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Advancing Telemedicine in Asia

Enabling Environments & Emerging Opportunities

August 2024

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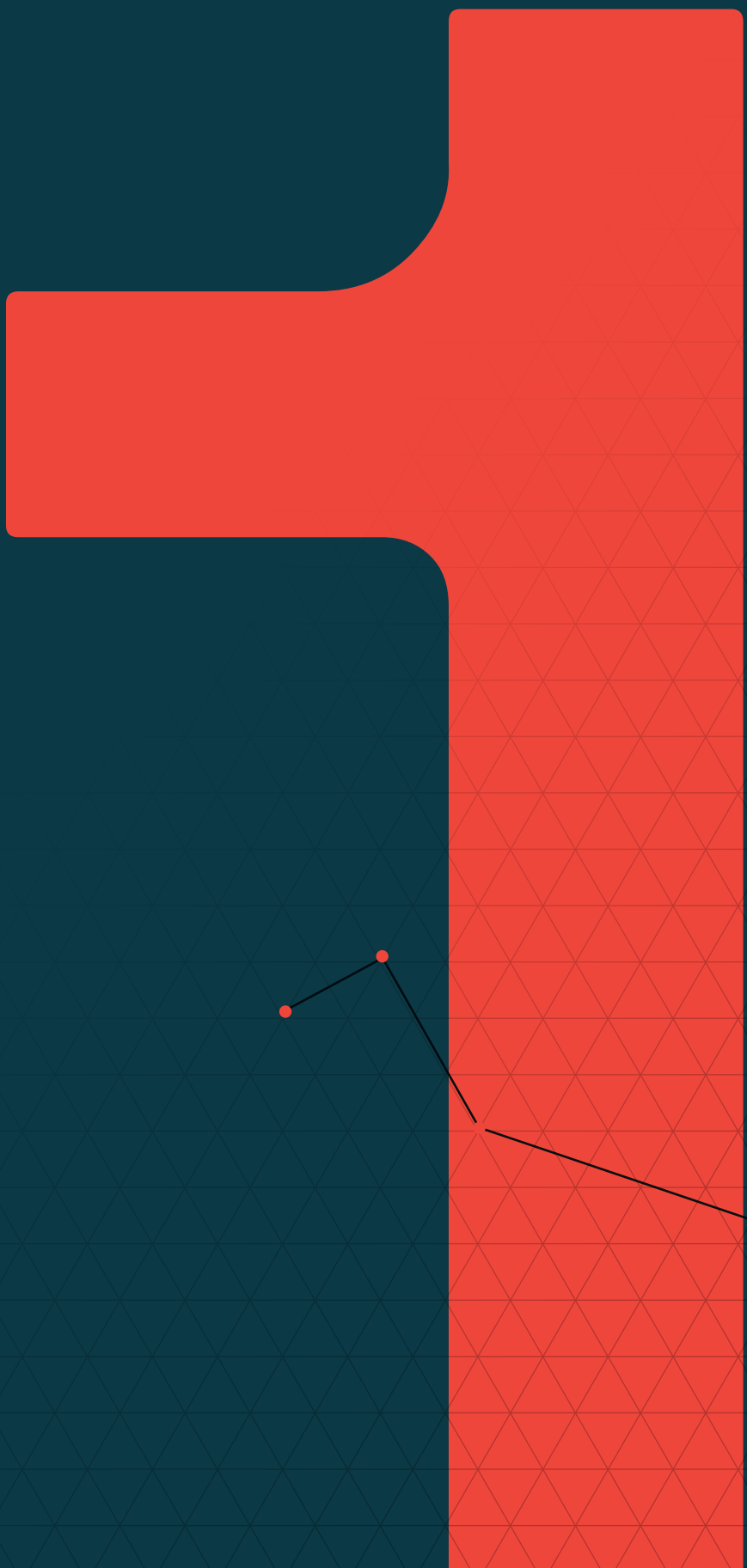
Contents

Abbreviations

AI	Artificial Intelligence
CHW	Community Health Worker
DFS	Digital Financial Services
DPI	Digital Public Infrastructure
DPI-H	Digital Public Infrastructure for Health
eHealth	Electronic Health
EHR	Ehealth Record
HSP	Health Service Provider
ICT	Information and Communication Technology
ID	Identification
IoT	Internet of Things
mHealth	Mobile Health
RMP	Registered Medical Practitioner
USAID	United States Agency for International Development
WHO	World Health Organization



Chapter 1

Background

Across Asia, telemedicine has undergone significant transformation as technology has advanced, evolving from basic telephone consultations to sophisticated digital platforms. Breakthroughs across the continent such as the development of video conferencing systems in the 1970s facilitated real-time interaction between patients and health care providers.

In South Korea, the establishment of telemedicine networks in the early 2000s by private companies like Samsung and LG contributed to the expansion of telemedicine services.

Noteworthy public-private pilots include the partnership between the Indian Space Research Organisation (ISRO) and Apollo Hospitals to establish telemedicine centers in remote villages in south India. These centers utilized satellite technology to connect patients with specialists. Additionally, the deployment of telemedicine vans equipped with diagnostic tools and video conferencing capabilities facilitated access to health care in underserved regions.[1]

Although early private sector efforts helped fast-track innovation for telemedicine, they often struggled to achieve widespread adoption and scalability. **This resulted in a growing list of isolated demonstration projects, ultimately contributing to the prevalence of the phenomenon of "pilotitis" in health in the early 2000s.**

Early projects were hindered by the complexity of the technology and the **lack of necessary infrastructure** among potential users, both health care providers and patients. Health system managers often lacked the knowledge and expertise to manage the integration of these technologies into health systems which significantly impeded the broader implementation of telemedicine solutions.[2]

Another challenge faced by telemedicine was the diminished **level of personal interaction and attention** from health care providers. The perception that increased digitalization in medical consultations often leads to physicians focusing more on their computer screens than on direct patient engagement was highlighted through multiple studies. This reduction in personal engagement seemed to adversely affect the patient's experience and satisfaction with telemedicine services.[3]

Regulatory hurdles further impeded the expansion of telemedicine. As a developing innovation telemedicine evolved rapidly, far outpacing the development of comprehensive regulatory frameworks. Governments were hesitant to enact sweeping regulations on a technology that was evolving by the day, leading to uncertainty and ambiguity in the legal landscape surrounding telemedicine.[4]

So, the question that emerges is:
How does one regulate a technology that is not fully understood or has not yet fully developed?
The answer is complex. Despite its potential to save lives, concerns about misuse and patient safety further complicate regulatory efforts, creating barriers to the adoption of telemedicine on a larger scale.

Where We Are Today

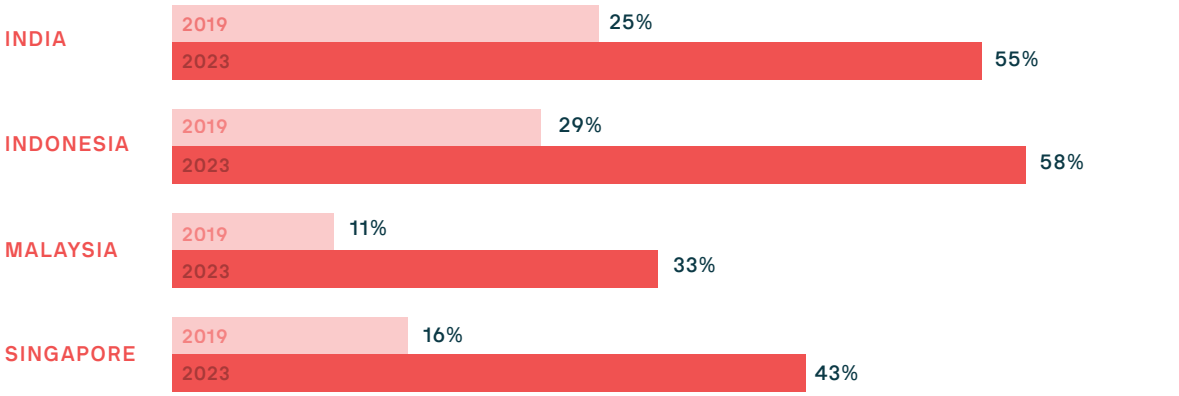
The COVID-19 pandemic accelerated the mainstream adoption of digital health platforms across the globe. Faced with lockdowns and social distancing measures, health care systems turned to digital platforms to ensure continuity of care. Telemedicine was a core part of this mainstream adoption. Regulatory changes that concern leveraging remote health care, its practice, and the surrounding ecosystem eased the widespread adoption of telemedicine.[5]

These changes differed across countries. While some countries, like Singapore, relaxed their previously implemented telemedicine guidelines to allow quicker adaptation, others, like Japan, centralized and strengthened their guidelines to ensure regulated scale by the private sector. Further, as was in the case of South Korea, the pandemic's end prompted the government to retract and rework their telemedicine policies that had been launched pre-pandemic based on their experiences during COVID-19.

These regulatory changes, coupled with advancements in technology, have propelled telemedicine into the mainstream, transforming health care delivery models beyond the pandemic.

In 2023, the global telemedicine market was valued at over US$120 bn, projected to cross US$280 bn by 2030.

Figure 1. Percentage of survey respondents who used telemedicine in 2019 and 2023



Source: Adapted from Bain & Company, Asia-Pacific Frontline of Healthcare Consumer survey, 2020 and 2024.

Note: Respondents were asked about telehealth usage in the past 12 months across 2019 and 2023. Growth percentage has a deviation of +/- 1% due to rounding off. 2019 (n= 1823), 2023 (n= 2300).

Beyond financial metrics, the lasting impact of the pandemic on telemedicine is evident by its integration into routine health care practices, with many health-seeking individuals seeing these consultations as a long-term supplement rather than a replacement to conventional care models.

While *Figure 1* depicts only a small sample of health-seekers across Asia and does not represent countries as a whole, it does indicate that post pandemic these consultations have become more commonplace, offering convenience and accessibility to patients. They typically include services such as real-time video appointments with physicians and remote monitoring of chronic conditions using wearable devices, and online prescription management. Health care providers and seekers both seemed to have embraced telemedicine as a valuable tool in delivering patient-centered care, overcoming geographical barriers, and expanding access to health care services.[6]

The Purpose

Aligning[i] with the United States Agency for International Development (USAID) Digital Policy and Digital Health Position Paper,[7] this resource focuses on informing efforts to advance Asian regional capacities for telemedicine, and, in turn, digital health. Through secondary research, this document aims to define telemedicine and its components, understand the institutional factors that enable its adoption, and explore where the opportunities lie to drive this health service delivery innovation at scale across countries in Asia.[ii]

[i] Aligning with policy goals 'Transform' and 'Protect', and Priority #2 in the position paper.

