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Digital Transformation Through the Prism of Digital Identity

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Abstract

Breakthroughs in digital technologies have notably helped to enhance the capability of administrative systems across the globe and allowed precision and effectiveness in governance mechanisms like never before. The current study attempted to build around three critical aspects of governance, that is, lack of state capacity, trust deficit between citizen and state (empowerment), and poor service delivery. The study elaborated how the use of biometrics and smart technologies enhances public service delivery and revitalises trust of citizens in the state. It is a qualitative research based on observations, case studies, and real world examples to link national citizens' registry to various disparate repositories and use it innovatively in order to reform governance. Its manifestations are manifolds, for instance, from empowering persons to avail public health services and financial inclusion to create value for private sector through market, creating innovations, that is, National Database and Registration Authority (NADRA). It has fortified digital governance framework in Pakistan by the virtue of legal identity. The success story of NADRA provides guidelines to developing countries that how organisations could be turned around by employing technologically innovative and culturally targeted approach towards public policy and digital governance initiatives.

Keywords: digital transformation, e-governance, legal identity, technology

Introduction

For centuries, identity has been reflected through tribes, race, religion, shared values, and nations. With the rise of post-Westphalian nation-states, the sovereign states became responsible for the welfare of its people and to ensure that a legal identity for its people was crucial. Legal identity today acts as a stepping stone to strengthen the social contract by bridging the gap of citizen-state trust deficit. Addressing 'ID-Gap' by enhancing outreach mechanism and governance of citizens registry that protects rights and

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democratize services by eliminating the rent seekers out of system is hence, the panacea to the development of the country.

Governance is just the last mile transaction. World Bank defined governance as the process through which state and non-state actors interact to design and implement policies within a given set of formal and informal rules that shape and are shaped by the power (The World Bank, 2017). Power is the ability of groups and individuals to make others act in the interest of those groups and individuals in order to bring about specific outcomes (Dahl, 1957; Lukes, 2005). Connecting the loosely defined dots between governance and power, this relationship has been closely observed while trying to govern in the interest of people of Pakistan by focusing on not only last mile transaction, *that is, improved service delivery*; however, on processes that require digitalization. This is only possible when the services are examined through the lens of peoples' needs with the help of 'whole-of-society' approach. The focus in that endeavor pertaining to the current study was simple and result oriented, that is, the outcome must strengthen the social contract. Digital technologies make this connection of dots a reality.

In modern times, lives are rapidly reshaped by an increasing reliance on digital tools and platforms. Digital channels are leveraged and interaction takes place for day-to-day activities, such as, communication, banking, payments, travelling, government services, e-commerce, healthcare, education, and entertainments. Collectively as people, institutions and internet-enabled devices interact with one another virtually and there is an urgent need for solutions that would enable the people to establish trust between themselves and other entities within the digital ecosystem.

Globally, a fast-paced wave of digital transformation was already underway, while the emergence of COVID-19 pandemic further accelerated this digital transformation phenomenon. There is a crucial need to identify and verify the identity of individuals across a wide range of sectors in varied contexts, such as, the introduction of vaccine certificates to remote onboarding for new employees. Moreover, this paradigm shifts also exposed the urgent need for cross-sectoral consistency and collaboration, enabling individuals and organizations to leverage their digital identity more effectively and securely. Digital identity is therefore, a collection of individual attributes associated with a uniquely identifiable individual. For instance, name, date of birth, occupation, and health status, stored and

authenticated in the digital sphere which are trusted and used for transactions, interactions, and representations in that digital sphere (World Economic Forum, 2021).

There are several use cases of digital ID in everyday life, for instance, accessing healthcare and employment, opening bank account, making payment, purchasing a cellular SIM, receiving government benefits to pay taxes and many others. In this paper, it has been argued that a robust and interoperable digital ID framework is the bedrock of digital transformation that is undergoing in every aspect of day to day lives of people. Through various real-life examples taken from National Database and Registration Authority (NADRA) and UNDP, the current study attempted to expand the notion that the integration of digital ID with governance strategies results in enhanced state capacity, improved service delivery, and trust between state and citizens. It was further argued that the national digital transformation framework must include valuable private sector research and development, expertise and resources coupled with the scale, and infrastructure and legal mandate of the public sector. Therefore, it helps to establish a public-private partnership model to achieve efficient governance.

