

# Addressing Challenges in mHealth Implementation: Comparative Analysis of ASEAN and EU Approaches

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## 1. INTRODUCTION

E-health, in its broadest sense, encapsulates an array of Information and Communication Technologies (ICTs) employed within the healthcare sector. This includes electronic health records (EHRs), telemedicine, health analytics, and notably, mobile health (mHealth) applications. These technologies are poised to significantly impact healthcare delivery, potentially increasing efficiency and reducing costs. They can streamline care coordination, empower patients through improved access to health data, facilitate remote patient monitoring, reduce medical errors, and foster cost-effectiveness<sup>1</sup>.

As digital technologies continue to permeate various sectors, healthcare has emerged as a prominent field at the forefront of this transformation. The integration of electronic health, or e-health, signifies a paradigm shift in healthcare delivery, promising enhanced patient outcomes and optimised healthcare management<sup>2</sup>. Within the e-health area, mHealth stands out due to its direct patient interaction and role in making healthcare more widely available, particularly in resource-constrained regions. However, this potential does not come without challenges. Similar to e-health solutions, the path to successful mHealth implementation is paved with obstacles, necessitating a deep understanding of these issues, especially given the

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1. Chan, Janet, AHIP, RN, MLIS. 2021. Exploring Digital Health Care: eHealth, mHealth, and Librarian Opportunities. *J Med Libr Assoc* 109, no.3: 376–381. DOI: (<https://doi.org/10.5195/jmla.2021.1180>).

2. Eysenbach, Gunther. 2001. What is e-health? *Journal of Medical Internet Research* 3, no. 2: e20. DOI: (<https://doi.org/10.2196/jmir.3.2.e20>).

distinct socio-cultural, economic, and technological settings that distinguish various locations and demand tailored solutions<sup>3</sup>.

Transitioning from the broader context of e-health, it becomes clear that the success of mHealth is contingent upon navigating these regional nuances. This paper will focus on the difficulties and approaches related to mHealth, taking into account its distinct place in the e-health spectrum. It recognises that the implementation of mHealth solutions is not uniform. Consequently, this paper undertakes a comparative analysis of mHealth implementation between two markedly different geopolitical entities: the European Union (EU) and the Association of Southeast Asian Nations (ASEAN), each with its distinctive challenges and strategies. The selection of the EU and the ASEAN for this comparative study is particularly pertinent due to their contrasting approaches to health policy, economic development, and digital infrastructure, which can provide valuable insights into the scalable models of mHealth. These regions, with their unique healthcare landscapes shaped by distinct cultural and economic factors, provide a rich tapestry for comparison. By juxtaposing their experiences, this paper seeks to answer the critical question: “What are the key challenges and strategies in mHealth implementation across the EU and the ASEAN, and how do these approaches compare in addressing the diverse obstacles presented by each region’s unique healthcare landscape?”

The core of this study revolves around three pivotal areas: policy and governance, the potential and pitfalls of mHealth, and global challenges. Each domain is critical to the widespread adoption and success of mHealth projects.

The aim of this analysis is to examine the use of mHealth in the EU and ASEAN, identify challenges and illustrate recommendations based on existing research. The focus is on understanding how mHealth can be better implemented in these regions.

## **2. POLICY AND GOVERNANCE FRAMEWORKS: INFLUENCES AND IMPACTS**

The governance and policy frameworks in place can have a significant impact on the development and implementation of e-health and mHealth solutions. These

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3. Tadesse, Melaku, et al. 2023. Facilitators and Barriers to the Sustainable Use of eHealth Solutions in Low-and Middle-Income Countries: A Qualitative Descriptive Exploratory Study. *JMIR Medical Informatics* 10, no. 2: e10221492. DOI: (<https://doi.org/10.2196/10221492>).

frameworks have an impact on how widely e-health is accepted and used in health-care systems, in addition to providing the essential regulatory rules<sup>4</sup>.