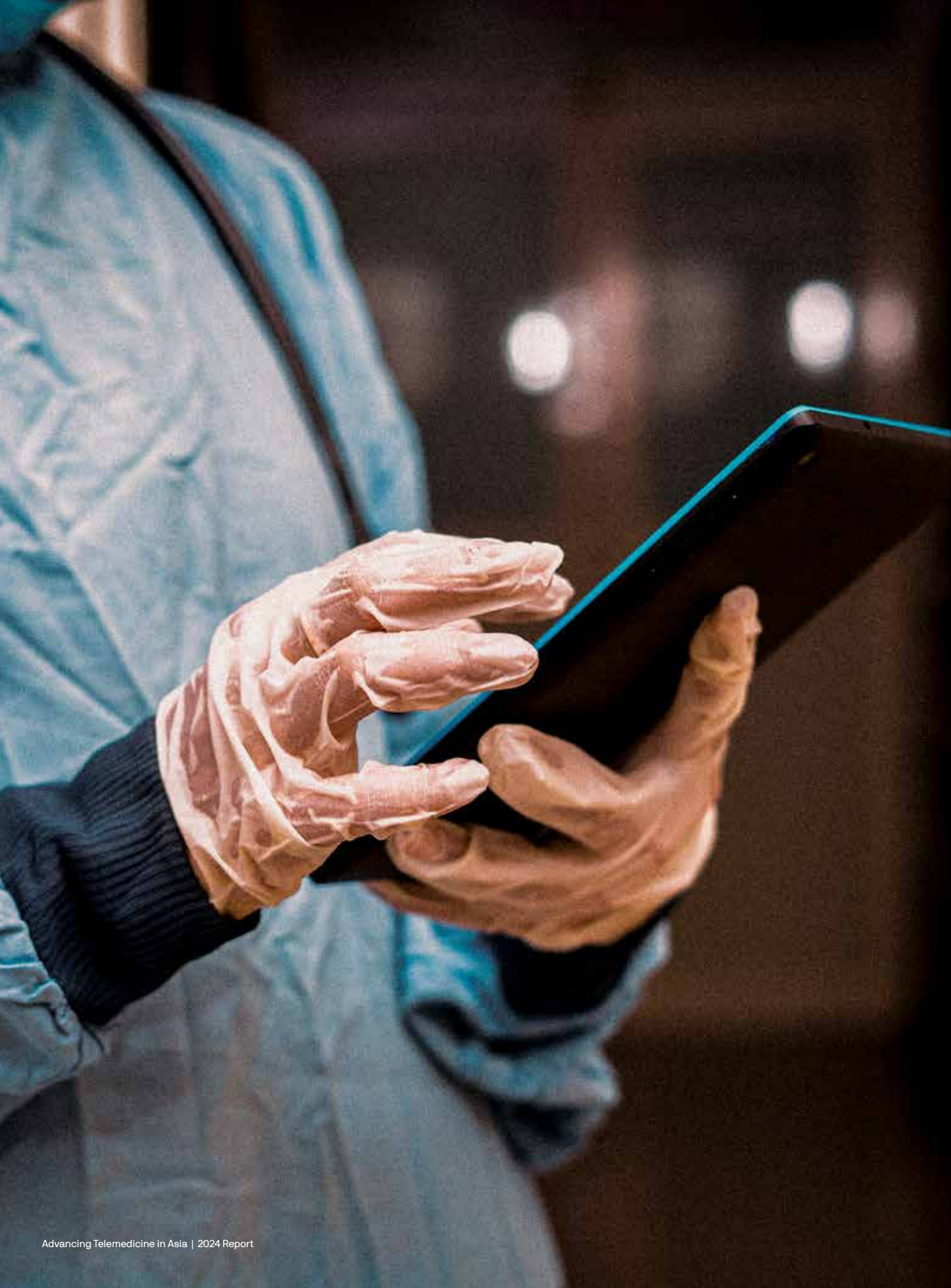
[ii] The "Asia region" from this point on in the resource will restrict itself to the 18 countries that are the focus of USAIDs Bureau for Asia. These include 15 countries with bilateral missions and 3 countries with regional missions. These can be found on their official website here.

Our Target Audience

This resource is tailored for policy decision makers and individuals tasked with financing, designing, or overseeing telemedicine initiatives in the Asia region. It provides potential opportunities and research-based insights to ensure that telemedicine interventions contribute lasting value to both the health care system and the communities they serve. It is important to note that while not exhaustive, this document offers avenues to scale for consideration and further exploration.

Chapter 2

Defining Telemedicine



Digital health is the systematic application of information and communications technologies, computer science, and data to support informed decision making by individuals, the health workforce, and health institutions for strengthened resilience and improved health and wellness for all.[8]

The comprehensive field of telemedicine encompasses multiple technologies and practices designed to enhance health care delivery and outcomes. Within the expansive domain of digital health, telehealth and subsequently telemedicine are critical subsets.

While digital health has been largely well defined in the development community, **the definition of telemedicine lacks consensus**, leading to its frequent interchangeability, often mistakenly, with other terms within the broader digital health domain, such as mHealth, teleconsultation, telemonitoring, and most commonly, telehealth. This is best exemplified by a study in 2009, which found 104 different peer-reviewed attempts at defining telemedicine. This resource positions telemedicine under the wider ambit of telehealth, which is a more comprehensive term and refers to the use of electronic information and telecommunication technologies to support and enhance contactless health care, education, administration, and related services[9].

Definitions of telemedicine often share common core principles but diverge in the emphasis placed by organizations on specific aspects tailored to their focus areas.

OECD's definition

The Organisation for Economic Co-operation and Development (OECD), for example, highlights the role of information and communication technology (ICT) in delivery, defining telemedicine as **"the use of information and communication technologies to deliver health care at a distance." This underscores technology's role in bridging geographical divides and enhancing health care accessibility."**[10]

CDC and the Federation of State Medical Boards' definition

Emphasizing the aspects of distance and third-party intervention, the Centers for Disease Control and Prevention (CDC) and the Federation of State Medical Boards define telemedicine as **"the practice of medicine using electronic communication, information technology, or other means between a physician in one location and a patient in another location, with or without an intervening health care provider."**[11] Médecins Sans Frontières (MSF) highlights telemedicine's crisis response potential in overcoming barriers to medical care, especially in underserved regions, calling it **"a service that helps break barriers for access to medical care, [which] provides improved speed and accuracy for health care services in areas that are more difficult to access."**[12]

MSF's definition

WHO's definition

Perhaps the most widely accepted definition is by the World Health Organization (WHO), which defines telemedicine as **"the delivery of health-care services where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries all in the interests of advancing the health of individuals and their communities."** This underscores telemedicine's goal of improving health care outcomes and promoting public health by leveraging technology to transcend geographical limitations.[13]

Our definition of telemedicine

In alignment with the aforementioned definitions, this resource understands telemedicine as the utilization of information and telecommunication technologies to provide health care services remotely, encompassing consultation, diagnosis, treatment, and monitoring.

This definition succinctly captures the essence of telemedicine, providing clarity and specificity to its scope and purpose.

To further our understanding of telemedicine, we must dive a little deeper into the three ways in which it can be conducted: remote monitoring, store and forward, and synchronous telemedicine.[14]

Remote Monitoring

Remote monitoring facilitates the remote tracking of an individual's health status using technologies such as connected medical devices and sensors. This approach is commonly employed in managing chronic conditions and is supplemented with communication channels for care coordination or alerts to health workers based on clinical parameters or ranges.

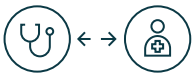
Synchronous Telemedicine

Synchronous telemedicine, also known as "real-time" or "interactive services" in digital health care, entails direct communication between two or more parties in clinical practice. These interactions aim to provide diagnostic and therapeutic assistance to clients or patients who may not have timely access to care otherwise.

Store and Forward

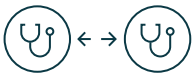
Store and forward involves the remote storage and transmission of information, commonly utilized in non-emergency scenarios. In such instances, health data and images are digitally submitted by patients or specialized health workers for deferred consultation. This method finds application across various medical specialties like dermatology, radiology, and ophthalmology, and is characterized as an asynchronous or deferred mode of digital health care delivery.

Figure 2. Types of interaction in telemedicine



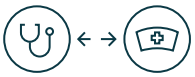
Health Care Provider to Patient

Direct communication between patients and providers, where individuals seek medical advice or consultation remotely. This interaction utilizes synchronous channels such as video calls, audio calls, or dedicated smartphone applications, offering convenience and accessibility to health care services.



Health Care Provider to Health Care Provider

Provider to provider communication, facilitating consultations or referrals between health care professionals. This type of telemedicine ensures efficient collaboration and enables specialists to offer expertise regardless of geographical barriers.



Health Care Provider to Health Care Provider (Assisted)

Assisted telemedicine, also known as provider to health worker interaction, involves intermediaries such as nurses or community health workers facilitating communication between patients and physicians. This approach ensures health care access in remote or underserved areas where direct doctor-patient interaction might be challenging.

It is important to note that a single telemedicine solution may not neatly align with just one of these ways of conducting telemedicine. In fact, telemedicine solutions often blend elements from all three categories to meet specific contextual requirements.

Another key aspect while formulating our understanding of telemedicine is exploring the mechanisms through which telemedicine is implemented. Briefly, there are three types of telemedicine interactions, including health care provider to patient, health care provider to health care provider, and assisted telemedicine, which serve as the last-mile touchpoints of remote health care delivery. These interactions not only bridge geographical distances but also facilitate seamless communication among health care stakeholders, enhancing patient outcomes and streamlining care delivery processes *(Figure 2)*.

Assisted telemedicine in particular presents an important opportunity for Asian countries. Low-and-middle-income countries (LMICs) already have an existing large network of community health workers (CHWs) who serve as the backbone of primary health care services in rural and underserved populations through an outreach model.

Notable examples include lady health workers in Pakistan, female community health volunteers in Nepal, community health officers and accredited social health activists (ASHAs) in India, and CHWs in Afghanistan.