The creation of new value for businesses and users, along with helping the organizations to realize efficiencies and growth depends on collaborative breakthroughs in digital identity integrating various industries and sectors. Users prefer to do business with companies that are already operating within secure ecosystems and protecting their privacy when given the option. Digital identity ecosystems, whether they are developed or established, benefit users and organizations more when they meet the following five guiding principles, that is, user-centric, dependable, interoperable, public-private, and sustainable (World Economic Forum, 2021). Luckily in Pakistan, all these criteria's could be met by enabling active participation of general public into the policy framing, public-private partnerships, and alignment of national goals with those of international Sustainable Development Goals (SDGs).

To elaborate on the key themes of this research paper mentioned above, the current study explains how the digital identity of Pakistan emerged as one of the leading ID-systems in the world, that too as an enabler of national development.

NADRA as Pioneer of Digital Transformation through Digital Identity

Legal identity is a pre-requisite of social participation and a right to exercise many other rights. Therefore, NADRA, in Pakistan provides legal identity in the form of National ID Card to empower individuals and maintain a multipurpose database (for GoP) informed decision making (The National Database and Registration Authority [NADRA] Ordinance, 2000). It evolved over time and developed a comprehensive digital ID-System that helps design people-centric digital solutions, resulting in improved service delivery as evidenced by the results.

Firstly, the success story has been focused through the lens of numbers. The quantitative achievement speaks for itself. For instance, NADRA has registered around 138 million people (with 10 fingerprints and digital photographs) (Malik, 2014) and issued them identity cards, out of which 53.20% are men and 46.80% are women. It makes a total of 97% of the adult population of Pakistan (aged 18 and above) (Pakistan Bureau of Statistics, 2017). Afterwards, establishing the infrastructure with innovative outreach mechanism successfully was another uphill task. It has now become one of the largest public serving organizations in Pakistan with its 'NADRA Registration Centers (NRCs) spread far and wide in the country. There are about 21,110 employees working in 776 registration centers (including 12 mega centers functional 24/7), NADRA Bikers, and 222 Mobile Registration Vans (MRVs) deployed across the country (NADRA, 2023). Mountaineers and trackers have been hired to register remote communities, living at the majestic mountains of Pakistan in efforts to implement 'Whole-of-Society' approach, in letter and spirt. As of today, around 126,000 people visit NADRA Registration Centers every day to process their identity documents.

This citizen registry in digital form became an asset of the country. Let's discuss how Moreover, its usage has also been discussed to digitalise the governance process, resulting in improved service delivery. Since this study revolves around three critical aspects of digital governance (Empowerment, Social Protection and Enhancing State Capacity), following are some of the evidences of how digital identity and e-governance solutions developed by NADRA serve as catalyst for digital change in Pakistan.

Figure 1

Registration Trend from 2017 to 2022 (August) in Pakistan
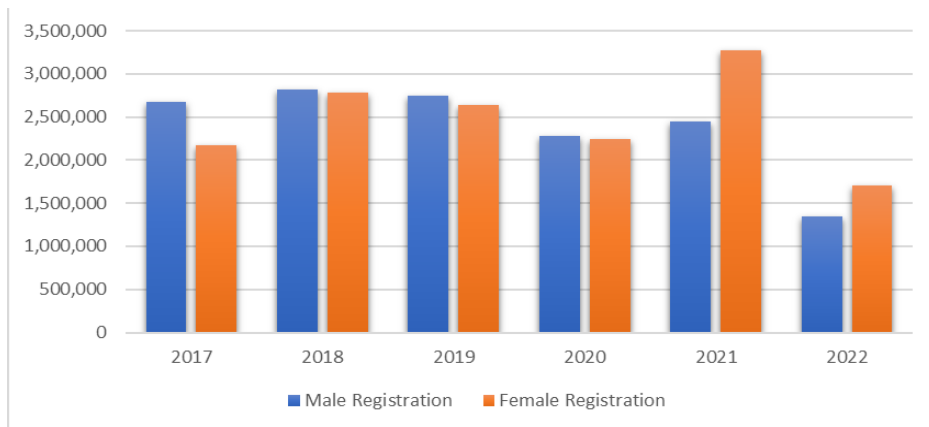
Empowerment

