

DATA LOCALIZATION IN PAKISTAN





The Asia Internet Coalition (AIC) was established in 2010 as an industry association that promotes the understanding and resolution of Internet policy issues in the Asia Pacific region. Our mission is to represent the internet industry and participate and promote stakeholder dialogue between the public and private sectors, sharing best practises and ideas on internet technology and the digital economy.

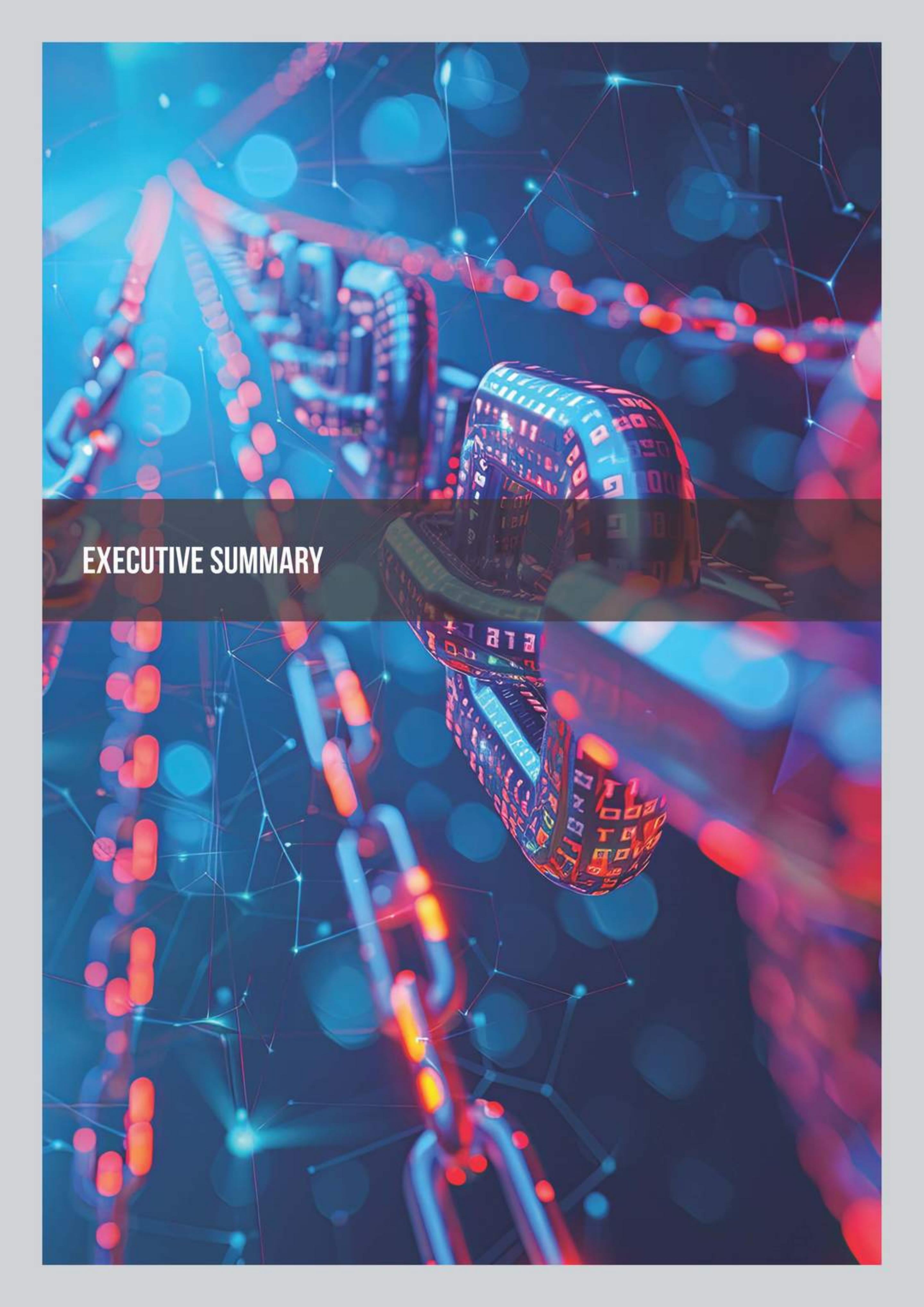


LIRNEasia Solutions (LAS) is a consultancy firm operating across South and South-East Asia. Over the last few years, LAS has been providing services to private sector clients on matters related to but not limited to telecom, ICT, and digital policy and regulatory issues in the region.



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EXECUTIVE SUMMARY

Given the global nature of the digital economy, data generated in a country is frequently stored and processed outside its borders. **Some countries, including Pakistan, have introduced or are considering, data localization policies** -- requirements to store and process data within the borders of a specific country within which the data was generated. This report assesses the current state, and potential impacts of data localization in Pakistan. It draws on legal and regulatory analysis, economic analysis, as well as key informant interviews.

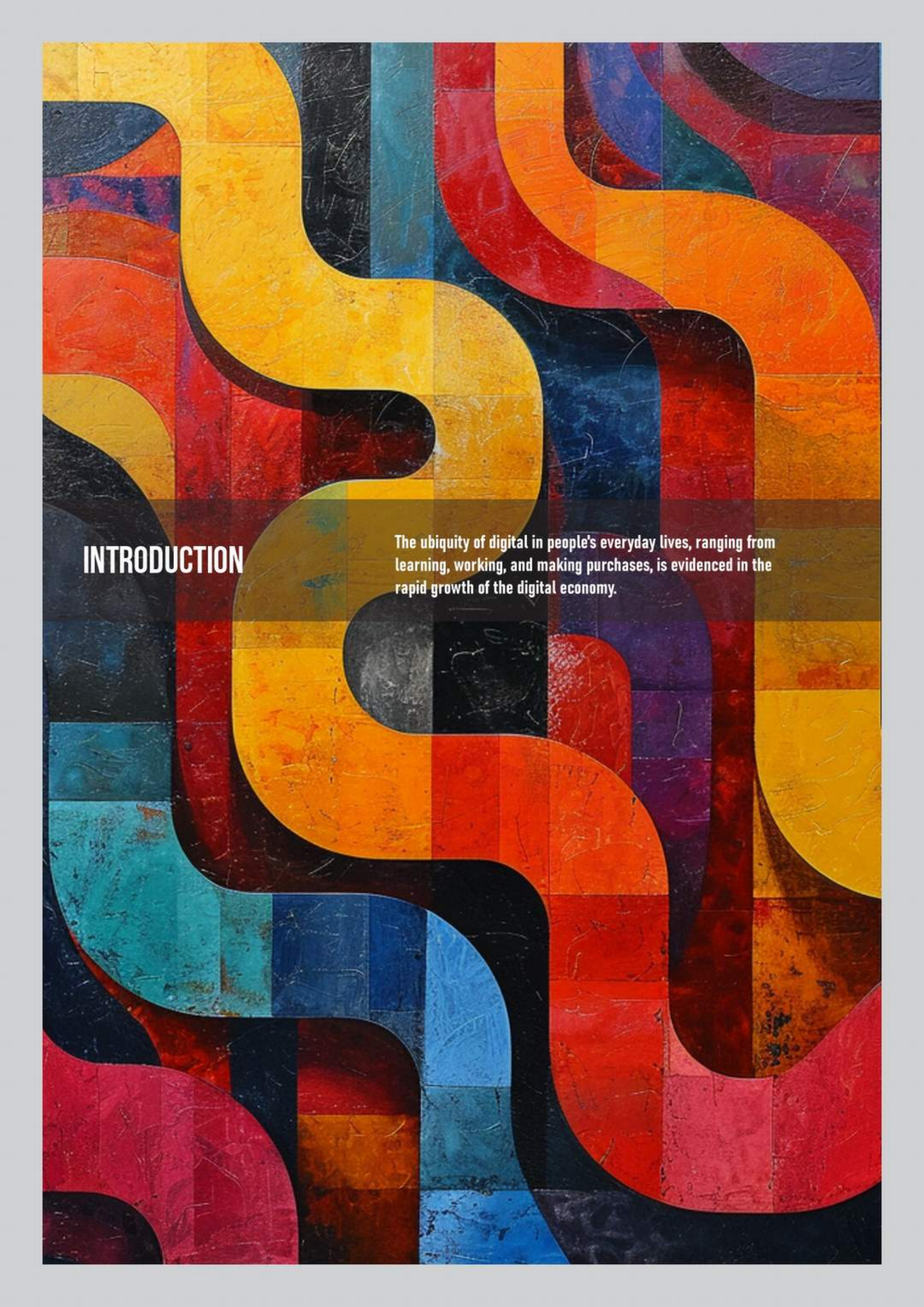
Data localization can contribute towards lower productivity, slower growth and reduced employment. This report estimates that labour productivity would decline by 4.7% in 2025 if the Personal Data Protection Bill based on its May 2023 draft is enacted in 2024.¹ This can roughly be calculated in dollar terms to a **GDP loss of USD 16.5 billion** in the following year after enactment. This decline in labour productivity and GDP loss can also be translated to a **potential loss of 3.2 million jobs**. Macroeconomic changes come about due to firms' and consumers' responsiveness to policy changes.

For this report, the representatives of local businesses indicated that they welcomed the government's efforts to increase data protection regimes. However, three key concerns were raised on data localization requirements.

1. **Data localization could increase hosting costs.** One IT company estimated a 70% increase in hosting costs, while, an e-commerce retailer estimated that a fully locally compliant solution for financial services would cost approximately over 10 times that of its current cloud-based solution. In the current environment, the high costs necessitated by a data localization requirement are likely to disproportionately impact small and medium firms.
2. **Data localization may raise cybersecurity risks.** An e-commerce retailer highlighted the risks of centralized data storage, emphasizing that such approaches compromise the security benefits of a decentralized architecture. Similarly, an IT company highlighted concerns about disaster recovery and data mirroring under data localization requirements.
3. Some interviewees suggest **data localization could raise human resource costs.** For example, one small firm indicated that it would need to double its employee headcount. Not only was it unclear if firms will be able to afford the headcount increases, concerns around the skills of the existing workforce were raised. This supports the findings of the economic analysis, which suggests that greater data localization requirements may have further impacts on the labour market, taking a long-term view.

The relative importance of these factors will vary from firm to firm, based on the types of data in question. For example, the data localization requirements are more stringent for financial institutions, given sectoral regulations. This will also be true if the current version of the Personal Data Protection (PDP) Bill is passed and enacted – although this is a law of general applicability, it differentiates between different types of data. A firm engaging with sensitive data (e.g.: health data) or critical data (government data) will be subject to more processes, thereby increasing costs and skilling needs. The potential risks associated with a cybersecurity breach will further heighten.

¹ Employment figures are only available for 2020/2021 from Pakistan's Bureau of Statistics.



INTRODUCTION

The ubiquity of digital in people's everyday lives, ranging from learning, working, and making purchases, is evidenced in the rapid growth of the digital economy.

Given the global nature of the digital economy, many of these activities require data to cross national borders. The global Internet value chain incorporates elements from various industries across multiple jurisdictions. GSMA (2022) identifies five distinct segments: content rights, online services, enabling services, connectivity, and user interfaces (Table 1). The market value of the global Internet value chain quadrupled between 2008 and 2020 according to GSMA (2022).

Table 1: Value creation along the Global Internet Value Chain

SEGMENT	EXAMPLE ACTIVITIES	2008		2015		2020		GROWTH
		USD BILLION	SHARE %	USD BILLION	SHARE %	USD BILLION	SHARE %	
CONTENT RIGHTS	Premium content rights	37	3%	66	2%	186	3%	403%
ONLINE SERVICES	e-Travel, video and audio publishing, gaming, gambling, search, social media, information & reference, cloud-based services, other online services	477	40%	1595	48%	3792	57%	695%
ENABLING TECHNOLOGIES & SERVICES	Web design & hosting, payment systems, advertising exchanges, CDNs	188	16%	442	13%	812	12%	332%
CONNECTIVITY	Mobile access, tower cos, fixed access	229	19%	586	18%	988	15%	331%
USER INTERFACE	Hardware devices, software and systems	251	21%	659	20%	897	13%	257%
TOTAL		1,182		3,348		6,675		465%

SOURCE: GSMA (2023)

At the heart of the global Internet value chain are data and various technologies that generate, store and process data.