Table 1. Specialized applications of telemedicine

TAILORED TO MEDICAL SPECIALTIES

- Tele-ophthalmology
- Teledermatology
- Telepsychiatry
- Tele-oncology
- Telepathology
- Teleradiology
- Telenephrology
- Tele-obstetrics
- Tele-orthopedics

TAILORED TO TYPES OF CARE

- Telerehabilitation
- Telecare
- Teletriage
- Tele-assessment
- Telesurgery
- Telediagnostic
- Tele ICU

TAILORED TO TARGETED CONDITIONS

- Telestroke
- Telecardiology
- Tele-oncology
- Telediabetes
- Telegynecology
- Tele-urology
- Telepsychology

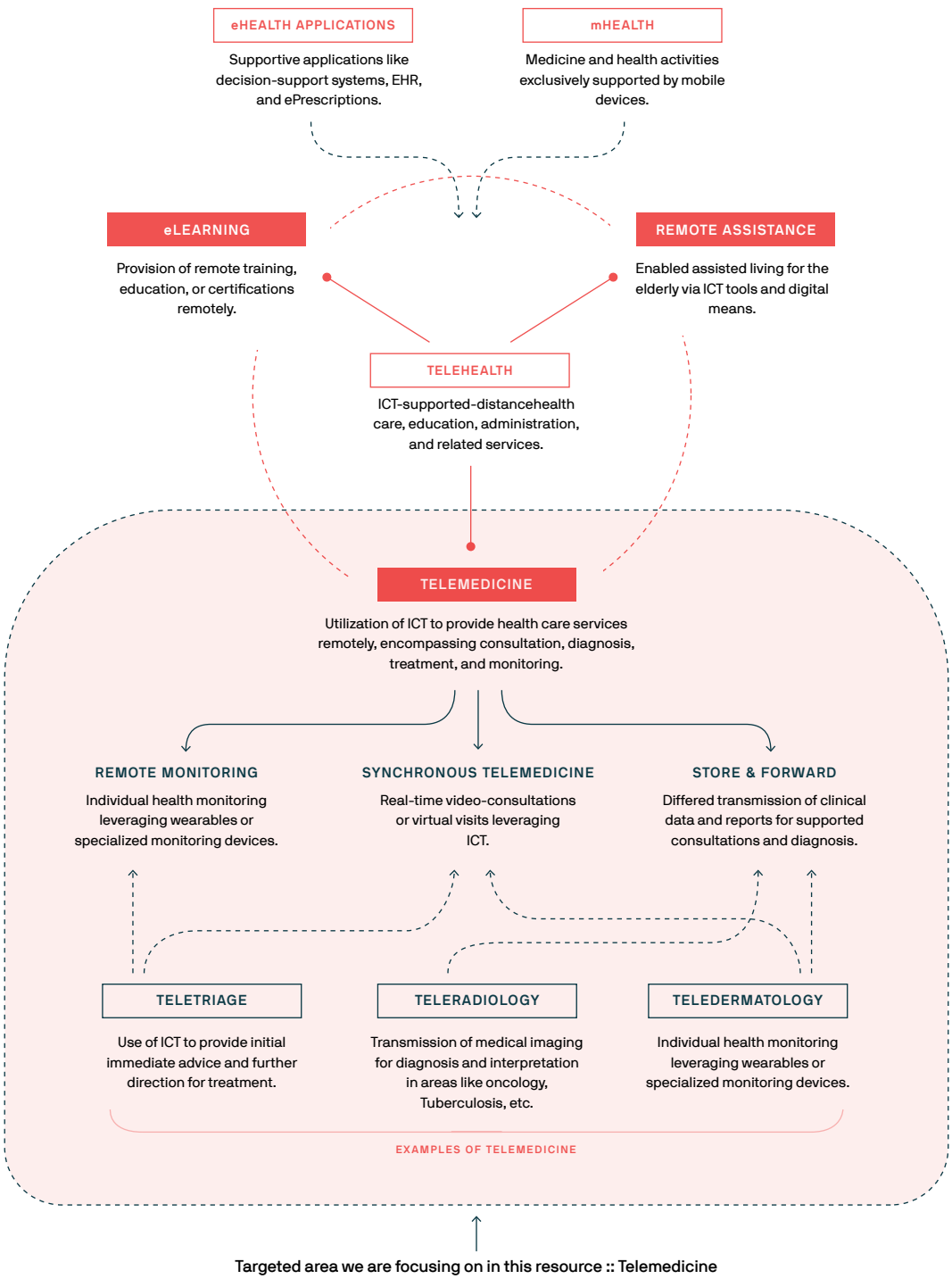
Empowering these intermediaries with advanced support and resources can significantly enhance the quality of doctor-patient interactions. For example, a trained and enabled CHW can conduct basic physical examinations, identify relevant symptoms disregarded by the patient, and utilize connected medical devices to measure vital signs and capture images—tasks that take away additional time from a consultation and that patients typically cannot perform themselves. This approach holds the potential to not only improve diagnostic accuracy and treatment outcomes but also enhance the capabilities of CHWs, making them more effective in their roles.[14]

Having established a clearer understanding of telemedicine, the ways it is conducted, and types of interactions, it is now time to explore its specialized applications. These may be tailored to specific medical specialties, types of care, or targeted conditions. Specialized use cases demonstrate both the versatility and adaptability of telemedicine across various health care domains.

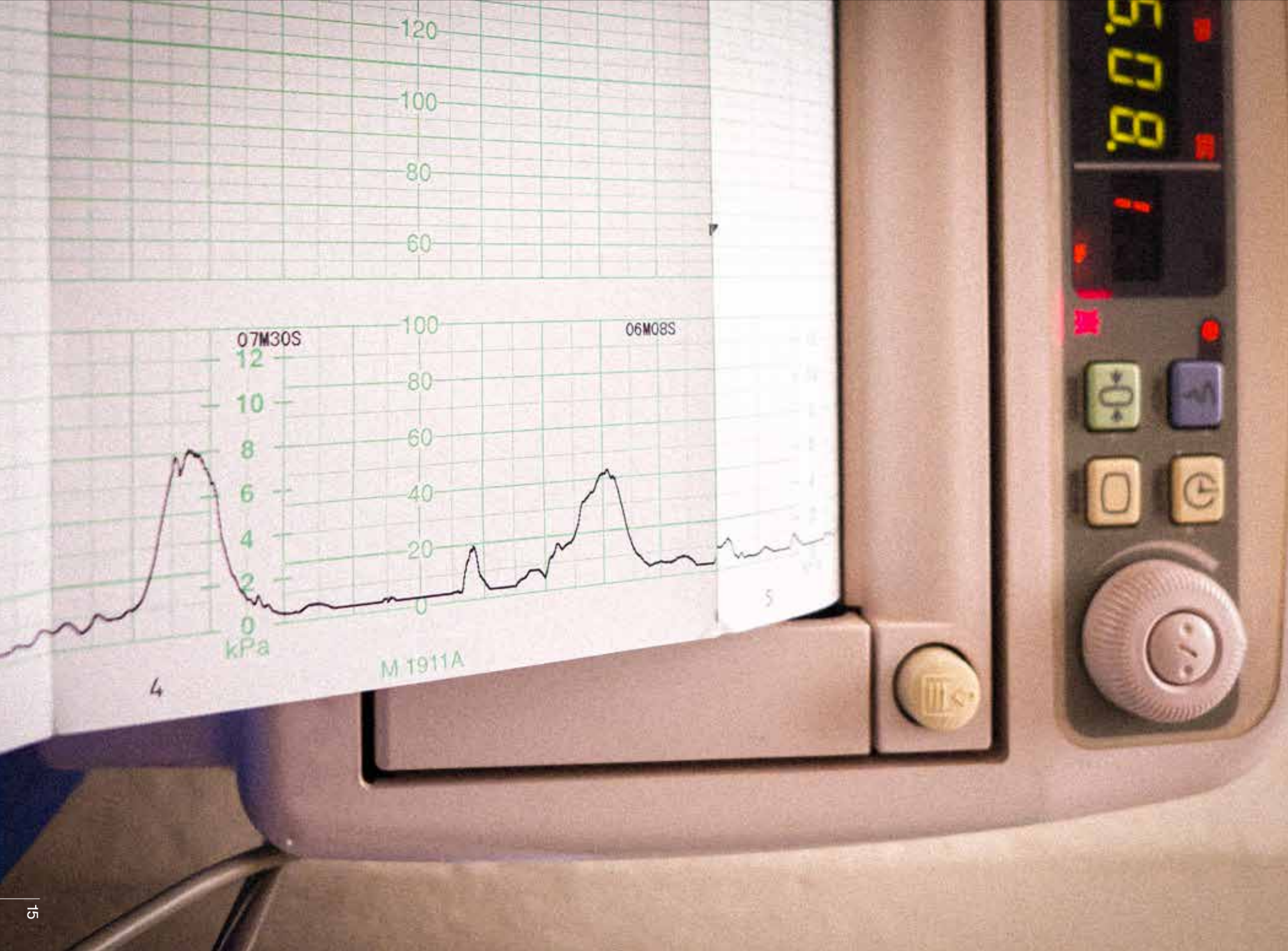
Each of these applications showcases how telemedicine can effectively address unique health care needs, whether it is providing remote rehabilitation services (telerehabilitation), conducting virtual eye exams (tele-ophthalmology), diagnosing conditions remotely (telediagnostic), delivering mental health counseling (telepsychiatry), managing cancer care (tele-oncology), rapidly diagnosing and treating strokes (telestroke), or facilitating remote diagnostics across various medical facilities (telediagnostic). These specialized use cases highlight the diverse range of telemedicine applications, demonstrating its potential to revolutionize health care delivery across various medical disciplines. *Table 1* provides further examples of these use-case scenarios.

Figure 3 (next page) aims to situate telemedicine—and the terms discussed in this study—within the larger ecosystem of telehealth to ensure clarity. Alongside the primary objective of providing a distilled understanding of telemedicine, this section also attempts to identify how it is conducted, the types of interactions involved, and some key prevalent use cases. Since telemedicine cannot scale in a vacuum, the subsequent sections connect this topic to the broader technology and policy ecosystem, shedding light on the essential prerequisites and enablers that allow telemedicine to drive universal health coverage (UHC).

Figure 3. Telemedicine within the larger telehealth ecosystem



Source: Adapted from Organisation for Economic Co-operation and Development (OECD), 2023.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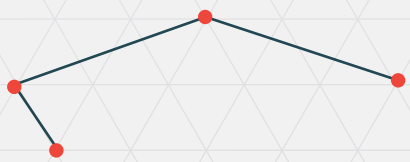
Chapter 3

Technology requirements to enable telemedicine

Scaling telemedicine initiatives beyond pilot programs or limited hospital settings relies heavily on the availability of robust digital public infrastructure (DPI), essential for ensuring seamless access to health care delivery. At its simplest, DPI can be understood as an intermediate layer in the digital ecosystem. It sits atop a physical layer—connectivity, devices, servers, data centers, and routers—and supports an applications layer, including information solutions to different verticals, which include unique identifiers, cash transfers, remote education, and telehealth.