Digital identity, coupled with the use of connective technologies, offers innovative solutions with regards to empower general public, particularly the most disadvantaged. NADRA empowers people through identity. If people do not have legal identity, it means they are invisible and state does not consider their needs or requirements in decision making. People without a legal ID tend to lose their rights and entitlements. Absence of formal proof of identification puts vulnerable communities, that is, women, persons with disabilities, trans-genders and minorities at comparatively greater risk. Provision of legal identity to these people is a quick way of mainstreaming them. It is a global trend that lesser women as compared to men have access to legal identity, so was the case of Pakistan. Various socio-cultural and financial barriers create a hindrance that limit women's awareness, mobility, and access to basic ID documents. Above all, there was a policy gap to include the excluded strata.

Just like one size does not fit all, one strategy cannot help in all the scenarios. Through innovative interventions it was possible to listen to women's voice for designing women-centric registration strategies which established a new department "*Inclusive Registration Department (IRD)*". This department is dedicated to identify women-specific registration related challenges and problems so that they could be turned into opportunities in order to increase women registration in Pakistan. IRD team also caters for the problems of other vulnerable groups that are excluded from the

mainstream with a targeted approach. Through this department vulnerable communities are given a channel to communicate to NADRA. Extensive registration campaign " شناخت بنائے بااختیار " (*Identity Empowers*) is executed at national level to create awareness about importance of legal identity. 19x women-only registration centres with female staff, *where everyone is dedicated to further facilitate women in registration process*exist. Apart from this, women-staffed mobile registration vans and NADRA women bikers were also deputed to provide home registration service to the women who cannot visit registration centres. Eventually 4.5 million fresh adult women were registered in short span of time and gender registration gap in adult registration shot down from 14% to 8.6%. It marks a huge success of NADRA.

Figure 2

Increase in Fresh Adult Women Registration (Jun 2021 - Aug 2022)

Not only women, religious minorities, differently-abled persons, the transgender community, Afghan Refugees, and aliens are also engaged in dialogue so that their registration related problems could be figured out and appropriate digital solutions (identity instrument) could be designed for them. NADRA's policies are inclusive in nature and free of any kind of racial, linguistic, religious or regional biases. Hence, the innovative processes, (departure from close room, file-based policy making to active public engagement), such as, employing social media and conducting e-

town hall meetings coupled with physical public forums, yielded quick results. It is on account of the organization's two-way (government to public & public to government) outreach mechanism that the numbers are increasing every day. These are strategic initiatives on part of Pakistan to close the gender gap for fulfilment of SDG 5(reduce inequalities) of the United Nations (United Nations, n.d.).

The most important story is how digital identity transformed the governance when it was deployed to reconnect the state's relationship with citizens. These matters in a country are described as a fragile state. Mapping the unique identities of citizens could be a powerful tool to extend voting rights, providing access to financial services, disbursing cash transfers, and combating corruption. The result depicts a remarkable empowerment of ordinary people.

For empowerment, one needs to look no further than the use of digital identity in order to sanitize voter lists, long been manipulated by insiders. The reconciliation of the manual voters list of 2007 with the multi-biometric citizens' database of NADRA, provided astounding results. Nearly, 37.1 million entries were incorrect which is a little less than 50% of the entire electoral lists. Almost 9 million voters were registered multiple times and 15 million had no matching identity in NADRA's database (Ghauri, 2011). It would be discussed in detail in Section III.