For example, the Internet of Things (IoT) generates data, the cloud stores data, big data combines large data sets, AI learns from data and blockchain is a mechanism to reliably capture data transaction history in a distributed manner (Stork, 2020). When IoT is associated with personal information, data protection becomes pertinent because the interconnected nature of IoT devices increases the risk of unauthorized access, data breaches, and misuse of sensitive information.

Data is collected, stored and processed not only through IoT devices such as smartphones and smart watches but also through shopping reward cards, means of payment (credit cards, mobile money etc.) and the use of online service-based platforms. For instance, the market entry of Uber lowered the cost of taxi rides and made them more transparent and secure, knowing the price, the driver and the car model in advance (Pepić, 2018).

As a result of such activities, data is frequently stored and processed outside the borders of the country in which it is generated. Data protection and data localization laws impact on how local businesses can play a part in this value chain, and the type of services citizen may use.

Some governments have raised concerns about this practice, ranging from data protection and security, sovereignty, supervisory access, and competition (Medaine, 2023). On the other hand, concerns about economic impacts of such measures include increased costs for businesses, the loss of economies of scale of operations, inability to use certain cloud-based services, and consequently, impacts on efficiency; these in turn are passed onto consumers. Balancing between consumer benefits and consumer protection is, therefore, key.

Some governments have instituted data localization policies; though defined differently, this broadly refers to requirements to store and process data within the borders of a specific country within which the data was generated. Notably, the European Union's General Data Protection Regulation (GDPR) requires data to be localized, unless 'adequacy decisions' are provided by the European Commission. This takes a 'whitelist' approach wherein data can only be transferred across borders to countries once a green light is provided. However, adequacy has proven to be a long and complex process to undertake.

Over the past seven years, only a small number of countries and territories (Andorra, Argentina (European Union, 2003), Canada (commercial organisations), Faroe Islands, Guernsey, Israel, Isle of Man, Japan, Jersey, New Zealand, Republic of Korea, Switzerland, the United Kingdom (under the GDPR (European Union, 2021) and the LED (European Union, 2021)), the United States (for commercial organisations certified under the EU-US Data Privacy Framework) and Uruguay (European Union, 2012)) have been found to be adequate.



Countries take differentiated approaches to data localization, having different requirements based on a variety of factors such as data type and sector.

Even within South Asia, countries take different approaches. This is done through a variety of laws, rules, regulations and policies. Data protection legislation has gained prominence in recent years. Sri Lanka was the first country in South Asia to enact personal data protection legislation. The Personal Data Protection Act No. 9 of 2022 does not require localization for all data. However, it requires data localization for data processed by public authorities, subject to adequacy decisions.

Consent and other exceptions exist for third party processing outside the country in the case of non-public authorities. India's approach has changed over time. While the 2019 iteration of the Bill contained stringent data localization requirements, the Digital Personal Data Protection Act 2023 takes a less restrictive approach. India's DPDP Act adopts a 'blacklist' approach, wherein all countries are deemed suitable for data transfers unless specifically notified.

Unlike Sri Lanka's PDPA, it does not require data localization for public authorities. It indicates that it does not override sectoral regulations, which may impose more stringent conditions. For example, this allows the Payment Directives imposed by the Reserve Bank of India to mandate that data related to payment transactions are "stored in a system only in India" (Storage of Payment System Data, 2018).

Further, the way the relevant localization requirements are implemented and enforced will further impact the outcomes. This report first examines the legal and regulatory environment (Section 2), and the economic impacts of data localization (Section 3). Thereafter it studies differentiated impacts for 4 sectors: healthcare, IT and ITeS (software), e-commerce, and freelancers (Section 4).

Legal and regulatory analysis, economic modeling, secondary research, and key informant interviews were used to produce this report (See Annex 1 for methodology note).

This report provides analysis on implications of data localization, which policymakers may wish to consider when considering policy options.





LEGAL AND REGULATORY ANALYSIS

The constitution of the Islamic Republic of Pakistan 1973, which is the supreme law in Pakistan, declares that any laws inconsistent with the fundamental rights, mentioned in it, will be void.

One of the fundamental rights mentioned in the Article 14 is privacy.

“The dignity of man and, subject to law, the privacy of home, shall be inviolable.”

Even though privacy being a fundamental right, till today Pakistan does not have a privacy law. There have been attempts to draft a data protection law since 2005. The latest draft is from May 2023.

The information technology revolution in Pakistan started in the year 2000, when the federal government established an Information Technology and Telecom Division and issued an **IT Policy and Action Plan 2000** (IT Policy). The IT Policy mentions providing safeguards for the privacy of individuals and the confidentiality of transactions against all possible misuse, including that by the State, within the legal framework.

To support the IT revolution, Pakistan also deregulated and liberalised its telecom sector through **De-Regulation Policy for the Telecommunication Sector (2003)**, and **Mobile Cellular Policy (2004)** and encouraged broadband through the **Broadband Policy (2004)**. Through those policies the Government was given with the power of interception of communication, which was translated in law and licensing documents. The licenses issued under those policies were the first document mentioning data localisation. The Broadband Policy also encouraged "Locally Located Content" with the motivation to host websites locally for reducing reliance on international bandwidth.

On the legal recognition of electronic documents and transaction, the **Electronic Transactions Ordinance (ETO) 2002** was promulgated, which under Sections 36 and 37 made violation of privacy and damage to information system, offences for the data and systems located in Pakistan. Section 43 empowered the Certification Council to make regulations on "privacy and protection of data of subscribers".

Prior to the ETO 2002, the **National Database and Registration Authority Ordinance (NADRA), 2000** was promulgated to create the comprehensive digital database of the citizens of Pakistan while making the NADRA responsible for ensuring due security, secrecy and necessary safeguards for protection and confidentiality of citizens' data and information contained in the National Data Warehouse. Though not specifically mentioned in the NADRA Ordinance but the NADRA database resides in Pakistan.

The legal and policy environment was relatively stagnant between 2004 to 2015 on the policy and legal side, until the **Telecommunications Policy of 2015** was adopted. This policy contained provisions regarding international standards of customer service and consumer protection, including measures associated with protection of consumer data and quality services. The requirement of keeping the telecom customer data within Pakistan remained unchanged.

The Prevention of Electronic Crimes Act (PECA), 2016 was enacted which specifically deals with offences relating to the data located in Pakistan. It also makes violation of privacy of individuals and confidentiality of data criminal offences under Sections 20 and 40.

Using the rule making powers granted by PECA, the government made **“Removal and Blocking of Unlawful Online Content (Procedure, Oversight and Safeguards) Rules, 2021”**, to reinforce its data localisation ambition. Under sub-rule (6) of Rule 7 of Removal and Blocking of Unlawful Online Content (Procedure, Oversight and Safeguards) Rules, 2021, a significant social media company must register with Pakistan Telecommunication Authority (PTA), establish an office in Pakistan, appoint an authorized compliance officer, and a dedicated grievance officer, both based in Pakistan and comply with the user data privacy and data localization requirements.

In parallel, PTA also came up with certain regulations to reinforce the data localisation requirements either in the shape of data retention requirement under **Public WiFi-Hotspots Regulations 2018** or controlling data flow under its **Cyber Security Strategy for Telecom Sector 2023-2028**.

The strategy states that “PTA believes in the free flow of data; however, Critical Telecom Data (CTD), as defined in the PTA's Cyber Security Framework - 2022, needs to reside within the geographical boundaries of Pakistan as per the obligations under CTDISR and operators' licenses”. The strategy further states that the “localization would only be limited to Personal Identifiable Information (PII) and CTD”. “Similarly, the data localization policy will be aligned with the “Data Protection Bill/ACT” and “Cloud Policy”, it adds.



Meanwhile on the policy side, government reiterated its commitment to data protection law in the **Digital Pakistan Policy, Pakistan Vision 2025** and **National Cyber Security Policy 2021**. The big shift came with the introduction of the Cloud First Policy 2022, which finds mention of data residency requirements and the concept of data sovereignty. The **Pakistan Cloud First Policy 2022** prescribes that data localization is a rule and transborder data flow is an exception subject to permission.

It “acknowledges the capabilities and economies of scale obtained when there are no data residency requirements in place. The Policy also states that if there is “no data residency requirement in place, the data belonging to Government of Pakistan (GoP) may be stored outside the boundaries of Pakistan and there is a possibility that GoP loses access to its data or the data may be subject to the laws of other countries” (page 9).

From the benign mention of data localization in the Broadband Policy 2004, it became a mandatory requirement in various frameworks mentioned above. The draft Personal Data Protection (PDP) Bill will finally make it more obvious and applicable across the board, if passed.

The government of Pakistan has been working on a data protection law since 2005, when the first draft came out for consultation. There were also draft Personal Data Protection Bills in 2018 and 2021, but neither was enacted. The current **draft Personal Data Protection (PDP) Bill** was released by the Ministry of Information Technology and Telecommunication (MoITT) in 2023 for consultation.

The PDP states that privacy is a fundamental right, and the law lays out the modus operandi and ancillary details to protect individuals' data. However, what is being done is that the PDP is being used to solidify the data localization requirement and hinder the free flow of the data.

In a significant deviation from the GDPR, the PDP added a special category of critical personal data, in addition to the usual personal data and sensitive personal data to justify data localization. The “Critical personal data” is defined as the personal data retained by the public service provider as well as data identified by sector regulators and classified by the National Commission on Personal Data Protection (NCPDP) as critical.

Box 1: Public sector data breaches/cyber-attacks in the current regulatory environment

Pakistan public sector institutions have frequently experienced data breaches and cyber-attacks (Figure 1). From 2019 to 2023, data of 2.7 million Pakistani citizens were compromised from the National Database & Registration Authority (NADRA) database (2.7 million Pakistani data compromised over five years, 2024). In 2021, the Federal Board of Revenue's (FBR) data centre in Islamabad was attacked by hackers. At the time, FBR explained that migration of data was necessary to provide better services to their clients (Rana,2021).

The data breaches affected in the public sector were critical personal data. A data localization requirement for this data category would potentially increase the exposure of these data for breaches and cyber-attacks.

Figure 1: Recent public sector data breaches/ cyber-attacks in Pakistan



The laws and policies mentioned above show a clear and consistent narrative is being built around privacy, security, data sovereignty and consequentially the need for localization. The banking (Enterprise Technology Governance & Risk Management Framework for Financial Institutions, 2017) and telecom (License template, n.d.) sectors are already obliged to keep the personal data of their customers within Pakistan through mandatory regulations.

It is not clear whether this sector specific data localization requirement will remain after the enactment of the Personal Data Protection Bill. The PDP, being a general law, would not be able to override the special laws and regulations of the banking and telecom sectors.

Though the PDP prohibits only the transfer of Critical Personal Data from being transferred out of Pakistan but between the lines it empowers the Commission to be established under the draft Bill to compel data localization even for personal data and sensitive data on the grounds of national security and public interest. The draft Bill does not define these terms, raising concerns among stakeholders.

The **draft National Artificial Intelligence Policy 2023** claims to be consistent with the Personal Data Protection Bill, Pakistan Cloud First Policy, and the Digital Pakistan Policy initiatives. However, there is a major conflict between this policy and the PDP Bill. The PDP Bill focuses primarily on protecting the privacy and personal data of individuals, whereas AI development depends on the access to large amounts of data.

A review of the current legal and regulatory framework reveals that there is no prohibition on the businesses and individuals to use either international cloud or international cloud-based applications unless the business is regulated by a sector regulator, such as State Bank of Pakistan (SBP) or Pakistan Telecommunication Authority (PTA). The public sector entities are prohibited from using international cloud or cloud-based applications in the "Email and Internet Policy for the Federal Government". However, it has been noted that many government officials are using web-based emails (Publicity officers, n.d.) (Contact details of community welfare attaches posted at Pakistan missions abroad, n.d.) like Gmail, Yahoo and Hotmail for official communication as most of the time the official email is not working.

Among the government officials, communication apps like WhatsApp are being used and the government attempted to develop its homegrown communication app "BEEP Pakistan" (Govt launches WhatsApp's alternative called 'Beep Pakistan', 2023) to move the government officials away from the international communication apps.