Based on sector-specific DPIs,[15] digital public infrastructure for health (DPI-H) has emerged as a key enabler for digital health including telemedicine. This chapter sheds light on the essential prerequisites of DPI and DPI-H, necessary for scaling telemedicine efforts, including connectivity, digital payments, digital identification, and health databases and registries.



[3.1] Connectivity: bridging the gap for universal access

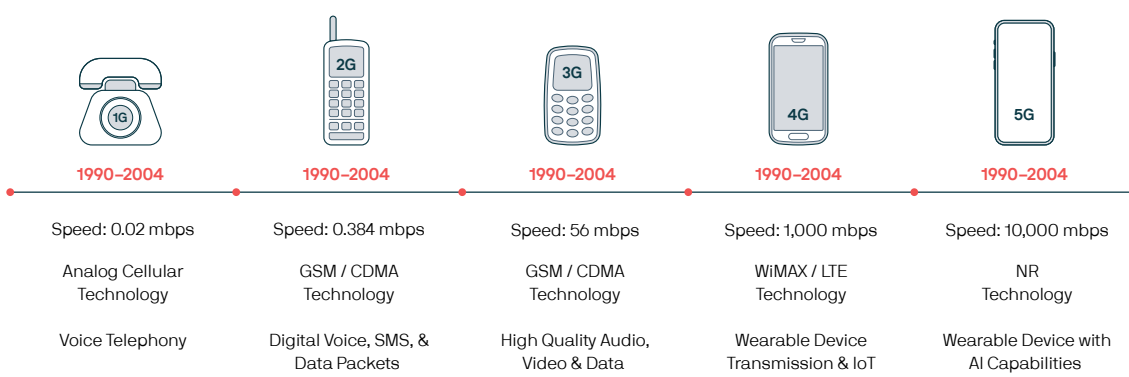
Connectivity acts as the conduit for remote health care delivery, data exchange, and patient engagement. High-speed internet and mobile connectivity are vital, enabling real-time consultations, remote monitoring, and access to medical information. However, the challenge of connectivity is multifaceted, particularly in remote and developing regions where infrastructure gaps persist.

In remote areas, inadequate fixed broadband infrastructure and erratic mobile network coverage pose significant barriers to accessing telemedicine services. The digital divide exacerbates existing disparities in health care access, leaving already underserved populations at a disadvantage. Drawing from the example of the geographically dispersed Pacific Islands, where the cost of mobile broadband is four times the world average, limited infrastructure investment poses a significant barrier to the widespread adoption of telemedicine platforms. This perpetuates health care inequities, exacerbating disparities in access to medical services.[16]

Despite these challenges, the advancement of mobile networks from the second generation (2G) to the fifth generation (5G) has enabled the addition of more complex telemedicine features *(Table 2)*.

For example, the transition to 5G significantly increases the capacity for connected devices, ensures a lower latency, and supports edge computing, which processes data closer to the source. For telemedicine, this potentially means offering higher-quality video consultations, enabling continuous remote monitoring of patients with chronic conditions through wearables, transferring higher volumes of medical records, and facilitating advanced applications like remote surgery and AI-driven diagnostics.

Table 2. How the evolution of connectivity lends itself to more complex telemedicine features



Notes: Abbreviations used include GSM: Global System for Mobile Communications; CDMA: Code Division Multiple Access; WiMAX: Worldwide Interoperability for Microwave Access; LTE: Long-Term Evolution;NR: New Radio

Contrary to the situation in the Pacific region, affordable mobile internet rates in South and Southeast Asia have enabled the growth of internet usage in multiple countries. Although outliers such as Indonesia (US$1.50 per Mbps) and Pakistan (US$2.35 per Mbps) exist, **the average cost per Mbps in countries like Bangladesh, Sri Lanka, India, and Vietnam remains below US$1.00.** Particularly notable are Singapore, with rates as low as US$0.16, and Thailand, offering internet at US$0.10 per Mbps, showcasing some of the most affordable examples.[17]

These low costs, combined with the advanced capabilities of 5G, make telemedicine more accessible and effective, especially in regions where health care infrastructure may be limited. This technological synergy supports a broader reach and more robust delivery of telemedicine services, enhancing patient care and overcoming geographical barriers.

Innovative solutions and emerging technology also offer avenues for bridging the connectivity gap, and, in turn, extending telemedicine to all corners of the globe. Subsidized low-orbit satellites such as Starlink represent a promising option for delivering internet connectivity to remote and underserved areas, supplementing traditional infrastructure. For example, Starlink was recently granted a license and rolled out across more than 300 islands in the Republic of Fiji.

Additionally, community-based networks also emerge as potent tools for addressing connectivity constraints, empowering local communities to take ownership of their digital infrastructure. Through mesh networking[iii] and shared resources, these grassroot initiatives foster sustainable connectivity solutions, ensuring continuous access to telemedicine services, even in the most remote of settings. Moreover, public-private partnerships play a pivotal role in driving connectivity initiatives, with tech giants like Google and Facebook investing in projects such as companion-based networks and wireless backhaul to expand internet access and bridge the digital divide.[18]

As telemedicine evolves, it becomes increasingly important to strengthen connectivity. Collaborative efforts between governments and the private sector have already spurred infrastructure development in many Asian countries. However, despite the positive trends, high population and diverse geography across Asia underscore the considerable scope for further improvements in connectivity. This includes broader access and affordability for all, thereby increasing the reach and efficacy of telemedicine initiatives across the region.

[iii] A mesh network is a network in which devices (or nodes) such as phones are linked together, branching off other devices or nodes. These networks are set up to efficiently route data between devices and clients. They help provide a consistent connection throughout an irregular on otherwise inaccessible physical space.

[3.2] Digital identification: safeguarding authenticity

As of 2023, approximately 850 million individuals lacked any form of identification, including paper-based documentation.

An estimated 1.1 billion people lacked a digital footprint for their identity, while 1.25 billion individuals lacked a digitally verifiable identity. A staggering 3.3 billion people lacked access to a government-recognized digital identity, hindering their ability to securely engage in online transactions.[19]

Nevertheless, the momentum of digital identity adoption in Asia is positive, with notable progress seen across multiple countries. In the **Philippines**, the Philippines Identification System (PhilSys) has achieved nearly 90 percent coverage of the population, with over 80 million registrations. Similarly, **Indonesia** has seen significant uptake, with over six million residents onboarded for the country's new digital ID smartphone application known as Identitas Kependudukan Digital (IKD).

In **India**, the Unique Identification Authority has generated over 1.3 billion Aadhaar numbers, representing the largest digital identity initiative worldwide. **Singapore**'s Singpass platform has also witnessed remarkable adoption, with 70 percent of the population actively using it, showcasing its effectiveness in streamlining processes and enhancing security. These examples highlight the growing importance of digital identity, not only for service accessibility but also for driving technological innovation and governance efficiency.[20]

While this progress is encouraging, it is essential to recognize and address the risks associated with digital identity systems, such as data breaches, verification vulnerabilities, and privacy concerns. Responsibility for regulating and ensuring security lies with both governmental bodies and private organizations handling this data. Implementing robust security measures, conducting regular audits, and fairly enforcing stringent data protection laws are critical steps to building and maintaining public trust in digital identity initiatives.[19]

These foundational digital identification solutions empower patients to assert control over their personal health information, enabling them to selectively share data with health care providers and third-party entities as needed.

Patients can maintain sovereignty over their digital identities, fostering trust and transparency in telemedicine interactions, by using consent managers, secure identity wallets, and decentralized identity protocols. When linked to telemedicine, the growth of digital IDs makes standardization efforts essential to ensuring compatibility and seamless integration across health applications, while compliance with data protection regulations such as GDPR and HIPAA remain paramount to safeguarding patient privacy and confidentiality.

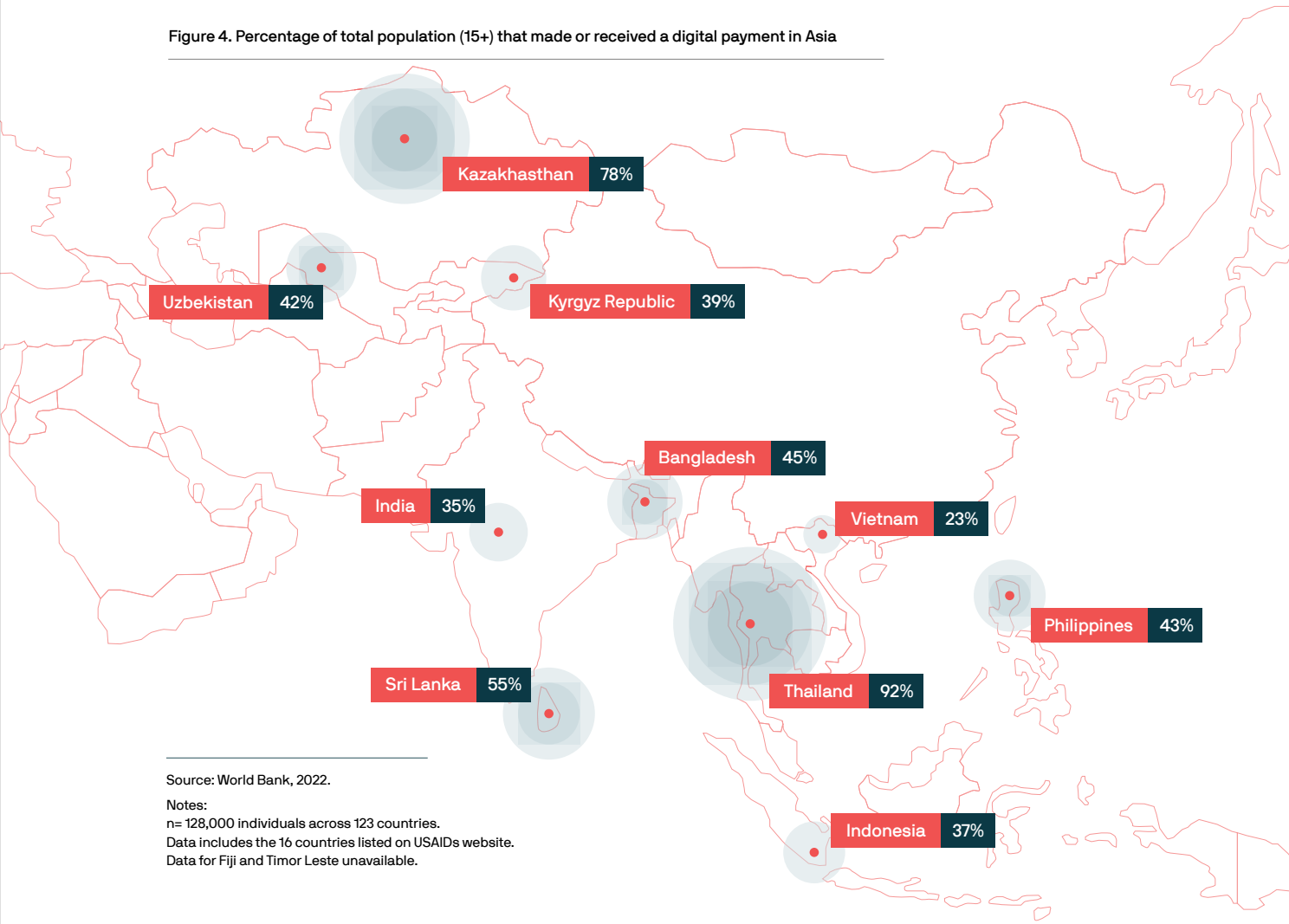
Public awareness campaigns and education initiatives have been shown to promote the benefits of digital identification in telemedicine and reduce misconceptions surrounding data security and privacy. Organizations in the process of supporting government rollout of IDs can focus on fostering a culture of trust and accountability, which has emerged as a clear barrier across literature. Health care stakeholders can then harness the transformative potential of digital ID to enhance patient safety, streamline care delivery, and advance the telemedicine paradigm.[21]

