

30.7 Million

| Valid IMEIs Blocked
IMEIs blocked due to non payment includes mostly SIM Boxes.

15 Million

| Fake IMEIs
IMEIs that have no valid identifiers and are not permitted.

1.9 Million

| IMEIs Unblocked
IMEIs unblocked by PTA after Payment of Tax.

All above figures are till 31st December, 2019.

Conclusion

Marching Towards A Profound Impact

Device Identification, Registration and Blocking System (DIRBS) has not only been able to fulfil its primary objective--eliminating illegal devices in the Pakistani market - but made additional contributions. Its impact will be more profound as the customized system gains maturity, and stakeholders conform to the various requirements of the DIRBS project.

DIRBS' significant impact has started to emerge, but there are other important milestones in the months and years to come. Government requirements keep changing as new policies emerge, which require changes in the business rules and technical requirements. The flexibility to adopt these changes has been the hallmark of the DIRBS implementation.

As is expected, one needs to be cognizant of the complexities of a mobile device management system. Therefore, the pace of implementation could be slow as it requires external stakeholders' buy-ins and actions that slow down the pace for realization of the benefits of such a system. The understanding and realization for the type of resource required for development and operations are fundamental as this kind of project traditionally is not a regulator's principal area of expertise. However, once implemented, it could open doors for a more futuristic and proactive outlook of the regulatory regime.



**Device Verification Subsystem
(DVS)**



**Device Registration Subsystem
(DRS)**



**Lost & Stolen Device Subsystem
(LSDS)**



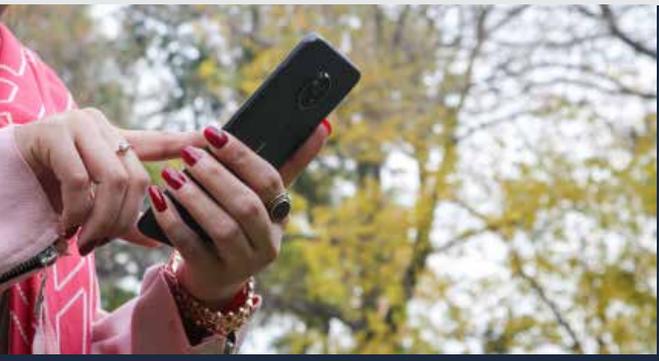
**Device Pairing Subsystem
(DPS)**



**Secure File System
(SFS)**



**DIRBS View
(DV)**



PTA

Device Identification, Registration & Blocking System



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