After the enactment of the PDP Bill, there will be restrictions on the private businesses and individuals to use international cloud and cloud-based services if the personal data involved is sensitive or critical. Public sector entities will not be able to use international cloud and international cloud-based applications at all after the PDP.

Table 2: Practical implications of data localisation on use of applications, before and after draft PDP Bill.

	PRACTICE APPLICATION	CURRENT	AFTER BILL IS ENACTED
BUSINESS	Using cloud services such as AWS, Azure	No prohibition unless it is regulated sector	Restrictions on sensitive and critical data
	Using Gmail, Yahoo, or similar email services	No prohibition on private sector unless it is regulated sector	
	Utilizing applications on the public internet such as Whatsapp, Facebook, WeChat etc	No prohibition	
	Shopping at global B2B platforms	No prohibition	
INDIVIDUALS	Utilizing applications on the public internet such as Whatsapp, Facebook, WeChat etc	No prohibition	
	Shopping at global e-commerce platforms such as Amazon or Temu	No prohibition	
PUBLIC SECTOR	Using cloud services such as AWS, Azure	Public sector can use NTC or local ISPs	Public sector may not be able to use international cloud
	Using Gmail, Yahoo, or similar email services	Public sector is not allowed	
	Utilizing applications on the public internet such as Whatsapp, Facebook, WeChat etc	Government officials are not allowed for official communication	



ECONOMIC ASSESSMENT

This chapter examines the economic impact of increased broadband penetration for Pakistan and estimates the potential impacts of data localization on economic growth and job creation.



1 - Economic impact of broadband adoption

Direct benefits flow from the expanding global Internet value chain and growing ICT sectors (connectivity segment). In addition, accessible, reliable and affordable broadband internet is the foundation of the digital economy and digital inclusion. Improved broadband penetration is associated with substantial socioeconomic benefits, contributing to enhanced productivity, facilitating information exchange, and improving service delivery across the economy. Table 3 lists a range of studies that measure the macroeconomic effects of mobile broadband penetration that range from 0.8% to 1.5% of additional GDP growth for an increase of 10% in mobile broadband penetration, depending on a set of countries and the period.

Table 3: Impact of an increase in mobile broadband penetration on GDP growth

AUTHORS	COUNTRIES	ADDITIONAL GDP GROWTH IN % FOR 10% HIGHER BROADBAND PENETRATION
Czernich et al. 2009	OECD, 1996-2007	0.9-1.5
Koutroympis 2018	OECD, 2002-2016	0.82-1.4
OECD 2011	EU Countries. 1980-2009	1
Qiang et al. 2009	Low-income countries, 1980-2006	1.4
Scott 2012	Low-income countries, 1980-2011	1.35
Endquist et al. 2018	Global, 2000-2015	0.6-2.8
ITU 2020	Global	1.5

A 10% increase in mobile broadband penetration could lead to USD 5.6 billion in GDP. Higher broadband also continues to benefit a country going forward and has multiplier effects on other sectors of the economy (Table 4)

Table 4: Additional GDP for 10% increase in broadband penetration

	GDP USD BILLIONS	IMPACT OF 10% HIGHER BROADBAND PENETRATION	ADDITIONAL GDP USD BILLIONS
Pakistan	374.7	1.50%	5.6
India	3,416.7	1.50%	51.2
Bangladesh	460.2	1.50%	6.9
Sri Lanka	74.4	1.50%	1.1
Source	WDI 2024 (2022 Data)	ITU Study 2020	Calculated

2 - Economic impacts of data localization

This study draws on a framework highlighted in Cory et al. (2022) to assess the impact of the PDP Bill on the economy. Cory et al. (2022) find that restricting data flows reduces the volume of trade and affects the entire economy. Any cross-border data restrictions impose a cost and must be weighed against the benefits. The effect sizes of the study by Cory et al (2022) will be used to measure the potential impact of Pakistan's data localization bill, i.e., the cost.

Cory et al (2022) construct a Data Restrictiveness Index (DRI) covering non-OECD Asian countries, including Pakistan, to measure the annual impact of data restrictiveness on labour productivity. This study constructs the DRI for Pakistan for 2024 and simulates the impact of the bill.

Table 5: DRI for Pakistan based on Cory et al (2022)

INDICATOR	2024	2024 + PDP BILL	JUSTIFICATION FOR CHANGE OF ASSESSMENT
NATIONAL PERSONAL DATA	No	Yes	There are provisions regarding personal data in sectorial laws but there is no national law applicable across the board. The draft Personal Data Protection Bill requires Critical Data to stay in Pakistan. There is also a restriction of the transfer of sensitive data. (See Chapter VI, Page 30)
SUBNATIONAL PERSONAL DATA	No	Yes	In Section 2(KK) (page 10) of the draft Personal Data Protection Bill "caste or tribe" and "individual's ethnicity" are described as sensitive personal data.
FINANCIAL, TAX AND BANKING DATA	Yes	Yes	Payment Systems and Electronic Fund Transfers Act, 2007 obligates banks to maintain secrecy and privacy of consumers (See Section 70, Page 26).
PAYMENT DATA	Yes	Yes	The State Bank of Pakistan requires financial and banking data to be stored and processed locally. Government of Pakistan, Ministry of Commerce and Textile, E-commerce Policy Framework of Pakistan (Islamabad, August 2019) (See Section VIII, Page 26)
MAPPING DATA	No	No	Section 7 (page 12) of the National Database and Registration Authority Ordinance, 2000 in a way talks about mapping data. Though the draft Personal Data Protection Bill defines "processing" which includes organisation, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination etc but there is no restriction on data mapping.

INDICATOR	2024	2024 + PDP BILL	JUSTIFICATION FOR CHANGE OF ASSESSMENT
HEALTH AND GENOMIC DATA	Limited	Yes	- National Genomic Surveillance Strategy for Priority Diseases/Pathogens adopted in February 2023 encourages data sharing. - The draft Personal Data Protection Bill covers health related data as Sensitive Personal Data and imposes additional requirements on its processing (See Section 15, Page 18-19). - National Digital Health Framework of Pakistan 2022-2030 acknowledges the lack of data security and privacy in healthcare data (Page 26) - The Mental Health Ordinance 2001 provides for the confidentiality of the information of patients with mental health disorders and restricts publicising or disclosing their identity to the public by any means unless a person chooses to publicise their own condition. This law is addressed to mental health facilities providing care and treatment for mental health patients. (See Section 50, Page 29)
GOVERNMENT DATA AND SERVICES	Yes	Yes	In Section 2(g) (page 7) of the draft Personal Data Protection Bill public sector data is described as critical personal data. In Section 9.2 (page 10) of Pakistan Cloud First Policy mentions about accreditation of Government Data.
ICT AND TELECOMMUNICATIONS DATA	Yes	Yes	The Telecom Consumer Protection Regulations, 2009 confer on subscribers of telecoms operators the right to lodge complaints for any illegal practices with the Pakistan Telecommunication Authority, "illegal practices" being a broad term which includes, inter alia, illegal use of personal data of subscribers. - Rule 7 (5) (e) (page 10) of Removal and Blocking of Unlawful Online Content (Procedure, Oversight and Safeguards) Rules 2021, mentions data localization. - Regulation 8 (12) (Pages 7-8) of the Critical Telecom Data and Infrastructure Security Regulations, 2020 prohibits data storage outside Pakistan without PTA approval. Regulation 8 also talks about data protection. - Under Clause 6.7.3 (page 16) of the Next Generation Mobile Service License, customers data cannot be transferred outside Pakistan issued in 2014. - Similar clause 6.7.3 (page 12) of the Mobile Cellular License restricts transfer of user data outside Pakistan, issued in 2004.
LOCAL CLOUD (NON-GOVERNMENT)	Yes	Yes	Enterprise Technology Governance & Risk Management Framework for Financial Institutions does not allow foreign cloud for certain core services under clause 4.4.2 (page 29)
NONPERSONAL DATA FRAMEWORK	Yes	Yes	Section 3A of the Official Secrets Act 1923 makes it a crime to take pictures, make sketches/plan/model etc of prohibited areas. Communicating with foreign agents is also a crime under section 4. Section 17 (Page 11) of the Surveying and Mapping Act, 2014 talks about the classified data regarding surveys and maps.
OTHER	Yes	Yes	The Prevention of Electronic Crimes Act, 2016 also contains certain significant provisions about data protection.



The Data Restrictiveness Index (DRI) is a function of a country's number of data restrictions each year. Table 6 presents evaluations for the dimensions used by Cory et al (2022) for Pakistan in 2024 and for Pakistan in 2024 with the bill, assuming that the Personal Data Protection Bill is enacted. The legal/regulatory rationales for the changes can be found in Table 5. Table 6 computes the numerical results, indicating that enacting the bill would increase the DRI from 21 to 27.75 index points.

Table 6: DRI calculations for Pakistan's based on Cory et al (2022)

WEIGHTS OF POLICY DIRECTNESS		WEIGHTS FOR TYPES OF DATA RESTRICTED		EVALUATION		INDEX VALUE		CHANGE IN INDEX POINTS
				2024	WITH BILL	2024	2024 WITH BILL	
DIRECT	1	National Personal Data	1	0	6	0	6	6
		Subnational Personal Data	0.25	0	6	0	0.75	0.75
INDIRECT	0.5	Financial, Tax and Banking Data	1.25	6	6	3.75	3.75	0
		Payment Data	1.25	6	6	3.75	3.75	0

WEIGHTS OF POLICY DIRECTNESS		WEIGHTS FOR TYPES OF DATA RESTRICTED		EVALUATION		INDEX VALUE		CHANGE IN INDEX POINTS
				2024	WITH BILL	2024	2024 WITH BILL	
INDIRECT	0.5	Mapping Data	0.5	0	0	0	0	0
		Health and Genomic Data	0.75	6	6	2.25	2.25	0
		Government Data and Services	0.5	6	6	1.5	1.5	0
		ICT and Telecommunications Data	0.5	6	6	1.5	1.5	0
		Local Cloud (non-government)	1.25	6	6	3.75	3.75	0
		Non-personal Data Framework	1.25	6	6	3.75	3.75	0
		Other	0.25	6	6	0.75	0.75	0
DRI						21	27.75	6.75
CHANGE IN LABOUR PRODUCTIVITY							-4.725%	

Cory et al (2022) estimate that a one-unit increase in DRI is associated with an approximately 0.7% decrease in labor productivity for the following year. They note that the 0.7% decrease in labor productivity is consistent with the findings of Cory and Dascoli (2021), that a one-unit increase in DRI is associated with a 2.9% decrease in Total Factor Productivity (TFP), which is a component of labour productivity.

Applied to Pakistan, this means that labour productivity would decline by 4.7% in 2025 if this bill is enacted in 2024. Labour productivity is closely linked to economic growth and is measured by dividing the Gross Domestic Product (GDP) by the number of employed persons or hours worked (International Labour Organization, n.d.).

1. GDP per worker = GDP at constant prices / Number of employed persons

2. GDP per worker * Number of employed persons = GDP at constant prices

GDP is derived from a country's national accounts and the employment and working hours are typically derived from labour force surveys. Labour productivity is calculated in line with national account classifications.

Table 7: Labour Productivity in Pakistan

	2019	2021	SOURCE
GDP (CURRENT BILLION USD)	320.9	348.5	WDI World Bank
EMPLOYMENT IN MILLION	64.03	67.25	LFS 2020 / 2021 Pakistan Bureau of Statistics
LABOUR PRODUCTIVITY USD CURRENT	5,012	5,82	Calculated
CHANGE IN LABOUR PRODUCTIVITY DUE TO BILL	-4.7%	-4.7%	
FOREIGN LABOUR PRODUCTIVITY IN USD PER WORKER	-237	-245	
FOREIGN GDP IN USD BILLION	-15.2	-16.5	
JOBS PER USD MILLION GDP	199.5	193.0	
ESTIMATED JOB LOSS IN MILLION	-3.03	-3.18	

The reduction in labour productivity can directly be translated into a loss of GDP and jobs. A 4.7% reduction in labour productivity applied to Pakistan's GDP in 2021² would mean a loss of USD billion 16.5 in the following year. Based on the ratio of jobs per USD one million GDP, this translates into a potential loss of 3.2 million jobs.