[3.3] Digital financial services: facilitating access to social security

Digital financial services (DFS) encompass a range of financial products and services delivered through digital channels. These include payments, savings, loans, credit, insurance, remittances, and transfers when made through digital means (e.g., mobile phones, ATMs, POS readers, and NFC-enabled devices). DFS have been shown to significantly enhance health programs and country-level efforts, accelerating progress toward global health goals and outcomes.

According to World Bank data, digital transactions across the Asia region are growing, with 41 percent of the population (more than 15 years of age) having made or received a digital payment at least once till 2022 *(Figure 4)*. This surge in digital financial activity is further underscored by the significant rise in credit card penetration, which escalated from 13 percent in 2021 to 29 percent in 2022.[22]

Figure 4. Percentage of total population (15+) that made or received a digital payment in Asia



Source: World Bank, 2022.

Notes:
n= 128,000 individuals across 123 countries.
Data includes the 16 countries listed on USAIDs website.
Data for Fiji and Timor Leste unavailable.

The volume of real-time transactions across the region has also seen exponential growth, with real-time payment systems, like India's **Unified Payments Interface (UPI)**, Thailand's **Prompt Pay**, and Malaysia's **DuitNow**, making up a significant volume of global transactions made on digital platforms.[23]

Cross Border Digital Payments →

These payment mechanisms have also lent themselves to cross-border digital payment integration across several Asian countries, thereby strengthening the region. Indonesia, Malaysia, and Thailand have interconnected their QR code payment systems to facilitate seamless transfers between borders. Singapore has followed suit, interlinking its real-time QR-based payments with those of Thailand and India, with plans to integrate with Indonesia in 2024. Furthermore, initiatives like UPI in India are expanding their reach beyond national borders by being made available to non-resident Indians in 10 countries to facilitate global remittances.

Additionally, UPI has been adopted by other countries too, like Bhutan and Nepal, and is in the process of integration with payment systems in Saudi Arabia and France. This further demonstrates the growing international significance of Asia's digital payment ecosystem.[24]

Efficient financial transactions are essential for the equitable functioning of digital health platforms, ensuring telemedicine services are accessible to everyone. Digital payment gateways provide secure methods for handling transactions, supporting billing, reimbursement, and subscription models. This integration guarantees fair compensation for health care providers and smooth access to medical services for patients, including those covered by social security provisions. By embedding telemedicine into the broader health system, DFS contribute to a more inclusive, efficient, and responsive health care delivery model, improving better health outcomes and reducing disparities.

Integrated DFS streamline telemedicine's financial aspects, enabling access to social security benefits for consultations, prescriptions, and other medical fees. Incorporating payment gateways into country-level DPI, allows health care providers to deliver a better user experience with stringent security standards to protect sensitive financial information and ensure traceability.

Additionally, digital payment gateways enhance health care accessibility by offering flexible payment options tailored to diverse socioeconomic backgrounds. For underserved populations without traditional banking services, mobile money platforms and digital wallets provide convenient alternatives for financial transactions within telemedicine platforms.[25]

[3.4] DPI for Health: A domain-specific linkage

DPI for Health or DPI-H is a set of domain specific components that capitalize on foundational technology infrastructure and DPIs via a service gateway. These can be thought of as health-specific building blocks that layer on top of existing DPIs to allow for integrated digitization of health.

Digital Registries

These are databases housing critical information on diverse entities like citizens, health care providers, facilities, and products. Examples from Asia include India's Ayushman Bharat Digital Mission (ABDM), which includes the ABHA Health account building upon the national digital ID. These registries assign unique and universal identities to each entity, serving as a singular source of truth. Users can directly access this data or integrate it into software and applications in a plug-and-play fashion. While these registries are relatively static, they can be enriched with ancillary data, which changes more rapidly, such as provider contact details, to facilitate communications. This information may also include details about facility services and the qualifications of health care workers.

Health interoperability or exchange layer

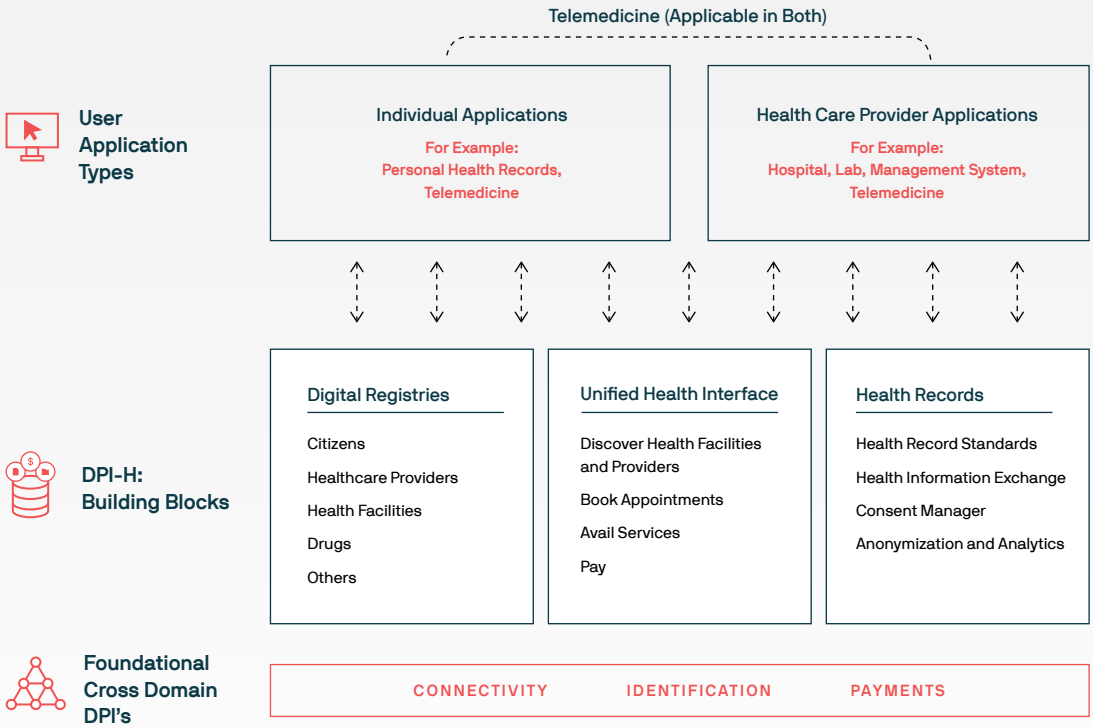
This refers to an open protocol facilitating access to various digital health services. This open network links end-user applications and health service provider (HSP) applications, enabling patients and HSPs to avail themselves of a wide array of digital health services. Examples include Indonesia's SatuSehat (One Health data system)[26] and Thailand's digitized Universal Coverage Scheme (UCS), which offer protocols for ID verification, claims, reimbursement and employ artificial intelligence (AI) for auditing.[27]

eHealth records

These systems are designed to store, manage, and share individuals' health information digitally. Alongside facilitating secure sharing and interpretation of health information between health care providers (with patient consent), eHealth record (EHR) platforms enable health care professionals to access comprehensive patient records, leading to informed decision making, effective treatment plans, and improved patient outcomes. Additionally, EHR systems play a crucial role in anonymizing and aggregating health data, allowing for the identification of disease trends and evaluation of health program effectiveness while upholding patient privacy and confidentiality. These EHRs are commonly underpinned by standards such as FHIR, Health Level 7 (HL7), and SNOMED across Asia to ensure interoperability and seamless exchange of health data.

Countries require anywhere between US$50–250 mn[iv] of investment to strengthen DPI-H.

Figure 5. Where telemedicine fits within a larger DPI and DPI-H ecosystem



Once a thorough situational understanding has been established, partners can engage in collaborative efforts that support governments in designing substantial, multi-year costed investments, guided by an implementation roadmap for multiple interoperable DPI and DPI-H components. Such investments would greatly benefit the implementation of truly sustainable and scalable telemedicine solutions.

As shown in *Figure 5*, telemedicine, at its most effective, is only a part of a much larger enabling environment underpinned by digital infrastructure, registries, and linkages. While not covered by this resource, a subsequent step for readers would be to explore how telemedicine fits into an enterprise architecture ecosystem, examining its role within a broader and more intricate network of application development. This topic is further explored in the **Digital Health Planning National Systems course**,[28] which is highlighted in the resource toolbox *(Toolbox #1)* at the end of this chapter.

[iv] This is investment per year, per country, usually projected over a five-year timeline (Co-Develop, 2023).

In conclusion, addressing technological foundations is essential for telemedicine to navigate the complex digital landscape effectively. By ensuring robust connectivity, secure payment gateways, reliable digital identification systems, and DPI-H integration, health care stakeholders lay the groundwork for scalable and interoperable telemedicine ecosystems. Without these fundamental elements, telemedicine initiatives risk becoming mired in inefficiencies and the phenomenon of "pilotitis," where pilot projects require parallel, high-effort identification, authentication, and other systems that are not feasible to scale.

In regions where telemedicine initiatives are already in place, integrating these foundational technologies through approaches such as **DPI as a service (DaaS)** would be crucial for scaling and enhancing existing systems. By incorporating robust infrastructure incrementally, these regions can overcome initial limitations and move toward more efficient, scalable operations.