For the first time, a voters lists was developed that carried the photographs of voters to reduce the risk of electoral fraud. Isn't this digital transformation.? With the support of the election commission, a mobile phone service was launched to verify the polling information for voters. Nearly, 60 million voters checked their vote registration and polling station information on their mobile phones which is a perfect example of digital engagement with citizens. Post-election complaints of rigging compelled the investigating courts to solicit NADRA's help. However, the qualitative side of this reform was transformational. First time in history of Pakistan, over 2 million Hindus were truly represented with over 2 million Christians in the voters list. Nearly, 943 proud Jews Pakistani families registered for the first time which is quite trustworthy for NADRA. When it was calculated that 10,000 minority votes per constituency could make or break the winning candidate, all the religious parties then went to minorities to beg for their vote which was something unthinkable in Pakistan. However, the most profound thing that happened was using NADRA database for post

poll investigation of rigging in elections. This database was used to reconcile counterfoils of ballot papers. In some cases, the evidence of rigging was so glaring that it put many political power brokers to shame. In one constituency, one person voted 310 times from a women-only polling station. The election was recalled. Digital transparency stripped the political brokerage system naked.

Social Protection

Another second key experiment was to improve social service delivery ,for instance, global conflicts, natural disasters, and pandemics lead to a quick transition towards digitalization. The development of public policy without reliable data in critical circumstances, such as, flood and covid-19 is equivalent to winging it. NADRA has repeatedly proven that it could facilitate access to essential services through the cutting edge of technology.

Flash floods of 2010 adversely influenced a total of 20 million people across the nation. There was already a lack of confidence between the donors and the former administration at that time due to mismanagement of funds. When World Bank's Poverty Score card survey was conducted in Pakistan, NADRA digitized it, reconciled it with the biometrics database, and facilitated the compilation of one of the first poverty databases. (The World Bank, 2016).

This way, a secure and precise method was created to identify the afflicted people and ensure transparent pay-outs. Although, bureaucratic resistance posed serious challenges, however, NADRA collaborated with banks to provide an ATM card known as the "Watan Card" (NADRA, n.d.). using the citizens' database. The intended beneficiaries could easily withdraw the money that was placed onto these cards. With the help of the World Bank and various other donors, 2.84 million families received a total of Rs77 billion (an average of about Rs27,000/family). At the time of registration, cash-loaded ATM cards were handed over to eligible families. This technological intervention provided quick relief in crisis and strengthened state capacity.

The strategy pursued in the current research still serves as the foundation for immediate relief and rehabilitation of victims of the most recent floods of 2022. Though, the melancholic loss of precious lives and infrastructure cannot be compensated, however, the state could stand in solidarity with the victims by providing quick relief. In this hour of distress, NADRA is always

ready to cooperate with the federal and provincial governments. The organization has devised a *"RRR Strategy for Flood Victims"* for immediate aid and facilitation. The RRR strategy stands for Relief, Rehabilitation, and Reconstruction of the affected communities. Since legal identity determines people's eligibility to avail quick basic health and financial services in such disastrous situations, documents applied in normal category have been converted to executive category without charging extra fees. The validity period of National Identity Cards (NICs), issued to the residents of flood effected regions has also been extended including Sukkur, till December 31, 2022 (ARY, 2022), so that they may become eligible. In coordination with National and Provincial Disaster Management Authorities, NADRA's centralized help desks for identification of dead bodies of flood victims which are functional 24/7 in each region and headquarters too. NADRA's registration centers, situated in flood-stricken areas, are also adversely affected and are non-functional temporarily. Mobile Registration Vans (MRVs) have been deputed in these areas, so that people could process their identity documents with ease. SOPs have been devised for swift identification and verification of all flood effected population in order to extend immediate cash assistance. It would also make sure that transparent delivery of relief and rehabilitation aid is delivered to effected population.