² Employment figures are only available for 2020/2021 from Pakistan's Bureau of Statistics.

Table 8: Economic impact of fine tuning of Pakistan's DRI to similar levels of selected economies

	SWEDEN	INDONESIA	SOUTH KOREA	GERMANY	INDIA
DRI FOR 2020 FROM CORY (2022)	6.1	6.4	6.63	8	13.25
CHANGE IN DRI INDEX POINTS FOR PAKISTAN	-14.9	-14.6	-14.4	-13.0	-7.8
CHANGE IN LABOUR PRODUCTIVITY	10.4%	10.2%	10.1%	9.1%	5.4%
CHANGE IN LABOUR PRODUCTIVITY: USD PER WORKER	541	530	521	472	281
CHANGE IN GDP USD BILLION	36.4	35.6	35.1	31.7	18.9
CHANGE IN JOB IN MILLION	7.02	6.87	6.77	6.12	3.65

Table 8 draws on DRIs calculated for select countries in Cory (2020), which though not reflective of their current regulatory environments, provides a comparison point for the status quo in Pakistan. It shows that the India's DRI was 13.25 in 2020, when its more stringent regulatory environment was in place (see introduction). This is lesser than the DRIs of both the current regulatory environment in Pakistan, as well as that if the PDP Bill was enacted. Moving towards less restrictive regimes has positive impacts on labor productivity, GDP, and employment.

The fourth industrial revolution is driven by the digital transformation of our economies and societies, resulting in global integration of value chains, economic growth and job creation. Consumer benefits from new services, increased quality of life and lower prices need to be balanced with consumer protection. Data protection and data localization are two different measures with different economic and consumer protection outcomes. This section demonstrated the costs and the benefits of changes in data restrictiveness in terms of movement across borders, estimating the impacts of data localization laws. Passing the PDP bill threatens to lower labour productivity and cause significant economic costs.

An important next step for Pakistan is to review its data protection governance framework across sectors and services with specific focus on economic growth, job creation and its vision for digital transformation. Handicapping Pakistan-based firms by imposing additional costs will result in them being unable to compete in the global market and for investment. Other countries with more sensible policies will have an advantage over Pakistani firms. Increasing the costs of state organizations and reducing their options in terms of security is unlikely to serve the public interest in robust and effective government services.

A man with dark hair and glasses is looking down at a laptop. The background is a blurred city street at night with warm, bokeh lights. The image has a blue and orange color palette.

SECTOR LEVEL IMPACTS

Section 3 shows the high-level impacts on the economy, through economic analysis. This section provides greater insight on the mechanisms through which economic impacts would occur.

Across the board, data localization impacted firms through similar means – for example, high costs for firms and cybersecurity threats. This section delves into the impacts on four sectors that underpin Pakistan's economy for varied reasons – information technology (IT) and information technology enabled services (ITeS), e-commerce, healthcare, and freelancing.

The industries differ in terms of their contribution to GDP, employment, reach, and impact on the lives of the citizens of Pakistan (Table 9). In some sectors such as healthcare, widely considered a merit good, the impact should be viewed beyond its contribution to the GDP. In exports services such as software and online freelancing, the customers may be located outside the country. They may also differ in how crucial data is to its operations. For example, Cory & Dascoli (2021) estimated that data intensity (as measured by log non-capitalized software expenditure per worker) in the United States in 2013 was greatest in ICT and business services industries. Health, and trade and distribution services, on the other hand, scored lower in data intensity.

Table 9: Focal sector – key metrics

SECTOR	CONTRIBUTION TOWARDS GDP (% OF GDP)	EMPLOYMENT	CUSTOMERS
IT and ITeS	4.8%	300,000	n/a
E-commerce	n/a	3,003 (Number of merchants)	n/a
Health	n/a	483,526	236m
Freelancing	n/a	3m	n/a

Sources: Board of Investment Pakistan (n.d.) Salik (2022), Healthcare, Sector study. (2023), World Bank (n.d.), Raza (2024)

1 - IT and ITeS

Pakistan's USD 3.2 billion IT and ITeS industry is a significant contributor to its economy, contributing 4.8% of the country's GDP (Pakistan Software Houses Association (Pasha), n.d.). In addition to its contributions to the GDP, it is also among the top 5 net exporters, earning USD 2.1 billion in export revenue -- the highest net exports in the services industries. The sector consists primarily of software development and IT-enabled services (ITeS) for data centers, technical service/call centers, and telecom services (International Trade Administration, 2024).

Many key strategy and policy documents developed over the past three decades underscore the centrality of the industry to Pakistan's economy. Pakistan's IT Policy and Action Plan 2000 laid the foundation for the development of Pakistan's IT industry and played a crucial role in positioning the country as a leading destination for IT out-sourcing and software development services. More recently, the Pakistan Vision 2025 recognized the importance of digitalization and software exports as key drivers of economic growth, innovation, and global competitiveness. **Pakistan ranked 31st in A.T. Kearney's Global Services Location Index (GSLI) in 2021 among 60 countries on the A.T. Kearney's Global Services Location Index (GSLI) in 2021, however (Figure 2).** It was on par with peers such as Bangladesh, ranked in the bottom 20% of below 60 countries in such as Singapore, Malaysia, China, South Korea and India. Pakistan's legal adaptability, as per the index, was on par with peers such as Bangladesh, with the two countries. However, it scored below Asian frontrunners on this sub-component such as Singapore, Malaysia, China, South Korea and India.

Figure 2: Kearney - GSLI for South Asian Countries

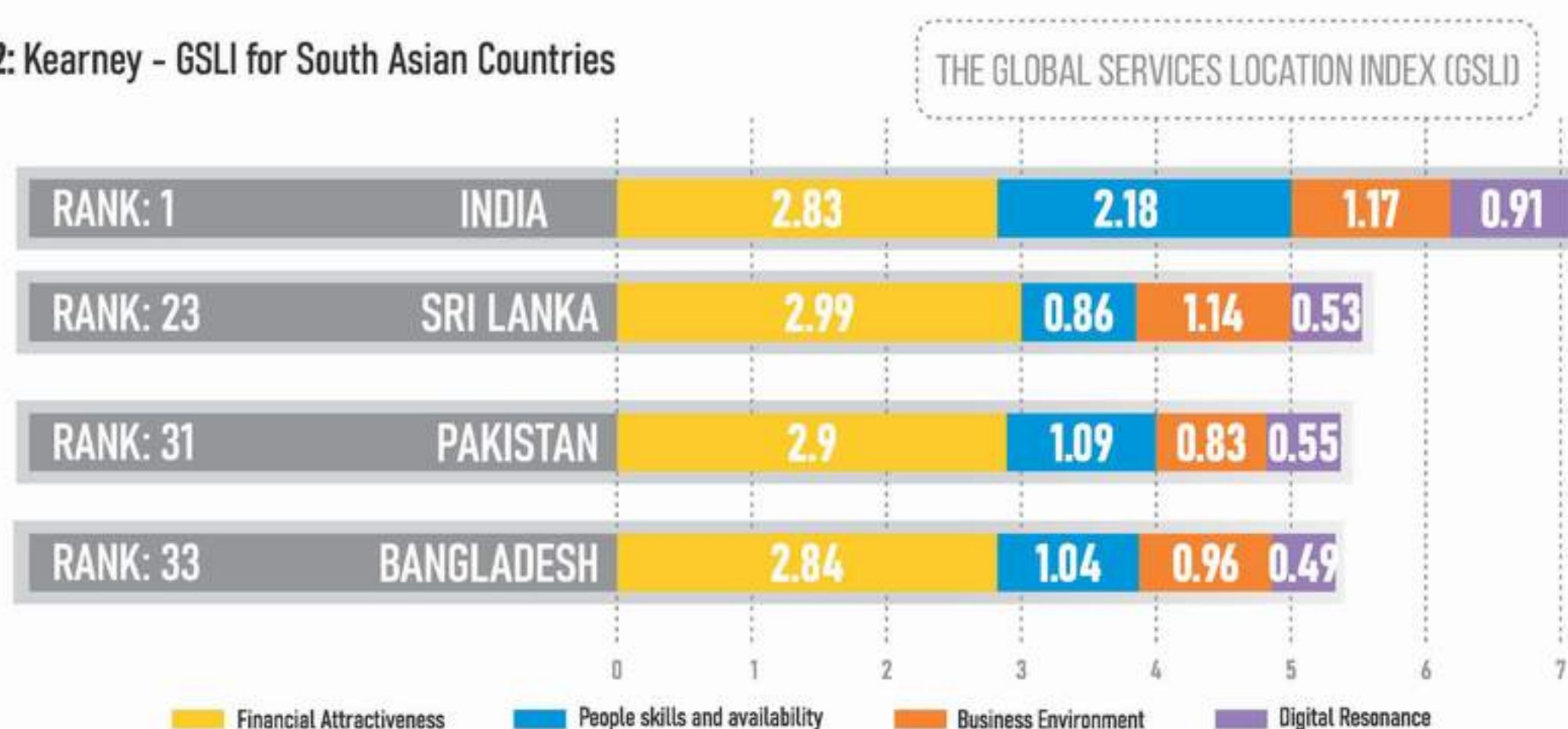
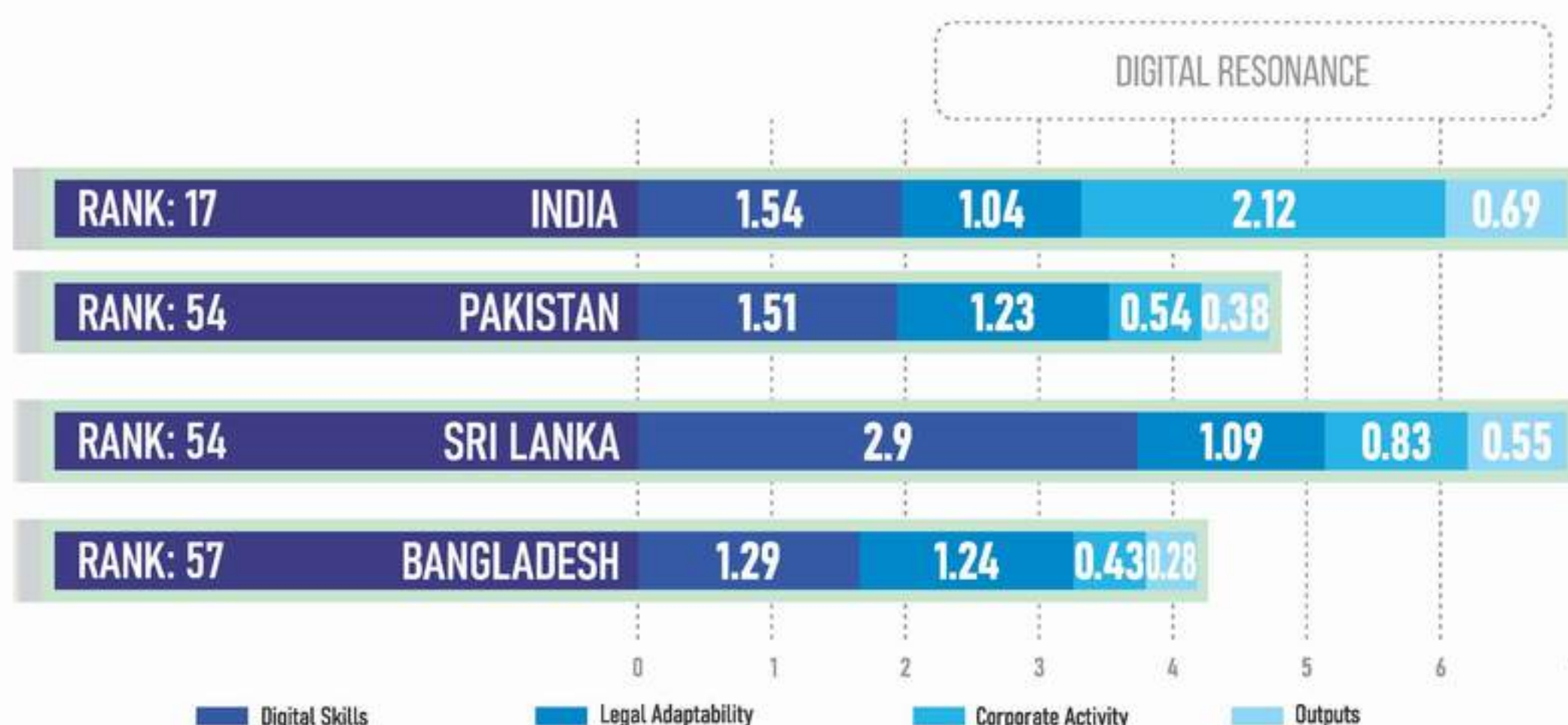


Figure 3: Digital resonance for South Asian countries - GSLI subindex



IT and ITeS is not subject to sector specific data localization measures, but general applicability laws may apply. For example, if the PDP Bill is enacted, an IT company engaging with sensitive personal data will have to comply with the law (this will be further elaborated in the healthcare case study). In addition, other sectoral laws, such as banking and telecom laws may also be applicable, based on the type of work the IT company engages in.