This foundational infrastructure not only supports current operations but also sets the stage for future growth and innovation. With the integration of emerging technologies like AI as value-added layers, telemedicine can potentially enhance its effectiveness and efficiency. This synergy holds immense potential for scaling medical care to underserved populations, improving health outcomes, and advancing global health agendas.[29]

TOOLBOX #1

Assessing a country's digital health maturity and building block status

SOME AVAILABLE RESOURCES →

A Framework for Conceptualizing DPI-H (Co-Develop, 2023)

WHO Global Digital Health Strategy (WHO, 2022)

The DPI Approach: A Playbook (UNDP, 2023)

USAID Digital Health Investment Review tool (USAID, 2018)

Global Digital Health Monitor (Global Development Incubator, 2023)

Digital Health: Planning National Systems Course (USAID, ITU, WHO 2021)

Chapter 4

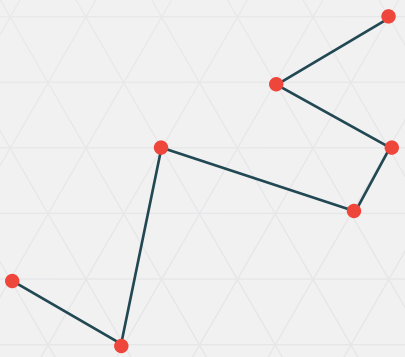
Policy and governance requirements to enable telemedicine

Policy is pivotal in advancing telemedicine, as it necessitates robust frameworks and guidelines to ensure its scalability, effectiveness, and safety. As per the WHO, policies that affect telemedicine are multidimensional, encompassing laws, regulations, and strategies that influence its implementation.[30]

Legal and regulatory policies, which may not specifically target telemedicine or health but impact its practice (e.g., pertaining to wider digital or health system contexts)

Core telemedicine policies, which directly address telemedicine services

Digital health policies, which ensure telemedicine integration into broader national health objectives and policies



[4.1] Legal and regulatory policies

Legal and regulatory policies do not directly address telemedicine but comprise a range of enforceable laws and regulations across multiple domains. These include both health-related policies like medical licensure or drug prescription regulations, as well as overarching policies such as data security, privacy, or consent laws. *Table 3* expands on some of these key policies, likely governance authorities, and their potential downstream effect on telemedicine.

Table 3. Key legal and regulatory policies impacting telemedicine

BROAD REGULATION	WHAT IS REGULATED?	GOVERNANCE AUTHORITY[v]	POTENTIAL IMPACT ON TELEMEDICINE SERVICES
Data privacy laws	Regulation of collection, storage, sharing, and permanent deletion of personal data	Ministry of IT / ICT / Electronics	Ensures confidentiality and security of patient data transmitted during telemedicine consultations. Protects patient privacy and fosters trust in remote health care.
Consent frameworks	Protocols for obtaining informed consent from citizens for digital services	Ministry of IT / ICT / Electronics	Ensures that patients understand the risks and benefits of telemedicine. Establishes clear consent processes for remote consultations, enhancing patient autonomy and trust in telemedicine.
National digital architecture	Infrastructure and standards for digital systems within a country	Ministry of IT / ICT / Electronics	Facilitates interoperability between telemedicine platforms and health care providers. Improves access to telemedicine services by creating a cohesive digital health care ecosystem.
Practitioner licensure	Regulations determining the authorization of health care providers to practice	National Medical Council / National Medical Association	Streamlines licensure processes for telemedicine practitioners, expanding access to remote health care services across state or national borders. Ensures provider competence, practitioner discovery, and patient safety.
Code of conduct of health care providers	Professional standards and guidelines for health care practitioners	Ministry of Health	Maintains quality and ethical standards in telemedicine practice. Reduces risk of malpractice and ensures patient safety during remote consultations. Upholds professionalism and trust in telemedicine.
Malpractice / medical negligence	Legal standards and consequences related to medical malpractice and negligence	Ministry of Health / Ministry of Justice	Establishes accountability for health care professionals in telemedicine, reducing the risk of errors and ensuring patient safety.
Guidelines for drug prescription	Protocols for prescribing medication, including in telemedicine settings	National Drug or medical product boards / Ministry of Health T	Ensures safe and appropriate prescribing practices during remote consultations. Provide the guidance on how patient identity is verified, and if digital prescriptions can be provided based on a virtual consultations.

[v] This is a broad selection of the likely governance agencies separated with a '/', based on an understanding of the Asia region. Rather than be prescriptive, it is meant to provide the reader with a broad understanding of likely governance authorities.

It is crucial to recognize that legal frameworks vary between countries, and specific regulations may not be identical either in content or nomenclature. In some cases, regulations may be subsumed within broader laws. For instance, malpractice laws might be integrated into comprehensive health care code of conduct regulations.

In the Asia region, countries like Bangladesh, India, Vietnam, and Sri Lanka stand out for their available and ratified legal and regulatory frameworks. They feature personal data protection acts, clear digital drug prescription guidelines, and well-defined practitioner policies, amongst others. Meanwhile, Pakistan, the Philippines, Myanmar, and Uzbekistan are witnessing rapid regulatory development but still have gaps in certain areas. Efforts are needed to strengthen regulation in countries like Afghanistan, Kazakhstan, Fiji, and Timor-Leste, where many regulations are not available or require significant development *(Table 4, on page 34)*.

Common challenges to implementation in the region have included coordination between regulatory authorities during enforcement, collaboration with civil society when updating regulations, and lack of awareness and in-turn compliance by the population.

While partners cannot directly draft or implement legal and regulatory policies, supporting best practice exchange can benefit in the implementation of aligned regulatory and legal frameworks to ensure the safe and ethical scaling of telemedicine.[31]

These overarching policies and regulations are not only enablers but also crucial determinants shaping how health data, health privacy, and health platforms are regulated as health technology scales. As telemedicine and other health technologies advance, they rely heavily on these underlying frameworks to draw regulatory boundaries. Thus, ensuring robust and comprehensive legal and regulatory frameworks becomes imperative to safeguarding patient rights, promoting ethical practices, and fostering innovation in health care delivery across the Asian continent.

[4.2] Dedicated telemedicine policies

The landscape of telemedicine policies across Asia remains varied and, in many cases, nascent. A recent study conducted across 51 Asian countries revealed that **only 20 countries, comprising approximately 39 percent of the total, have some form of telemedicine law, policy, regulation, or guidelines in place. Among these, 15 countries have enacted binding telemedicine laws**, signaling a growing recognition of the importance of formal regulation in governing telemedicine practices.

As discussed in Chapter 1, telemedicine utilization in most Asian countries prior to the pandemic was limited and often hindered by regulatory barriers. However, the unprecedented disruptions caused by the pandemic prompted swift government responses aimed at promoting telemedicine adoption.

Many governments expedited telehealth reforms, introducing policies and regulations within weeks that would otherwise have taken years to develop and implement. This rapid transition underscores the critical role of telemedicine in maintaining continuity of care during crises and has catalyzed the integration of telemedicine into mainstream health care systems across Asia *(Table 4, next page)*.

Table 4. Snapshot of telemedicine policies and their overseeing authority across the Asia region

COUNTRY	TELEMEDICINE POLICY AND YEAR	GOVERNANCE AUTHORITY
Bangladesh	Telemedicine Guidelines, 2020	Ministry of Health and Family Welfare – Directorate General of Health Services
India	Telemedicine Practice Guidelines, 2020	Minsitry of Health and Family Welfare
Indonesia	Health care services during the COVID-19 pandemic: 1. IMC Regulations, 2020 2. Ministry of Health Decree No. HK.01.07/ MENKES/4829/2021 – Guideline on Telemedicine, 2021	Ministry of Health – Kemenkes
Japan	1. Medical treatment using telephones and information communication equipment during the spread of new coronavirus infections 2. Guideline concerning proper implementation of telemedicine, 2022	Ministry of Health, Labor and Welfare
Kazakhstan	Code of the Republic of Kazakhstan on Public Health and Healthcare System, 2020	Ministry of Healthcare
Malaysia	Malaysian Medical Council Advisory on Virtual Consultation (during the Covid-19 pandemic), 2020	Ministry of Health
Nepal	Telemedicine Guidelines for Registered Practitioners in Nepal	Ministry of Health and Population
Pakistan	Policy for Telemedicine in Pakistan, 2022	Ministry of National Health Services – Regulation and Coordination
Philippines	DOH-DILG-PHIC Joint Administrative Order No 2021-0001 titled Guidelines on the Implementation of Telemedicine in the Delivery of Individual-based Health Services	Department of Health
Singapore	1. National Telemedicine Guidelines, 2015 2. Health Services Act, 2023	Ministry of Health
Thailand	Notification on Guidelines in respect to Telemedicine and Online Clinics No. 54/2563 (2020)	Ministry of Public Health – Department of Medical Services
Vietnam	Circular No. 30/2023/TT-BYT on promulgating list of diseases and health conditions subject to telemedicine, 2023	Ministry of Health

While dedicated telemedicine policies are crucial for scaling telemedicine, **effective governance requires collaboration between the ministry of health and the ministry of Information and Communications Technology** (or its equivalent). This interaction often results in comprehensive data management, privacy, and consent frameworks, as well as the seamless rollout of advanced technologies, relevant for digital health initiatives like telemedicine. Most guidelines mentioned in *Table 4* designate the MoH as the primary decision-maker for telemedicine, with countries like Thailand and Pakistan identifying sub-divisions within the ministry.

However, involvement of Ministries of ICT, or equivalent regulatory bodies, is often overlooked. This collaboration is essential for addressing the technological and data-related challenges of telemedicine. The figure below illustrates two successful approaches to telemedicine ownership and governance, highlighting the importance of cross-ministerial collaboration.[32]

Sandbox Model

Singapore successfully rolled out nationwide telemedicine through the Licensing Experiment and Adaptation Programme (LEAP) in 2018 using a "sandbox" governance model. This model allowed the Ministry of Health to partner with private telemedicine providers, such as Doctor Anywhere and MyDoc, to manage risks and co-create regulatory and governance measures. After three years, the sandbox was closed in 2021, transitioning to formal regulation under the Ministry of Health via the Health Services Act in 2022.

Centralized Governance and Development Model

In contrast, India's centralized governance and development model for its rapidly scaling telemedicine solution, eSanjeevani[33], was conceptualized by the Ministry of Health and Family Welfare (MoHFW) in 2018. The Centre for Development of Advanced Computing (CDAC), the R&D arm of the Ministry of Electronics and information Technology, initially developed and continues to operate, maintain, and update the software as the technical partner. This model demonstrates a more centralized approach with the MoHFW retaining ownership and governance while leveraging CDAC's technical expertise.