The lesson that an organization learns through disaster management provides a key foundation for future service delivery. The Benazir Income Support Program (BISP, n.d.) is arguably its most pertinent example which laid a framework for almost all social protection programs offered by the government. Even, 'Ehsaas Kafalat Program' was built on BISP's foundation. What makes it a world-leading poverty alleviation program is its focus on effectiveness across the board implementation, monitoring, control over processes, and delivery chain with the help of technology and artificial intelligence. It builds on a robust database of beneficiaries called National Socio-Economic Registry (NSER), developed by NADRA (for BISP), which determines the potential beneficiaries against their CNICs and family tree data. A proxy-mean test (PMT) is run to determine whether a person is eligible for financial assistance or not. It further helps in the deduplication of beneficiaries, elimination of fraudulent beneficiaries added to manual NSER of BISP.

Furthermore, the centralized database helped to sift out 16% of beneficiaries who did not fit in the inclusion criteria of the poorest quantile

through a wealth-profiling software. Not only this, Ehsaas adopts biometric verification system for cash disbursement hence, making sure that the recipient of financial assistance is the one who qualified for it. Using Biometric Verification Service (BVS) to deliver cash payments consequently ushered the most vulnerable and truly deserving individuals into the safety net and brought over 97-98% transactions within transparency system. Afterwards, the federal government of Pakistan distributed around Rs.179.2 billion among 16.8 million beneficiaries identified after successful biometric verification. BISP-NADRA collaboration presented key emends for good governance, that is, creating an end-to-end data driven, transparent, and automated system for social welfare programs.

Enhancing State Capacity

From a governmental standpoint, technology could improve administrative effectiveness by minimizing paperwork, the processing time and cost, and lowering the possibility of identity fraud. Digital ID may enhance citizen participation and engagement beyond welfare services. It also enables them to exercise their rights and duties, such as, casting votes and paying tax in transparent and fair system.

According to SDG objective 17.1, accurate identification could enhance public institutions in other ways, for instance, by improving the state's capacity to collect taxes (United Nations, 2015). Perhaps, the most unsung aspect of biometric applications is the ability to build state capacity which is essential for good governance. The concept of running data analytical tools to predict tax liability is practiced by many countries, such as, USA, Australia, and Ireland. These countries use data analytics to discover patterns and trends that impact their policy making. The same has been done in Pakistan for the first time ever. The data from multiple sources has been combined and analyzed to predict tax liability of individuals. With a goal to broaden tax net, NADRA, being the custodian of the biggest citizen database in Pakistan, was mandated to conduct this task of data analytics for tax-net broadening. In 2013, the biometrics database helped to identify 3.5 million tax evaders who resided in affluent areas, took expensive trips abroad, and held accounts in foreign currencies; however, were not included in the national tax database. Likewise, nearly 25,000 ghost workers were locate along with multiple-dipping pensioners, proxy prisoners, and those

who stole peoples' mandate. These digital interventions helped GoP saved billions of rupees.

Similarly, NADRA also plays a pivotal role to strengthen the democracy and maintaining integrity of elections along with the Election Commission of Pakistan (ECP) and Pakistan Bureau of Statistics (PBS). NADRA has been assisting the election commission of Pakistan since 2011 for preparation of the Computerized Electoral Rolls System (CERS). The General Election – 2013 was first of its kind to use such electoral rolls. For the first time, electoral rolls with photographs of voters were developed that helps to reduce the risk of electoral fraud. Since then, all elections including local government elections and bye-elections have been conducted using CERs. This technological intervention increased voter turnout in general elections and made elections more inclusive in nature. The CERs enjoy trust of all the political stakeholders in the country. 37.1 million incorrect entries (multiple entries, inclusion errors, dead voters, fraudulent entries, fake voters) were identified in 2011-12 when the manual voter lists were matched with the national multi-biometric database. Moreover, 36 million new eligible voters (having national IDs but were missing from electoral rolls) were also added to the lists. Minorities, trans-genders, special persons including all vulnerable communities became eligible as voters. With this 'Whole-of-Society' approach the social contract between citizens and state was strengthened and resultantly NADRA's digital citizen database played pivotal role to enhance state capacity in order to erode trust deficit.