“There is a 70% cost difference between local and international hosting. International hosting is cheaper”, an IT company based in Pakistan that services local and international entities in both the private and sectors estimated. International hosting being more economical has been a trend seen over the years. Economies of scale in service provision is one of the probable drivers of such a differential. Even over a decade ago, Reichman (2011) estimated that cloud storage could be up to 74% less expensive than in-house storage solutions. However, the specific cost benefits will differ from firm to firm. The benefits to a large e-commerce firm were notably larger, as highlighted later in another case study.



“Local cloud only provides server and storage with some basic services, while international providers provide multiple services”. The IT company also stated that they obtained significantly more services if they used the services of international providers on a subscription basis, including Software as a Service (SaaS), Data as a Service (DaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). Recent reports have emerged about international cloud providers establishing local data centers in new markets. For example, Amazon Web Services announced plans for seven new 'regions' including but not limited to Malaysia, Thailand and Saudi Arabia (Amazon, 2024). AWS reports that these regions are “fully isolated and comprised of multiple availability zones, which are fully isolated partitions of infrastructure”.

In the event that Pakistan were included in such a programme in the future, and if the cloud service providers were to provide local firms the option to host only within the region, this may provide an opportunity for local firms to access more services at a lower price point, even if data localization measures were in place. The IT company was of the view that even if international cloud players came to Pakistan – a positive step for the country -- **issues of mirroring and disaster recovery may remain if a data localization requirement was in place.** “In case of a disaster, if one data center is down, the back-up center elsewhere should be available in real time, otherwise resulting in a total outage for customers” the IT firm stated. However, this may be less of a concern if multiple zones are available within a region. Noteworthy, however, that is possible that cloud service providers could continue to host some data outside the region, even if they choose to set up data centers locally, which will not be compatible with data localization measures.

Competence required for running data centers is currently missing in Pakistan. Establishing and operating data centers requires significant levels of competence for various tasks such as ensuring security and handling demand surges. Even in Europe, “42 percent of data center operators believe there is not enough skilled labour to deliver increased capacity requirements” (Datacenter Dynamics, 2021). Adequate skill levels are seemingly absent in Pakistan. This is in part reflected in Pakistan's low performance on the skills indicator of the GSLI's digital resonance subindex (Figure 3). The IT company indicated that “building such competence in Pakistan will take a minimum of 8 to 10 years to develop with a lot of investments”, while also highlighting that they were facing a skills gap for the existing needs of the industry.

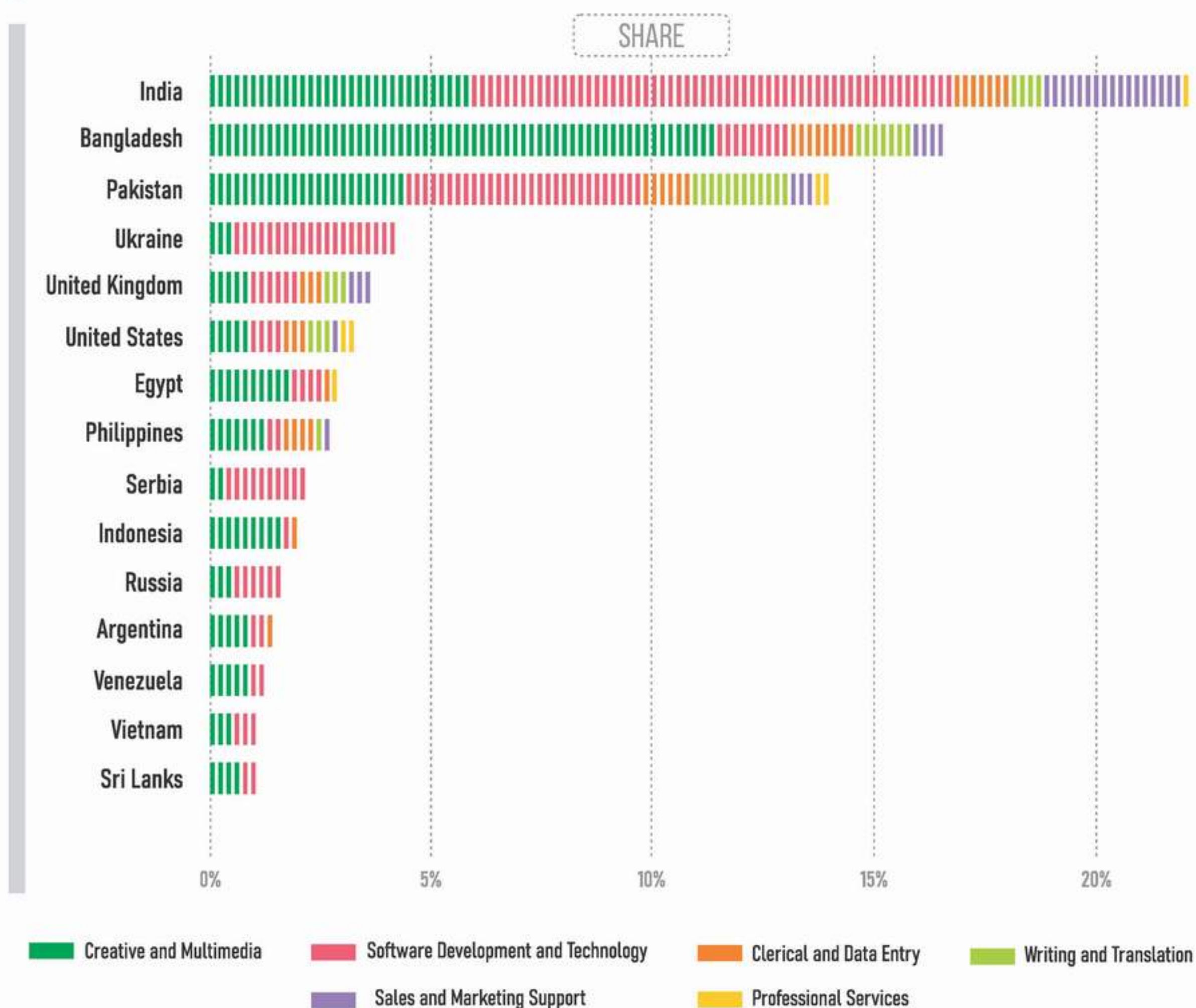
The lack of competitiveness in cost and choice in cloud infrastructure, as well as skill gaps to maintain such infrastructure are **expected to impact the strategic positioning of IT and ITeS sector in Pakistan**, as it aims to move its way up sectoral rankings. This can play a key role in facilitating investments into the sector, crucially, foreign investments which are in competition with regional peers with less stringent regimes.

2 - Online freelance

Online freelancing has become a viable employment option in recent years, with an uptick in workers. Online freelancing is where a specialized service is produced and delivered through online means (Bandaranayake et al,2020); thereby, services are digitally enabled and therefore can be considered a subset of ITeS services referred above. Kassi et al (2024) estimate that “163 million freelancer profiles registered on online labour platforms globally. Approximately 14 million of them have obtained work through the platform at least once, and 3.3 million have completed at least 10 projects or earned at least USD 1000.”

The Pakistan Freelancers Association (PAFLA), estimates that the country is home to more than 1 million freelancers in Pakistan, providing over USD 500 million worth of services annually (Pakistan Freelancers Association,2024). Online freelancers in Pakistan primarily provide services on software development and technology, followed by creative and multimedia fields.

Figure 4: Types of services provided by online freelancers (Ignite-National Technology Fund, n.d.)





Though not mentioned in policy documents, data localization could impact online freelancers. The more high-level topic, data protection, was mentioned in 2021 version of the MoITT led draft National Freelancing Facilitation Policy. Although the 2021 version of the same policy had reference to data protection, this was removed in the 2023 version. Although the link between online freelancers and data localization may seem relatively far removed, freelancers may have to comply with any general applicability or sectoral documents that are relevant to them.

“Online freelancers in Pakistan not only store their data but also manage stored data for the company they are providing services for”, stated a representative of the Pakistan Freelancer Association (PAFLA), a not-for-profit body working for the betterment of the freelancing sector in Pakistan. He was of the view that Pakistani cloud services are primarily utilized by Pakistani enterprises and those enterprises rarely hire or work with freelancers -- usually, freelancers work with SMEs in Pakistan, but even those SMEs also primarily utilize cloud services outside the country. Data are stored at different locations with a variety of cloud hosting providers such as AWS, Azure or Google Cloud and web hosting providers like Bluehost, Site ground or GoDaddy. He stated “some freelancers, like those who are working in the banking sector, are obliged to work with local hosting providers as mandated by the State Bank of Pakistan”.

Lack of awareness of on concepts and implications of data localization among online freelancers. The PAFLA representative was of the view that freelancers are not aware of any restrictions on transporting data outside Pakistan. He mentioned that freelancers in Pakistan are scattered all over the country and mostly based in isolated locations or small villages and often do not have access to anyone who can navigate them through strict legal requirements. Since the freelancers provide services on the internet, therefore there will always be exchange of data. He feared, if under any circumstance, such exchange of data is hampered or made difficult to flow, it is going to be very difficult for freelancers to offer their services online. He was not aware of any compliance teams existing in any state institution or in local private sector firms to provide advice on privacy or data protection laws for freelancers. However, freelancers working for international companies interact with their compliance teams and they are provided compliance checklists on data privacy and internal policies.

Elaborating on the impact of the draft PDP bill, the PAFLA representative stated that **freelancing marketplaces would not be able to comply with the law for some reason they will move away from Pakistan**”, and thereby estimated that a large portion of the freelancing sector would be wiped out in a short period. He indicated that the remaining freelancers would also be impacted if they are unable to sign NDAs and use VPNs, required by the international client companies to access their systems securely. Although the specific impacts of specific freelancers may differ according to the types of work they're undertaking, data localization measures could **disproportionately impact groups such as online freelancers, due to the flexible nature of work**. Unless country specific knowledge is being leveraged upon, business may move away from Pakistan towards one with more streamlined processes.

3 - E-commerce

E-commerce is a growing industry worldwide, including in Pakistan. Retail e-commerce sales worldwide amounted to USD 4,938 billion in 2021 and is expected to grow by 10% from 2022 to 2025 (Tech Destination Pakistan, n.d.). A mere 0.2% of Pakistan's population had used goods/product platforms in 2017, though this number has likely grown (Galpaya et al, 2023), given the strategic focus of the e-commerce policy, as well as heightened need during the COVID-19 pandemic. The State Bank of Pakistan reported the presence of 3,003 registered e-commerce merchants in Pakistan in 2020-21, a 76% increase from 1,707 in 2019-20. In 2021, e-commerce sales in Pakistan were worth USD 5.9 billion.

Popular e-commerce and shopping websites include Daraz, OLX, PakWheels and Zameen.com (Tashheer, 2022). Even though cash on delivery remains the predominant payment method in e-commerce transactions, card-based transactions have grown substantially. According to the State Bank of Pakistan, banks processed 13.6 million (78% growth YoY) e-commerce transactions worth PKR 26.7 billion (143% growth YoY) from October-December 2021. The popular e-commerce and shopping websites include Daraz, OLX, PakWheels and Zameen.com.