Common themes observed across the telemedicine laws and guidelines specified in *Table 4* include requirements[vi] for registered medical practitioners for both public and private licensed health care professionals to provide telemedicine services, patient consent for teleconsultations, adherence to ethical standards and medical codes of conduct, and compliance with data protection laws to ensure patient confidentiality. Moreover, telemedicine regulations in countries with binding laws often impose penalties for negligence, misconduct, or privacy breaches by health care professionals, ranging from license suspension or cancellation to fines and imprisonment.

[vi] It is important to note that while a majority of these guidelines underscore the significance of these requirements, enforcement often relies on other legally binding regulations or laws.

In countries where there has been progress across these regulations, particularly in the Southeast Asia region, it is interesting to note the contextualized and nuanced nature of these policies. The notes listed in the next page illustrates these nuances in telemedicine guidelines across five countries — Bangladesh, India, Indonesia, Nepal, and Thailand, (mentioned in Table 4).

This limited selection is intended to offer a more focused and comprehensible example set, aiding the reader's understanding.[34]

Registered medical practitioners (RMPs)

Telemedicine guidelines for all five countries address the use of telemedicine by practitioners, ensuring that only registered medical practitioners (RMPs) across both public and private health are authorized to engage in such practices. In Nepal and Indonesia, RMPs must possess thorough knowledge of telemedicine principles and technology by taking detailed online courses. Similarly, in India and Bangladesh, RMPs are required to complete mandatory online courses to qualify for providing online consultations. Thailand mandates health care providers to file forms with the health authority to include telemedicine in their services. Interestingly, India and Bangladesh have explicitly prohibited technology platforms based on AI or machine learning from counseling or prescribing medications to patients.

Patient verification and authenticity mechanisms

Patient verification and authenticity mechanisms vary across these countries. In India, Nepal, and Bangladesh, RMPs must ensure mechanisms for patients to verify their credentials and contact details. Verification involves confirming patient identity through various details such as name, age, gender, address, and phone number, with additional provisions for minors requiring consultation with an adult. Conversely, Thailand and Indonesia lack specific instructions for patient verification, although adherence to standard operating procedures and regulations is expected.

Prescription guidelines

Prescription guidelines in India, Nepal, Bangladesh, and Indonesia have strict regulations on the types of drugs that can be prescribed over teleconsultation, while Thailand outright prohibits prescribing via a teleconsultation. While some telemedicine policies may mention these drugs as a guideline, they are regulated by multiple drug and pharmaceutical laws that are legally enforceable. For private providers, these guidelines act to mitigate risks such as misdiagnosis or overprescription for additional profit, which can compromise patient safety and quality of care in telemedicine settings.

Consent frameworks

Consent frameworks are a critical aspect addressed in all guidelines, albeit with differences. While explicit consent is required in Thailand and Indonesia, implied consent is allowed in India, Bangladesh, and Nepal. Recording telemedicine sessions is currently required by guidelines in four countries, with the exception of Nepal where it is not explicitly mentioned. However, guidelines across all countries lack specifics on how recordings should be maintained and for what duration.

Telemedicine platforms are subject to regulations

Telemedicine platforms are subject to regulations, with stricter guidelines in India and Bangladesh. These platforms must ensure RMP registration, provide practitioner details, and establish grievance redressal mechanisms to reduce reinforcement of misaligned incentives. Thailand and Indonesia mandate adherence to existing data safety and security laws.

Despite the progress made in establishing telemedicine policies, there remain opportunities for further action, particularly in countries like Myanmar,[vii] Fiji, and Cambodia that lack formally ratified telemedicine guidelines. In such cases, telemedicine implementation has been listed as an objective under the national health strategies, although the status of implementation remains unclear. Countries like Afghanistan and Sri Lanka, without formal laws in this regard have witnessed the emergence of telemedicine systems and networks operated by non-government entities or private parties, often in collaboration with local governments, international organizations, and charitable institutions. These initiatives underscore the grassroot efforts to leverage telemedicine to address health care gaps and improve access to quality care in underserved communities.

[4.3] Policy foundation for telemedicine: embedding in a digital health strategy

Highlighted in global documents like USAID's Vision for Action in Digital Health and WHO's Global Digital Health Strategy, the need to invest in foundational digital health policies aligned with country-level health goals is well documented. This alignment of digital health strategies to policies has been noted by many countries across Asia. Digital health strategies are also often developed sequentially following national health policies. Moreover, these strategies emphasize the importance of aligning with national health policies to achieve overarching health objectives.

This coherence ensures that digital health initiatives address current health challenges and significantly contribute to national health goals. **Establishing a robust policy foundation for digital health initiatives, including telemedicine, requires aligning digital health strategies with national health agendas. This alignment enhances their effectiveness in addressing health challenges and improving health outcomes.**

In Asian countries where digital health strategies are being formulated, promoting the inclusion of telemedicine as a focal point within the strategy will facilitate the development of cohesive and interconnected telemedicine guidelines. In cases where telemedicine policies were established before the digital health strategies came into practice, this integration can serve as a catalyst to bolster existing telemedicine frameworks. For example, Indonesia issued telemedicine guidelines in 2020 due to COVID-19, and their 2021 Blueprint for Health Digital Transformation Strategy 2024 highlighted the need to improve these guidelines for future scaling.

A real-time example of this is the Republic of Fiji, which is sequentially building out its policy landscape. The country launched two strategic health plans—2020–2025 and 2030—which clearly laid out national health priorities, including a clear emphasis on the digital landscape. Fiji then launched its digital health strategy in 2024, embedding it within the health policy goals and identifying telemedicine as a key tool for progress.

[vii] The guidelines for Myanmar mentioned in Table 4 are understood to be temporary, and specific to the pandemic

Privacy and Security: Overarching Concerns

As digital identity, financial services, connectivity, and their subsequent policies become more intertwined in Asia's increasingly digitized health ecosystem, **privacy and security concerns loom large.** While chapters 3 and 4 touched on these concerns, the following paragraphs briefly expand on them and provide potential avenues for strengthening privacy and security measures.

Experiences with data breaches have made the public cautious about the vulnerabilities inherent in these technologies. Incidents across countries involving unauthorized access to personal financial information or healthcare records highlight the urgent need for robust security measures.

Governments and private entities handling sensitive data, such as individual's HIV status, mental health records, reproductive health information, or gender identity, must implement stringent protocols to protect against breaches and uphold patient confidentiality amidst societal stigma and discrimination concerns.

What does it take to improve privacy and strengthen data security?

To improve privacy and strengthen data security, the use of tools like encryption, multi-factor authentication, and regular security audits has been growing, and should continue to be encouraged. Encryption encodes data during transmission and storage, preventing unauthorized access. Multi-factor authentication adds an extra layer of security by requiring users to verify their identity through multiple methods, such as passwords and biometrics. Regular security audits and vulnerability assessments help identify and mitigate potential risks before they can be exploited.

Additionally, DFS need to implement secure payment gateways and fraud detection systems to protect transactions and personal financial data. Consent managers and secure identity wallets empower individuals to control how their information is shared, fostering trust and transparency in digital interactions. Consent managers (p.26) allow users to manage and selectively grant permissions for data sharing, ensuring that sensitive information is disclosed only with explicit consent. Secure identity wallets (p.14) provide safe storage for digital identities, reducing the risk of identity theft or fraud. By collectively leveraging these measures, the resilience of digital ecosystems can be strengthened against threats while promoting responsible data stewardship.

In conclusion, the successful deployment of telemedicine interventions demands a strategic approach. This entails not only leveraging existing legal and regulatory structures to fortify them but also crafting dedicated telemedicine policies that provide a clear roadmap for scalability.

Furthermore, it necessitates embedding these initiatives within comprehensive digital health strategies, ensuring alignment with overarching national health care policies, and addressing privacy and security concerns. By adopting this multifaceted approach, we can effectively propel the advancement of telemedicine and maximize its potential impact on health care delivery.

TOOLBOX #2

Telemedicine implementation frameworks and guides that account for comprehensive policy enablers

SOME AVAILABLE RESOURCES →

Comprehensive telemedicine implementation guide (WHO, 2023)

Framework for the implementation of telemedicine as a service (WHO, 2017)

Assessing the maturity level of health institutions to implement telemedicine services (PAHO, 2020)

Global standards for accessibility of telehealth services organisation (ITU and WHO, 2022)

Chapter 5

Opportunities to advance telemedicine across Asia

The potential of telemedicine to address global health challenges, when viewed as part of a larger enabling ecosystem is undeniable. The available literature underscores its transformative impact on health care disparities and access to quality care.

Asia has a history of unsuccessful siloed telemedicine initiatives, emblematic of the scalability challenges prevalent in the digital health community of the early to mid-2000s. Despite these setbacks, our examination sheds light on the region's evolving landscape, highlighting resilience and adaptability in overcoming past obstacles.

Throughout this resource, we have analyzed the essential relationship between enabling technology, essential policies, and telemedicine. This is crucial for the sustainable growth of telemedicine while prioritizing the safety of health seekers. Focus must remain on necessity of DPI, DPI-H, and comprehensive forward-looking regulations to foster an environment conducive to telemedicine innovation and implementation. We have observed promising progress in both technological advancements and policy frameworks across Asia. However, the pace and scope of these advancements vary significantly among countries, which reflect the diverse health care landscapes in the region *(Table 5)*.

Table 5. Progress comparison across 18 Asian countries

COUNTRY	TECHNOLOGY ENABLERS				POLICY ENABLERS		
	CONNECTIVITY	DIGITAL PAYMENTS	DIGITAL ID	DPI-H	LEGAL & SECURITY	TELEMEDICINE POLICY	DIGITAL HEALTH STRATEGY
AFGHANISTAN	Weak	Not Available	Limited	None	Insufficient	None	None
BANGLADESH	Moderate	Not Available	Partial	Emerging	Robust	Published	Published
CAMBODIA	Good	Available	Limited	Minimal	Insufficient	None	Published
FIJI	Good	Not Available	Not Available	None	Insufficient	None	Published
INDIA	Good	Available	Comprehensive	Established	Robust	Published	Published
INDONESIA	Good	Available	Partial	Emerging	Robust	Published	Published
JAPAN	Excellent	Available	Comprehensive	Established	Robust	Published	Published
KAZAKHSTAN	Good	Not Available	Comprehensive	None	Insufficient	Published	Published
KYRGYZ REPUBLIC	Good	Not Available	Comprehensive	Minimal	Insufficient	None	None
MYANMAR	Good	Developing	None	Emerging	Developing	None	Published
NEPAL	Good	Not Available	Partial	Minimal	Robust	Published	Published
PAKISTAN	Weak	Available	Partial	None	Developing	Published	Published
PHILIPPINES	Good	Available	Partial	Minimal	Developing	Published	Published
SINGAPORE	Excellent	Available	Comprehensive	Established	Robust	Published	Published
SRI LANKA	Good	Available	Partial	Minimal	Robust	None	Published
TAJIKISTAN	Limited	Not Available	Limited	None	Developing	None	None
THAILAND	Excellent	Available	Partial	Established	Adequate	Published	Published
TIMOR-LESTE	Limited	Not Available	Limited	Minimal	Insufficient	None	None
UZBEKISTAN	Good	Not Available	Comprehensive	None	Developing	None	None
VIETNAM	Excellent	Available	Partial	Minimal	Robust	Published	None

NOTES

This scorecard has been elaborated in the Annexure to this document.