In Oct 2021, election commission started annual revision of electoral rolls as per the provisions of elections Act, 2017 and again NADRA was asked to add digital value to help with transparent electoral rolls underpinning 'One-Person-One Identity-One Vote' principle. ECP was approached for confirmation of voters as per their addresses on CNIC. NADRA facilitated ECP in publishing the final electoral rolls 2022 following a massive exercise that required the digitization of 121 million voters following door-to-door verification. NADRA and ECP collaborated to address human errors in door to door verification exercise using intelligent citizens database that resulted in transparency and accountability. A virtual verification service (USSD app) was developed through which citizens could confirm their vote by texting their CNIC number to 8300. Pakistan is proud to have received two prestigious international Awards in 2013 for introducing this break-through mobile technology to provide voter

registration/polling station information via SMS during the 2013 general elections. Doing so, NADRA enables Pakistan to stand in the list of countries that fulfil SDG target 16.7 "responsive, inclusive, participatory and representative decision making at all levels"

Another aspect of NADRA's efforts towards capacity building of the state is towards formal economy and entrepreneurship. It collaborates with various other departments and organisations in both public and private sector to foster a digital change that encompasses all, leaving no one behind. A smart mobile application called Pak- ID was launched last year in 2021 which allows applicants to capture their digital photograph and finger-prints using smart phone camera, upload documents, and make secure fee payments using phone without going to NADRA registration centres. Pakistan has become the first country in the world (in 2021) to use this application at massive scale. Launch of Pak-ID mobile application is basically a cornerstone towards development of digital economy in Pakistan.

It would help to improve financial inclusion, ease of doing business, encourage start-ups, and fintech organisations along with e-governance initiatives by offering remote identification and e-KYC. Pak-ID is a building block of online services platform for public-private partnership and collaboration. Banks and EMIs in Pakistan are already working with Pak-ID to offer digital banking services to its customers in order to open bank accounts and digital wallets for e-KYCs. In a very short span of time, 32 financial institutions are digitally on-boarded. NADRA has also facilitated the State Bank of Pakistan (SBP) to launch an easy mobile account (Aasan Mobile Account -called AMA) service, using about 4.5 million poor people who were able to open bank accounts, resulting in financial inclusion. Besides, 441,344 Roshan Digital Accounts (RDAs) were also opened for overseas Pakistanis in collaboration with SBP. Through these accounts, overseas Pakistanis injected around $4.1 billion to the national economy amidst financial crunch.

The Pak-ID system tremendously helped to roll out digital public goods that bring convenience in common person's life. Technology that can do no good to all, is of no use. In collaboration with various state departments and ministries, a digital id infrastructure was leveraged by developing facilitating solutions, such as, Digital Power of Attorney, Pakistan Online Visa System, and Succession Certificate. NADRA with Ministry of Law

and Justice developed a solution to speed up cumbersome process of getting heirship rights. Before NADRA's launch of succession certificate, around 15 -25 cases of succession certificates were filed daily in the lower courts. This responsibility was later assigned to NADRA in order to issue succession certificates and letter of administration. People go to the Succession Facilitation Desks in NADRA centers to put up their cases. Certain innovative changes were incorporated in the system that empower the people to apply for it online, using Pak-ID smart biometric verification and provide succession facilitation facility at NADRA desks in Pakistani embassies too. Now, succession certificate powered by NADRA guarantees property rights through biometric verification and family tree data. NADRA has issued total 29,184 succession certificates, out of which 10,067 female applicants could get inheritance rights. Rolled out as digital public good, there are unfirmed claims that this application reduced 30 percent of load on lower courts.