Presently, there are no laws affecting the e-commerce sector covering data localization.

However, the e-Commerce Policy of Pakistan launched in 2019 indicates that "All e-Commerce platforms will make full disclosure on their websites/applications regarding data protection provisions. Such disclosure will also include disclosure about the country/legal jurisdiction where such data will be stored and the purpose for which it may be used.

These provisions will be implemented in line with Data Protection Act and Pakistan Cloud Policy" (p52). In addition, one of the largest e-commerce operators in Pakistan noted that it looks to several laws and regulations to understand requirements relevant to data storage and processing including requirements from the State Bank of Pakistan's for financial institutions and the Securities and Exchange Commission of Pakistan (SECP)'s guidance on how data should be stored.



“The PDP Bill will have a significant impact on payments and financial transactions data handled by ecommerce companies as they are classified as ‘sensitive personal data’ in the draft legislation”, the e-commerce provider stated. The specific impact on payments may vary, however, depending on the types of data shared during a transaction. Nevertheless, the e-commerce operator suggested that very strict laws and data localization requirements will not be business and investment friendly. Many eCommerce companies are leveraging cloud-based solutions; if companies are not able to use these given data localization requirements, costs to companies will be significant. The operator mentioned that an eCommerce player in the South Asia region was considering a license for financial services.

It estimated, following an extensive study, that **a fully locally compliant solution would cost approximately USD 2.5 million a year, over 10 times that of its current cloud-based solution costing USD 20,000 a month or 240,000 a year.** Table 10, based on publicly available information, highlights that local data storage solutions cost at least 5 times and up to 14 times more than international solutions for storing the same 500TB of data.

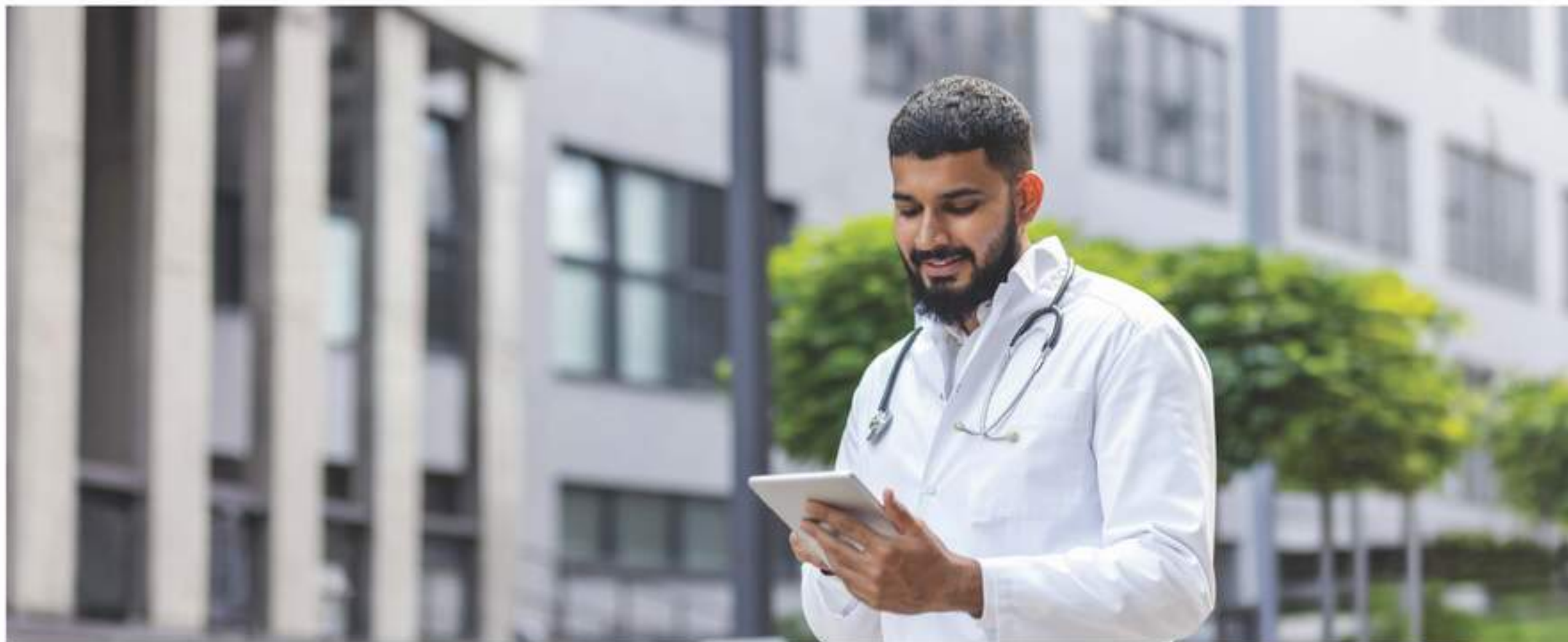
Table 10: Cost comparison - local vs international facilities

	STORAGE FACILITY	ANNUAL COST - 500 TB (USD)
INTERNATIONAL	AWS	132,000
	Microsoft Azure	103,000
	Google Cloud	156,000
LOCAL	Virtury Cloud	1,542, 857
	Linux	840,000

Calculated by authors based on, Amazon Web Services, Inc. (n.d.), Microsoft (n.d.), Google (n.d.), Virtury (n.d.), Ylinux (n.d.).

Centralizing functions allow global and regional players to leverage the synergies of talent in multiple countries. Though not specific to the industry, the e-commerce operator raised that breaking its centralized structure and creating silo approaches in each country, will make it hard to operate efficiently. This links to the concerns raised by other firms about skills gaps, despite potential job creation opportunities. While stricter data protection law and data localization requirements, may lead to more jobs being created for locals in compliance and data security departments, questions remain about technical expertise being readily available to meet demand.

“Storing data in a single location or a single honeypot does away with the security associated with a more disaggregated architecture”, the e-commerce retailer highlighted. In a similar vein to the issues of disaster recovery raised by the IT company, the broader issue of cybersecurity if moving to a more localized solution was mentioned by the e-commerce retailer.



4 - Healthcare

Pakistan's population of 236 million individuals are covered through a “mixed health system”, with services provided by a variety of stakeholders. Health service providers include “public, parastatal, private, civil society, philanthropic contributors, and donor agencies” (Kumar, 2017). Notably, 70% of its population obtains some form of healthcare from the private sector (Pakistan's hospital sector profile, 2020).

While there is some digitalization of patient records at a hospital level, a centralized health record database does not exist. Digitalization of patient records is a precursor to data management and storage. However, progress on digitalization is unequal. The Digital Pakistan Policy highlights an opportunity for “existing hospitals to develop a network across the country to facilitate nationwide integration of health-related records and data through central health database/s, adhering to a clear and consistent mechanism for patient data security to be ensured with appropriate instruments” (page 14).

The “National Digital Health Framework 2022-2030” developed by Ministry of National Health Services, Regulations, and Coordination in consultation with the provincial governments identifies national priorities, need for digitalisation, guiding principles for digital health and has a strategic action plan.

No enforced laws nor policies require data localization of health records, although addressed in the PDP Bill. At present, the health sector is governed by a plethora of laws³. While some sectoral laws such as the Pakistan Medical and Dental Council Act, 2022 and the Mental Health Ordinance, 2001 underscore the need for privacy and confidentiality, the existing legal environment does not require data localization for health records.

³ The Mental Health Ordinance, 2001, Pakistan Medical and Dental Council Act, 2022 Medical Tribunal Act, 2020 (XXXIV of 2020), Professional Ethics and Code of Conduct, The Pakistan Medical and Dental Council (Postgraduate Education) Regulations, 2023 and Medical and Dental Undergraduate Education (Admissions, Curriculum and Conduct) Policy and Regulations 2023

The draft PDP Bill covers health related data as Sensitive Personal Data and imposes additional requirements on its processing. Personal data retained by the public service provider, including public hospitals, will be classified as critical personal data, requiring data localization.

Segregating data challenging during transactions between customers of private and public sector service providers. In the presence of a mixed healthcare system, citizens tend to use both public and private sector services. This should require digital health records to be shared between different types of entities. Camden Health Systems (CHS), a US-based company operating in Pakistan, which develops hospital health information management systems, highlighted that the difference compliance processes for public and private health data result in compliance challenges. Segregating data, a precondition to differential treatment, is challenging too.

High compliance costs disproportionately impacting small and medium scale hospitals. Under the current conditions, CHS echoed the high costs of hosting locally, indicating it would require more employees, and greater expenditure on its cybersecurity. This accounts for a larger portion of costs for smaller entities.

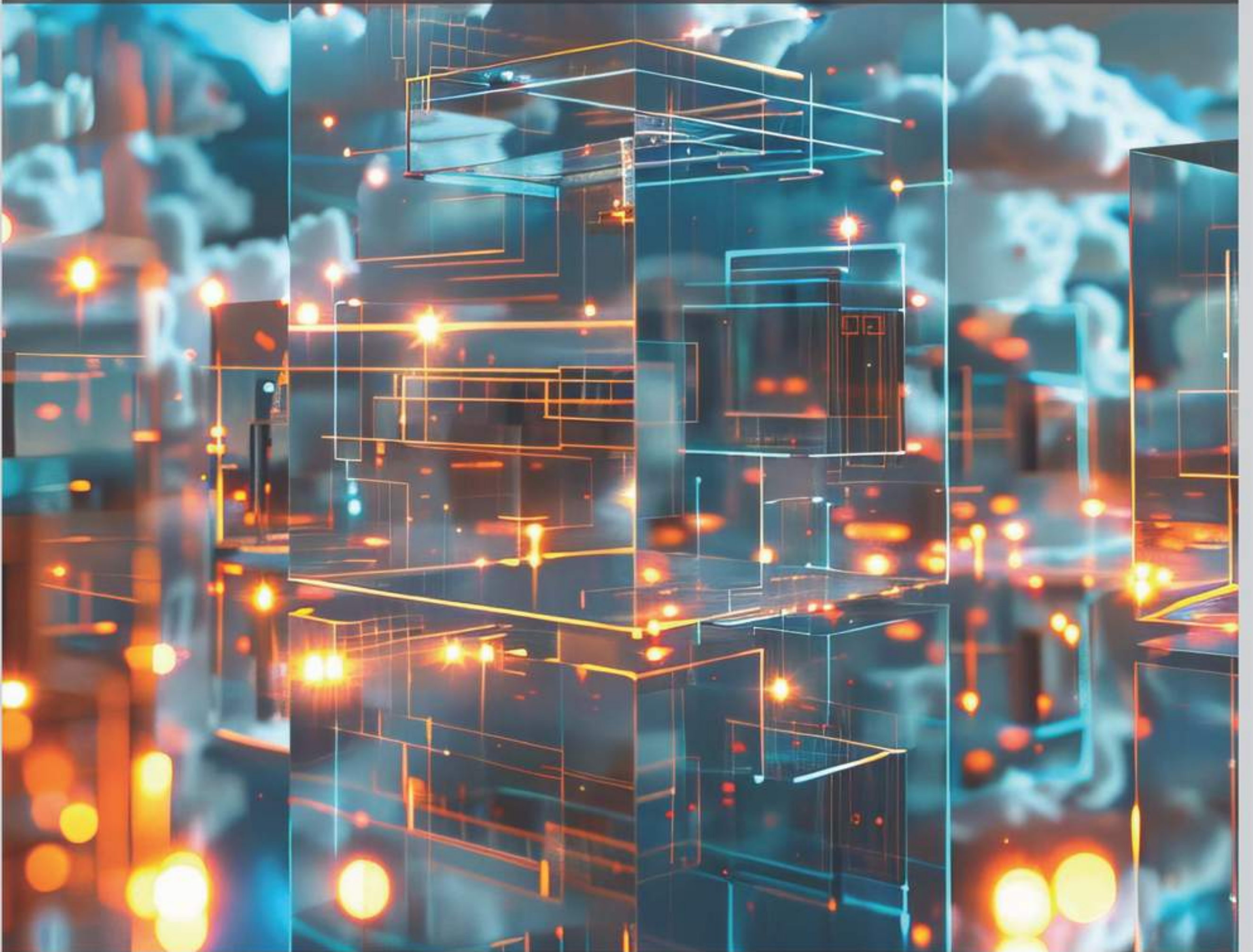
CHS also noted that the implications would differ depending on whether data needed to be stored within the country, or within the premises of an organization; the costs of data localization within the premises would be significantly higher. For example, CHS currently employs 8 engineers, who are managing around 100 clients. They noted, **if the same application was deployed on any local data center in any hospital or any organization, the same number of engineers would be required for each in-house data center.**

Further, additional costs like setting up the data center and cybersecurity would make domestic in-house data hosting more expensive in comparison to storing data on an international cloud.