Japan and Singapore are included here as high-income country (HIC) examples for comparative reference.

This resource has already identified significant opportunities to advance telemedicine across Asia. These range from leveraging emerging technologies to fostering partnerships and advocating for supportive policies.

The following sections expand on three of these opportunities, highlighting illustrative areas for technical assistance, such as capacity building and further research, to help build toward these larger opportunities.

Opportunity #1

Innovative approaches to implement and expand telemedicine in geographically spread-out areas

This document has already outlined some of the challenges faced in island nations across the Asia–Pacific region *(refer to Chapter 3, p.19)*. In archipelago nations, such as Fiji, Kiribati, and the Philippines, telemedicine emerges as a crucial solution for overcoming the obstacles of delivering health care in geographically dispersed regions. Many remote communities in these regions have limited access to specialized medical care, underscoring the potential of telemedicine for remote consultations and diagnostics.

Understanding the hub-and-spoke model

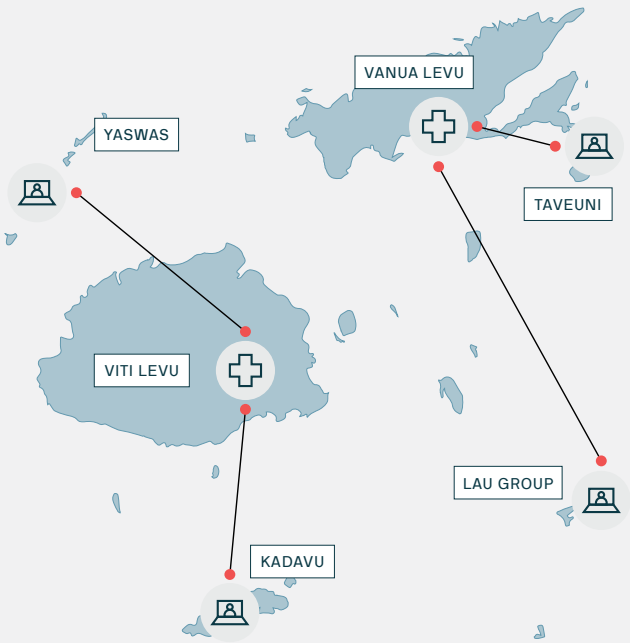
The **hub-and-spoke model**, a creative approach to telemedicine, not only corresponds with the geographical layout of these islands, where a central island often acts as a hub with smaller surrounding islands, but also aligns with traditional health care delivery mechanisms, with larger district and specialty hospitals located in the central islands and health posts in the smaller islands and islets *(Figure 6)*. **By leveraging existing technology or available telemedicine platforms, health care providers can bridge this gap, offering timely medical advice and treatment to remote patients, thereby alleviating strain on health care facilities.**

Illustrative areas of assistance could encompass supporting the development of a roadmap and toolkit to identify potential hub-and-spoke facilities, defining their roles, and developing a comprehensive toolkit. This toolkit would provide guidelines for setting up telemedicine infrastructure, protocols for patient care, and technical specifications for necessary equipment, ensuring a streamlined and effective implementation process.

Advantages of the Hub & Spoke Model

- Specialists from larger health care facilities connect remotely with patients in community clinics from home.
- Addresses shortages of specialists, particularly in remote areas.
- Increases access to specialty care while improving efficiency and cost-effectiveness.

Figure 6. An illustrative depiction of a hub-and-spoke telemedicine model in Fiji



Opportunity #2

Integration of AI and emerging technologies in telemedicine

The advancement of AI and the 5G technology presents an exciting opportunity to enhance the effectiveness of telemedicine across Asia. As discussed in *Chapter 3 (p.27)*, **deployed carefully with its inherent risks in mind**, AI holds significant potential as a layer to telemedicine. The potential of 5G networks to host increasingly complex features in telemedicine *(highlighted in Table 2, p.19)* further enhances the quality of consultations, enabling real-time video conferencing and remote monitoring of patients' vital signs. Here, we expand on how AI offers further potential in telemedicine across four key areas, with considerations regarding tentative risk areas:

AI-powered diagnostic tools

AI can analyze medical images, patient data, and real-time video feeds, aiding health care providers in making accurate diagnoses remotely. Additionally, AI can personalize treatment plans based on the unique profiles of patients, optimizing medical interventions. Addressing potential risks such as biases in AI algorithms and ensuring these tools are implemented in a rights-respecting way is crucial.

Patient engagement and support

AI-driven technologies like virtual health assistants and chatbots can enhance patient engagement by providing 24/7 access to information, scheduling telemedicine appointments, and conducting initial patient assessments. Implementing these technologies requires careful consideration of data privacy and security to protect patient information.

Remote monitoring and chronic disease management

AI can continuously monitor patients with chronic conditions using data from wearable devices and remote monitoring tools, ensuring timely follow-ups and alerting health care providers to early warning signs of disease progression. Mitigation strategies should include continuous monitoring for accuracy and reliability, as well as protocols for responding to false alarms

AI-driven clinical decision support

These tools can provide health care providers with evidence-based recommendations during teleconsultations, enhancing the quality of care delivered remotely. Regulation is necessary to ensure they support rather than override clinical judgment and to mitigate the risk of erroneous recommendations.

Once reliable connectivity, unique identity, DFS and DPI-H are established, incorporating emerging technologies into telemedicine platforms can significantly enhance health care delivery. Without this enabling environment, the aforementioned AI use cases will remain siloed in their deployment and potential impact. To realize the potential of AI in telemedicine, **illustrative areas of assistance** may include creating evaluation and funding mechanisms to encourage responsible innovation.

This will ensure high-impact AI applications in telemedicine are prioritized and supported. Building a robust evidence base through research and developing use cases can demonstrate the efficacy and benefits of AI in remote health care, providing tangible examples for wider adoption. Additionally, strengthening government and ecosystem capacity by investing in AI research and development, training programs, and aligning AI initiatives with government priorities can facilitate the integration of AI into telemedicine funding plans, ensuring sustainable and effective implementation.

Opportunity #3

Leveraging community health worker networks in telemedicine

Throughout Asia, a vast network of CHWs serves as the backbone of primary health care services for rural and underserved communities.[35] While their role in improving connectivity has been highlighted in Chapter 4, their importance in delivery, particularly in assisted telemedicine, as emphasized in *Chapter 2 (p.7)*, cannot be overstated.

Pivotal role played by Community Health Workers (CHWs)

Equipped with digital skills, these CHWs can play a crucial role in improving patient experiences by facilitating teleconsultations, providing basic and specialized medical care, and educating patients on preventive measures. By training CHWs to use telemedicine platforms, we can ensure that patients in remote communities receive timely and appropriate medical attention. This approach places the patient at the center of care, making health care more accessible and personalized. This opportunity is mutually beneficial, leveraging the strong presence and community engagement of CHWs to enhance the reach and efficacy of telemedicine, while telemedicine, in turn, empowers CHWs by improving their skills and effectiveness Further this opportunity leveraged correctly has the potential to strengthen the primary health care system by decentralizing care and utilizing local resources effectively.

Illustrative areas of assistance could include establishing comprehensive training programs to equip health care providers with the necessary skills for effective telemedicine implementation, covering topics such as teleconsultation protocols and patient communication strategies. Additionally, designing and implementing action plans to integrate telemedicine into the daily workflows of CHWs is crucial. Furthermore, providing supportive supervision and mentorship mechanisms is essential to offer ongoing guidance and assistance to CHWs in using telemedicine technologies and addressing any challenges they encounter.

Conclusion

This resource serves as a guide to understanding and advancing telemedicine across Asia. From tracing its historical emergence to identifying the technological and policy requirements for its successful implementation, this resource equips policymakers and stakeholders with the necessary insights to drive meaningful change in health care delivery.

By highlighting opportunities and mapping enablers across the region, this study lays the groundwork for scalable and impactful telemedicine initiatives. While not exhaustive, it provides a roadmap for further exploration and consideration, ensuring that telemedicine interventions contribute lasting value to both health care systems and individual patients in Asia.

Annexure

PARAMETER	CONNECTIVITY	PAYMENTS	IDENTIFICATION
Scoring basis	Country was given a score out of 300 based on 4 World Bank Indicators: • Individuals using the internet (% of total pop) + • Mobile cellular subscription (per 100) + • Fixed broadband connection (per 100) + • Cost per MBPS	Availability of real-time payments mechanism that is underpinned by an interoperability framework	Score out of 3 based on the status of their national ID (Digital Data, World Bank) • Score out of 3 based on the status of their national ID (Digital Data, World Bank) • Records are stored in a digital format rather than in paper records or ledgers. • Digital verification of identities and/or identity information. For example, name, date of birth, and other details can be verified or authenticated using digital rather than manual means in the context of in-person transactions. • Online digital identity can be used to access online services and transactions. This means digital credentials provide the ability to securely authenticate identities remotely.
	Excellent: ≥ 250	Available	3
	Good: 175–249.99		2
	Moderate: 125–174.99		1
	Weak: ≤ 124.99	Not Available	0

DPI-H	LEGAL & SECURITY	TELEMEDICINE POLICY	DIGITAL HEALTH STRATEGY
Score out of 3 based on the status of the availability of the following interoperable blocks: • Digital registries • EHR • Health interoperability or exchange	Country was given a score out of 4 based on the status of the availability of the following publicly available policies: • A digital data security act • An infrastructure technology act • Drug prescription regulation • A national digital architecture	Public availability of a national telemedicine policy, guideline, or government notification	Public availability of a national telemedicine policy, guideline, or government notification
3	3	Published	Published
2	2		
1	1		
0	0	Not Published	Not Published

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