Not only this, Pak-ID platform was used to unclog public services for overseas Pakistanis and collaborated with the Ministry of Foreign Affairs and automated the process of Power of Attorney. The pilot phase of this project was launched in November 2021 in 10-missions of two countries, US and UK. Applicants may now remotely file an instant power of attorney application on the web and there is online biometric verification using PAK-ID and online payment system. The overwhelming response of overseas diaspora encouraged NADRA to expand this service for widespread public use. These initiatives are in line with SDG 10.2 to make sure that everyone enjoys socio-economic growth and no one is left behind.

Discussion & Conclusion

An inclusive and reliable ID system improves governance mechanisms in the country and paves way for digital public services and projects. Using data registries, Pakistan was able to turn fragilities into opportunities. NADRA Pakistan, presents a successful use case how governments could craft customized social support schemes by utilizing digital tools and unique personal identification systems. Smart use of ID-system in Pakistan injects new life in the public sector by introducing new service delivery models. The innovative combination of technology and data brings forth such interventions which have helped to minimize fraud and leakage in transfers from the government to persons (G2P) and boosted administrative efficiency in general. Smart and secure identification authentication

platform developed by NADRA is crucial for the development of the private sector. By reducing the expenses associated with regulatory compliance, digital ID systems may help businesses grow their customer base, develop new markets, and generally build a business-friendly ecosystem. However, it must be remembered that even with the fastest and most efficient digital technologies, reforms are not one shot effort, however, it is likely to be gradual and incremental affair. Nevertheless, digital ID remains a good partner of citizen centric governance and policy reform!

References

ARY. (2022, September 2). *NADRA extends CNIC renewal dates for flood-affected regions*. https://rb.gy/thb133

Benazir Income Support program. (n.d.). https://www.bisp.gov.pk/ProjectDetail/ZDZjYzY3ZDAtZTQ2OS00NGRhLTliNmItMzJmMzdiYTY3ZDE0

Dahl, R. A. (1957). The concept of power. *Behavioral Science*, *2*(3), 201–215. https://doi.org/10.1002/bs.3830020303

Ghauri, I. (2011, September 22). Voter fraud: 65% of votes in Balochistan were bogus. *The Express Tribune*. https://tribune.com.pk/story/257762/voter-fraud-65-of-votes-in-balochistan-were-bogus

Lukes, S. (2005). Power and the battle for hearts and minds. *Millennium*, *33*(3), 477–493. https://doi.org/10.1177/0305829805033003120

Malik, T. (2014). *Technology in the service of development: The NADRA story*. Center for Global Development. https://www.cgdev.org/publication/ft/technology-service-development-nadra-story

Pakistan Bureau of Statistics. (2017). *Brief on census 2017*. https://www.pbs.gov.pk/content/brief-census-2017#:~:text=According%20to%20the%20final%20results,males%20and%20101.3%20million%20females.

The National Database and Registration Authority Ordinance, Pakistan, 2000, Ordinance VIII of 2000 (2000). http://nasirlawsite.com/laws/nadra.htm

The National Database and Registration Authority. (2023). *NADRA bike service*. https://www.nadra.gov.pk/nadra-biker-service/

The National Database and Registration Authority. (n.d.). *Watan card*. https://www.nadra.gov.pk/local-projects/social-protection/watan-card-phase-i-ii/#:~:text=Watan%20Cards%20were%20launched%20in,short%20notice%20of%2072%20hours.

The World Bank. (2016). *World development report 2016: Digital dividends*. https://www.worldbank.org/en/publication/wdr2016

The World Bank. (2017). *World development report 2017: Governance and the law*. https://www.worldbank.org/en/publication/wdr2017

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. https://sdgs.un.org/2030agenda

United Nations. (n.d.). *Sustainable development goal 5: Gender equality*. https://pakistan.un.org/en/sdgs/5

World Economic Forum. (2021). *Digital identity ecosystem: Unlocking new value.* https://www3.weforum.org/docs/WEF_Guide_Digital_Identity_Ecosystems_2021.pdf