Governing digital health records provides an additional layer of complexity, because of the sensitivity of data. Additional effort should be in place to ensure its privacy and security. However, **heterogeneous localization treatment of public and private sector can lead to compliance challenges.**



CONCLUSION



The current policy and regulatory landscape in Pakistan require some data localization. However, there is room in the policy landscape for such measures to be further tightened. For example, the introduction of the current draft of the Personal Data Protection Bill would lead to a significant shift in the regulatory landscape relevant to data localization. The Commission, to be constituted under the Personal Data Protection Bill, has wider powers and can refuse to allow transfer of personal data on the grounds of vague terms like “public interest” or “national security of Pakistan” (See Section 32 (1)(b)). The report highlights that data localization could also have repercussions for businesses, and consequently, on the economy. The additional requirements for, and the distinction made between, sensitive and critical data is a key focal point. Differentiated compliance processes for private sector and public sector was raised as a challenge by multiple firms. This challenge is likely to be compounded when data is to be shared between public and private organizations.

Concerns have also been raised about implications on cybersecurity if data localization is required. For example, international cloud providers provide a variety of services, which may not be the case for local providers not benefiting from economies of scale. Further, points were raised that use of distributed systems can increase resilience, making databases less susceptible to cybersecurity threats and outages.

Data localization measures can have cost implications for firms, as highlighted in the case studies. This could include an increase in labour costs, given the need to hire human resources. This narrative, which suggests that data localization would lead to job creation may seem contradictory to the economic analysis, which suggests that jobs will be lost. This may, in part, be due to the economic analysis taking a longer-term view. One could assert that this is due to some players having to cease operations if costs become unsustainable. The skills gaps, and the time needed to bridge the skills gap, may also contribute. In part, it may be due to a model's inability to capture all the nuances of the legal and regulatory environment, and firm behaviour.

Changes in the wider policy environment and market may change implications for firms. For example, many of the claims on the cost implications are made based on the current options for data storage in the local market; however, if an international cloud service provider were to set up data centers in Pakistan, the costs to firms may fall. However, certain concerns about data security and availability in the absence of distributed systems may remain.

Despite these common challenges, sectoral impacts will differ. The strategic positioning of the IT/ITES sectors can be impacted by these laws, which in turn can influence investment and growth. In contrast, any impact on health provision – a merit good – can have knock on effects on the quality of life of Pakistan's citizens.

As with many other areas, **the extent of the impacts of localization requirements would differ according to the government's approach to enforcement.** A more light touch approach to enforcement will yield less stark impacts on an economy than a more heavy handed one. However, in principle, the merits of data localization do not seem to outweigh the potential risks, as illustrated by its regional peers' move away from such measures.



REFERENCES

- Amazon Web Services, Inc. (n.d.). Amazon S3 pricing. Amazon. Retrieved July 11, 2024, from <https://aws.amazon.com/s3/pricing/>
- AWS Global Infrastructure. (date accessed: 18 June 2024). Amazon. <https://aws.amazon.com/about-aws/global-infrastructure/>
- Bandaranayake, A., Iqbal, T., Galpaya, H., Senanayake, L., Perampalam, S. (2020). "Now we are independent": Female online freelancers in India and Sri Lanka. LIRNEasia. <https://lirneasia.net/wp-content/uploads/2020/07/LIRNEasia-Female-Online-Freelancers-in-India-and-Sri-Lanka.pdf>
- Board of Investment Pakistan (n.d.) Sector Profile Tech (IT and IT enabled Services). <https://invest.gov.pk/sites/default/files/inline-files/IT.pdf>
- Broadband Policy Pakistan. (2004). (Pakistan). <https://moitt.gov.pk/SitelImage/Misc/files/BroadbandPolicy2004.pdf>
- Cloud First Policy Pakistan. (2022). (Pakistan). <https://moitt.gov.pk/SitelImage/Misc/files/Pakistan%20Cloud%20First%20Policy-Final-25-02-2022.pdf>
- Contact details of community welfare attaches posted at Pakistan missions abroad. Ministry of over-seas Pakistani and human resource development. <https://ophrd.gov.pk/Detail/M2MwYjVkJYtZGQ2My00NjRRLTg4YmYtMzAyNjRhMG12NjQ5>
- Cory, N., Dascoli, L. and Clay, I. (2022). The Cost of Data Localization Policies in Bangladesh, Hong Kong, Indonesia, Pakistan, and Vietnam, ITIF.
- Cory, N. and Dascoli, L. (2021). "How Barriers to Cross-Border Data Flows Are Spreading Globally, What They Cost, and How to Address Them" (ITIF, July 19, 2021), <https://itif.org/publications/2021/07/19/how-barriers-cross-border-data-flows-are-spreading-globally-what-they-cost/>.
- Cyber Security Strategy for Telecom Sector 2023-2028. (Pakistan). https://pta.gov.pk/assets/media/cyber_security_strategy_telecom_sector_2023_2028_11-12-2023.pdf
- Czernich N., Falck, O, Kretschmer, T. and Woessmann L., (2009). "Broadband Infrastructure and Economic Growth," CESifo Working Paper Series 2861, CESifo, https://ideas.repec.org/p/ces/ceswps/_2861.html.
- Datacenter Dynamics, ABB. (2021). Construction trends in the Asia Pacific. Datacenter Dynamics. <https://www.datacenterdynamics.com/en/research/construction-trends-in-the-asia-pacific/>
- Data retention of internet extended to public WiFi-Hotspots regulations. (2018). (Pakistan). https://www.pta.gov.pk/assets/media/data_retention_wifi_hotspots_2018_181218.pdf
- De-Regulation Policy for the Telecommunication Sector. (2003). (Pakistan). <https://ipop.org.pk/wp-content/uploads/2019/08/Telecom-Deregulation-Policy-2003.pdf>
- Digital Pakistan Policy. (Pakistan). <https://moitt.gov.pk/SitelImage/Misc/files/DIGITAL%20PAKISTAN%20POLICY.pdf>
- Digital Personal Data Protection Act, 2023. (2023). (India) <https://www.meity.gov.in/writereaddata/files/Digital%20Personal%20Data%20Protection%20Act%202023.pdf>
- Draft National Artificial Intelligence Policy. (2022). (Pakistan). <https://moitt.gov.pk/SitelImage/Misc/files/National%20AI%20Policy%20Consultation%20Draft%20V1.pdf>
- Draft of Personal Data Protection Bill. (2023). (Pakistan). <https://moitt.gov.pk/SitelImage/Misc/files/Final%20Draft%20Personal%20Data%20Protection%20Bill%20May%202023.pdf>
- E-commerce. <https://app.techdestination.com/public/assets/assets/pdf/11.pdf>
- E-commerce policy of Pakistan. (2019). (Pakistan). https://www.commerce.gov.pk/wp-content/uploads/2019/11/e-Commerce_Policy_of_Pakistan_Web.pdf
- Edquist, H., Goodridge, P., Haskel, Li, X., and Lindquist, E. (2018). "How Important Are Mobile Broad-band Networks for the Global Economic Development." Information Economics and Policy, Volume 45, December 2018, Pages 16-29, <https://www.sciencedirect.com/science/article/pii/S0167624517301695>.
- Email and Internet Policy for the Federal Government. (Pakistan). <https://pkcert.gov.pk/wp-content/uploads/2023/06/internet-and-emails-policy.pdf>
- Enterprise Technology Governance & Risk Management Framework for Financial Institutions. (2017). Banking Policy & Regulations Department. <https://www.sbp.org.pk/bprd/2017/C5-Annex.pdf>
- European Union. (2003). Commission Decision of 27 June 2003 on the harmonisation of the 24 GHz range radio spectrum band for the time-limited use by automotive short-range radar equipment in the Community (2003/490/EC). EUR-Lex. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32003D0490>
- European Union. (2012). Decision No 484/2012/EU of the European Parliament and of the Council of 14 March 2012 on the reuse of public sector information. EUR-Lex. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012D0484>
- European Union. (2021). Council Decision (EU) 2021/1772 of 5 October 2021 on the position to be taken on behalf of the European Union in the International Civil Aviation Organization Council. EUR-Lex. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021D1772>
- European Union. (2021). Council Decision (EU) 2021/1773 of 6 October 2021 on the position to be taken on behalf of the European Union in the International Civil Aviation Organization Council. EUR-Lex.

- <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021D1773>
- Galpaya, H., Hurulle, G., Amarasinghe, T. & Bamaramannage, S. (2023, April). Digital platforms in Asia: Access and Use. (LIRNEasia Working Paper 2023/01) https://lirneasia.net/wp-content/uploads/2023/03/Digital-Platforms-Asia-LIRNEasia-WP2023_01-6Apr2023.pdf
 - Google. (n.d.). Cloud Storage pricing. Google. Retrieved July 11, 2024, from <https://cloud.google.com/storage/pricing#multi-regions>
 - Govt launches WhatsApp's alternative called 'Beep Pakistan'. (2023, August 7). Business Recorder. <https://www.brecorder.com/news/40256645>
 - GSMA (2020). The internet value chain 2022, <https://www.gsma.com/solutions-and-impact/connectivity-for-good/public-policy/wp-content/uploads/2022/05/Internet-Value-Chain-2022-1.pdf>
 - Healthcare, Sector study. (2023, December). The Pakistan credit rating agency limited. https://www.pacra.com/view/storage/app/PACRA%20Research%20-%20Healthcare%20-%20Dec%2723_1702988929.pdf
 - Individuals using the Internet (% of population) – Pakistan. World Bank. <https://data.worldbank.org/indicator/IT.NET.USER.ZS>
 - Industry overview. Pasha, Pakistan IT Industry Association. <https://www.pasha.org.pk/industry-overview/>
 - IT Policy and Action Plan. (2000). (Pakistan). <https://lgkp.gov.pk/wp-content/uploads/2014/03/National-IT-Policy.pdf>
 - ITU (2020). How broadband, digitisation and ICT Regulation impact the global economy, https://www.itu.int/en/ITU-D/Conferences/GSR/2020/Documents/ITU_Global_Econometric_Modeling_GSR-DiscussionPaper.pdf
 - Kässi, O., Lehdonvirta, V., Stephany, F. (2021). How many online workers are there in the world? A data-driven assessment. https://www.researchgate.net/publication/355345216_How_many_online_workers_are_there_in_the_world_A_data-driven_assessment
 - Koutroumpis, P. (2018). The economic impact of broadband: evidence from OECD countries, April 2018, https://www.ofcom.org.uk/_data/assets/pdf_file/0025/113299/economic-broadband-oecd-countries.pdf
 - Kumar, S., Bano, S. (2017) Comparison and Analysis of Health Care Delivery Systems: Pakistan versus Bangladesh. J Hosp Med Manage. <https://hospital-medical-management.imedpub.com/comparison-and-analysis-of-health-care-delivery-systems-pakistan-versus-bangladesh.php?aid=18097>
 - License template. Pakistan telecommunications authority. <https://www.pta.gov.pk/media/AnnexFIM-17032014.pdf>
 - Medaine, D. (2023, March 27). Data Localization—a Hidden Tax on the Poor. Center for Global Development. <https://www.cgdev.org/blog/data-localization-hidden-tax-poor>
 - Microsoft. (n.d.). Azure Blob Storage pricing. Microsoft. Retrieved July 11, 2024, from <https://azure.microsoft.com/en-us/pricing/details/storage/blobs/#pricing>
 - Mobile Cellular Policy. (2004). (Pakistan). <https://moitt.gov.pk/SiteImage/Misc/files/MobileCellularPolicy2004.pdf>
 - National Cyber Security Policy. (2021). (Pakistan). <https://moitt.gov.pk/SiteImage/Misc/files/National%20Cyber%20Security%20Policy%202021%20Final.pdf>
 - National Freelancing Facilitation Policy. (2021). (Pakistan). https://moitt.gov.pk/SiteImage/Misc/files/National%20Freelancing%20Facilitation%20Policy%202021%20-%20Consultation%20Draft%202_0.pdf
 - National Freelancing Facilitation Policy. (2023). (Pakistan). <https://moitt.gov.pk/SiteImage/Misc/files/National%20Freelancing%20Facilitation%20Policy%20Updated%20July%202023%20UPLOAD%20VERSION.pdf>
 - OECD (2011). Economic Impact of Internet/Broadband Technologies, 2011, DSTI/ICCP/IE(2011)i/Rev1.
 - Pakistan – Country Commercial Guide. (2024, January 12). International trade administration. <https://www.trade.gov/country-commercial-guides/pakistan-computer-software>
 - Pakistan E-Commerce Report 2022. Tashheer. <https://tashheer.com/pakistan-e-commerce-report-2022/>
 - Pakistan Freelancers Association. (date accessed: June 2024) <https://pafla.org.pk>
 - Pakistan Medical and Dental Council Act. (2022). (Pakistan). <https://pmdc.pk/Documents/law/PMDC%20Act.pdf>
 - Pakistan Vision 2025. (Pakistan) <https://www.pc.gov.pk/uploads/vision2025/Pakistan-Vision-2025.pdf>
 - Pakistan's Hospital Sector Profile. (2020, November). <https://pakonehealth.org/wp-content/uploads/2018/08/Hospital-Sector-Profile-Final-Nov-2020.pdf>
 - Pepić, L. (2018). The sharing economy. Uber and its effect on taxi companies. ACTA ECONOMICA. 16. 10.7251/ACE1828123P. https://www.researchgate.net/publication/329898519_The_sharing_economy_Uber_and_its_effect_on_taxi_companies
 - Personal Data Protection Act, No. 9 of 2022. (2022). (Sri Lanka). <https://www.parliament.lk/uploads/acts/gbills/english/6242.pdf>
 - Population, total- Pakistan. World Bank Group. <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=PK>

- Publicity officers. Press Information Department. https://pid.gov.pk/publicity_officers
- Qiang, Christine Zhen-Wei, Carlo Rossotto, and Kaoru Kimura. (2009). "Economic Impacts of Broad-band." In Information and Communications for Development. Washington D.C.: World Bank.
- Rana, S. FBR reels under a major 'cyberattack'. (2021, August 15). The Express, Tribune. <https://tribune.com.pk/story/2315712/fbr-reels-under-a-major-cyberattack>
- Raza, M. (2024, June16). Freelancing Statistics in Pakistan (2024): Trends & Insights. MohsinZox. <https://mohsinzox.com/blog/freelancing-statistics-in-pakistan/#:~:text=According%20to%20the%20Tribune%2C%20there,3%20million%20freelancers%20in%20Pakistan>
- Reichman, A. (2011). File storage costs less in the cloud than in-house. https://media.amazonwebservices.com/Forrester_File_Storage_Costs_Less_In_The_Cloud.pdf
- Salik, M. (2022). The rising e-commerce industry of Pakistan: an appraisal. Institute of Strategic Studies Islamabad. https://issi.org.pk/wp-content/uploads/2022/09/IB_Salik_Sept_30_2022.pdf
- Scott, Colin (2012). "Does Broadband Internet Access Actually Spur Economic Growth?" <http://www.eecs.berkeley.edu/~rcs/classes/ictd.pdf>.
- Size and scope of public sector. International labour organization. <https://ilostat ilo.org/resources/concepts-and-definitions/description-competitiveness-indicators/>
- Storage of Payment System Data. (2018, April 6). Reserve Bank of India. <https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=11244&Mode=0>
- Stork, C. (2020). Chapter 7. Regulatory responses to evolving technologies, Digital Regulation Hand-book, International Telecommunication Union and The World Bank, 2020, ISBN: 978-92-61-31651-8, <https://www.itu.int/en/myitu/Publications/2020/08/31/09/09/Digital-Regulation-Handbook>.
- Study for Assessment of Pakistan's Freelancing Ecosystem & DigiSkills.pk. Ignite-National Technology Fund. https://ignite.org.pk/wp-content/uploads/2018/06/Final-Report-on-Assessment-of-the-Freelancing-Ecosystem-DigiSkills.pk_.pdf
- Telecommunications policy. (2015). (Pakistan). <https://moitt.gov.pk/SiteImage/Misc/files/Telecommunications%20Policy%20-2015%20APPROVED.pdf>
- The Electronic Transactions Ordinance. (2002). (Pakistan). <https://pakistancode.gov.pk/pdffiles/administratordbc98dd49f2df3b1d07bb986dcceb9a3.pdf#viewer.action=download>
- The Mental Health Ordinance. (2001). (Pakistan). <https://pakistancode.gov.pk/pdffiles/administratorf3bd8ebe041346ad002f70ddae5d0799.pdf#viewer.action=download>
- The National Database and Registration Authority Ordinance. (2000). (Pakistan). <https://pakistancode.gov.pk/pdffiles/administrator413b54becc75f8df45c9a57fcea6d16.pdf#viewer.action=download>
- The Prevention of Electronic Crimes Act. (2016). (Pakistan). <https://pakistancode.gov.pk/pdffiles/administrator6a061efe0ed5bd153fa8b79b8eb4cba7.pdf#viewer.action=download>
- The Removal and Blocking of Unlawful Online Content (Procedure, Oversight and Safeguards) Rules. (2021). (Pakistan). <https://moitt.gov.pk/SiteImage/Misc/files/Removal%20Blocking%20of%20Unlawful%20Online%20Content%20Rules%202021.PDF>
- Virtury. (n.d.). Cloud Server pricing. Virtury. Retrieved July 11, 2024, from <https://my.virtury.com/index.php?/cart/cloud-server/&step=0>
- Ylinx. (n.d.). vCloud pricing. Ylinx. Retrieved July 11, 2024, from <https://www.ylinx.pk/vcloud/>
- 2.7 million Pakistani data compromised over five years. (2024, March 27). Deccan Herald. <https://www.deccanherald.com/world/27-million-pakistani-data-compromised-over-five-years-295445>

A black chess king piece stands prominently in the center of a chessboard. The board is dark with light-colored squares. In the background, several other chess pieces are visible, including a queen and several pawns. The background is filled with out-of-focus, warm-toned lights in shades of orange, yellow, and red, creating a bokeh effect. A semi-transparent dark blue horizontal band spans the middle of the image, containing white text.

ANNEX 1 METHODOLOGY NOTE

The analysis consisted of several distinct, but interlinked types of analysis; legal and regulatory analysis; economic analysis; case studies, drawing from secondary research and key informant interviews.

1 - Legal and Regulatory Analysis

The legal and regulatory analysis was undertaken examining two scenarios: first, the existing landscape. The existing legal and regulatory landscape relevant to data localization was examined by analyzing numerous general applicable laws, policies and regulations developed over time, as well as sectoral ones. The second scenario focused on changes to the landscape if the current version of the Personal Data Protection (PDP) Bill released by the Ministry of Information Technology and Telecommunication (MoITT) in 2023, is passed and enforced.

The analysis utilized frameworks from Bauer et al. (2016)¹ and Cory et al. (2022)² to assess differences in the legal and regulatory landscape. These papers were chosen following a literature review, which prioritized papers with a suitable regulatory framework, and a robust economic analysis (relevant to Section 2). This analysis relied on policy documents available in the public domain or accessible to the team. Only documents with credible English translations were used.

2 - Economic Analysis

The economic analysis is linked to the regulatory analysis.

Literature review: A literature review was conducted to identify a suitable method to base the economic analysis on (see Section 1). The framework highlighted in Cory et al. (2022) was chosen to assess the economic impacts of the Personal Data Protection (PDP) Bill. **Construction of the DRI:** The regulatory assessment was used to calculate the Data Restrictiveness Index (DRI) in line with the methodology used in Cory et al (2022) in two scenarios (existing landscape, and that with the PDP Bill).

Effect size extraction and impact simulation (labour productivity): Cory et al (2022) estimate that a one-unit increase in DRI is associated with an approximately 0.7% decrease in labour productivity for the following year. This paper thus uses this effect size from Cory et al, to estimate the impact of the change in DRI in the two scenarios on labour productivity.

Impact simulation (GDP and jobs): The impact on labour productivity was then in turn used to estimate the knock-on effects on two other widely used economic indicators, GDP and employment. The most recent data from the World Bank and Pakistan Bureau of Statistics, were used for these estimates.

3 - Case Studies

This study used case studies to examine impacts of the proposed Bill on the four sectors proposed by AIC: software (IT and ITeS), online freelancing, healthcare, and e-commerce. Secondary research, and key informant interviews with a (mutually agreed upon) single key entity representing the sector was undertaken. The general process undertaken to conduct key informant interviews is as follows:

Initial Contact and Discussion: The research team reached out to potential interviewees for a preliminary discussion. This initial engagement focused on explaining the subject matter and objectives of the research.

Distribution of Discussion Guides: Draft discussion guides, designed for semi-structured interviews, were circulated to the interviewees before the scheduled interviews. This step was undertaken at the request of the interviewees, who preferred to receive the line of questions in advance to prepare adequately. The discussion guide shared with the interviewees with indicative questions. In some cases, the interviewees highlighted which subjects they were comfortable discussing, and which they weren't.

Conducting Interviews: Interviews were conducted via an online meeting. During the call, the team reiterated the study's objectives and obtained consent from the interviewees in accordance with internal ethical guidelines. The interviews were carried out in a semi-structured manner, allowing for flexibility and depth in the conversation.

Validation of Insights: After the interviews, key takeaways were shared with the interviewees for their review. This step ensured the accuracy and reliability of the insights before they were included in the final report. Interviewees' sign-off was obtained to confirm their agreement with the summarized findings. Following the completion of the interview, the key takeaways from the interviews were synthesized before including it in the report.

ANNEX 2

Data localizations requirements by different laws and policies in Pakistan

Pakistan Broadband Policy	Refers to “locally located content” with the motivation to host websites locally.
Pakistan Cloud First Policy	Requires that whenever there are legitimate use-cases requiring cross-border data flows, then the relevant stakeholders may consult with the Cloud Office established under the policy, to ensure appropriate security standards and controls are in place for such data flows.
Email and Internet Policy for the Federal government	Government entities shall only use government data centre. If that is not available, services of local ISPs will only be used.
Removal and Blocking of Unlawful Online Content (Procedure, Oversight and Safeguards) Rules, 2021	Significant social media company must register with PTA, establish an office in Pakistan, appoint an authorized compliance officer, and a dedicated grievance officer, both based in Pakistan and comply with the user data privacy and data localization requirements.
Cyber Security Strategy for Telecom Sector 2023-2028 under Pakistan Telecommunication (Re-organization) Act, 1996	Requires Critical Telecom Data (CTD) ⁴ to reside within geographical boundaries of Pakistan. Localization requirement is only limited to Personal Identifiable Information (PII) and CTD and free flow of the rest of the data will be allowed.
Draft Personal Data Protection (PDP) Bill	Adds a special category of critical personal data to the localization requirement.

⁴“The term CTD refers to confidential and personal data related to PTA licensees, users/customers, sensitive data belonging to government institutions, and such information which is critical for the operations/ confidentiality/ security of the Telecom Operators' systems including voice/data. communication of their users/customers etc. Furthermore, any data that can result in a financial loss and impede organizations from performing their duties, cause a major loss of competitive ability or a combination thereof, can also be classified as CTD.”



The Asia Internet Coalition (AIC) was established in 2010 as an industry association that promotes the understanding and resolution of Internet policy issues in the Asia Pacific region. Our mission is to represent the internet industry and participate and promote stakeholder dialogue between the public and private sectors, sharing best practises and ideas on internet technology and the digital economy.

<https://aicasia.org>

EMAIL:
secretariat@aicasia.org