## 2.1. ASEAN Perspective: Varied Approaches and Governance

ASEAN's policy and governance frameworks in e-health and mHealth are evolving at different rates. In Singapore, the Ministry of Health's establishment of National Telemedicine Guidelines and online courses for doctors underscores its advanced approach<sup>5</sup>. Local primary care clinics have introduced teleconsultations, reflecting telemedicine's growing importance in managing non-communicable diseases (NCDs) like type-2 diabetes, especially given Singapore's ageing population<sup>6</sup>. Struggling with problems such as overpopulation and environmental pollution, Indonesia is still developing in e-health<sup>7</sup>. In contrast to ASEAN countries, India's digital health initiatives, like the National Digital Health Mission (NDHM), provide a unique benchmark due to their scale and comprehensive approach. These efforts aim to build a unified digital health infrastructure, enhancing workforce capacity and system efficiency. India's ambitious strategy offers valuable contrasts to ASEAN's varied e-health development stages, highlighting diverse global approaches and potentially adaptable best practices for similar challenges.<sup>8</sup>

In the ASEAN region, the development and harmonisation of e-health and mHealth policies are marked by significant diversity in regulatory tactics. This divergence among member states not only presents barriers to the creation of a unified Asian mHealth ecosystem but also reflects the complex balance between

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4. Lefevre, Arthur, Chamberlain, Sara and Singh, Natasha S., et al. 2021. Avoiding the Road to Nowhere: Policy Insights on Scaling up and Sustaining Digital Health. *Global Policy* 12, no. 2: 225-235. DOI: (<https://doi.org/10.1111/1758-5899.12909>).

5. Ministry of Health, Singapore. Licensing Experimentation and Adaptation Program (LEAP) – A MOH Regulatory Sandbox. Retrieved from (<https://www.moh.gov.sg/home/our-healthcare-system/licensing-experimentation-and-adaptation-programme-leap---a-moh-regulatory-sandbox>).

6. Tan, Mui Suan, et al. 2023. Patients' Perspectives on Video Consultation for Noncommunicable Diseases: Qualitative Study in Singapore. *BJGP Open*, DOI: (<https://doi.org/10.3399/BJGPO.2023.0103>).

7. Archer, Norman, Cynthia Lokker, Maryam Ghasemaghahi, and Deborah DiLiberto. 2021. eHealth Implementation Issues in Low-Resource Countries: Model, Survey, and Analysis of User Experience. *Journal of Medical Internet Research* 23, no. 6: e23715. (<https://doi.org/10.2196/23715>).

8. Gudi, Nachiket, Theophilus Lakiang, Sanjay Pattanshetty, Suptendra Nath Sarbadhikari, and Oommen John. 2021. Challenges and Prospects in India's Digital Health Journey. *Indian Journal of Public Health* 65, no. 2: 209-212. ([https://doi.org/10.4103/ijph.IJPH\\_1446\\_20](https://doi.org/10.4103/ijph.IJPH_1446_20)).

national healthcare priorities and the emerging needs of a globalised health context. The stark contrast in healthcare policies across the ASEAN countries, ranging from advanced systems in places like Singapore to evolving frameworks in nations like Indonesia<sup>9</sup>, highlights the challenges of regional integration.

Notably, in the face of global health crises such as pandemics, the necessity for integrated e-health and mHealth policies becomes more pronounced. The need for a collaborative and coordinated approach is no longer just a regional preference but a global imperative. This is where ASEAN's collective efforts come into play<sup>10</sup>. ASEAN meetings have become platforms where member states discuss and strategise on strengthening their regional health architecture. These discussions aim not just at pandemic preparedness and response but also at building a resilient healthcare infrastructure that can withstand and adapt to future health emergencies<sup>11</sup>.

These efforts are exemplified by initiatives such as the Asia e-health Information Network (AeHIN) and its "Mind the GAPS, Fill the GAPS" framework. This initiative is a testament to ASEAN's commitment to enhancing healthcare cooperation. By focusing on key areas like Governance, Architecture, People and Programme Management, and Standards and Interoperability, AeHIN seeks to create a more cohesive and standardised digital health landscape across ASEAN countries<sup>12</sup>. The framework's holistic approach underscores the importance of multifaceted cooperation in healthcare, encouraging not just inter-country collaboration but also cross-sectoral partnerships.

However, the realisation of these objectives should focus on regional rather than country-centred strategies. This is because the individual approach, while addressing specific national needs, often overlooks the potential benefits of regional co-operation, particularly in terms of economies of scale. For example, the development of mHealth infrastructure and solutions can be more cost-effective and innovative when approached from a regional perspective. Benefiting from shared

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9. Tan, Mui Suan, et al. 2023. Patients' Perspectives on Video Consultation for Noncommunicable Diseases: Qualitative Study in Singapore. *BJGP Open*, DOI: (<https://doi.org/10.3399/BJGPO.2023.0103>).

10. Agoramorthy, Govindasamy. 2017. Legal and Health Dilemmas Challenging India's E-Cigarette Endorsement. *Cancer* 23, no.16:3197. DOI: (<https://doi.org/10.1002/cncr.30836>).

11. ANTARA. 24 August 2023. ASEAN Ministers Discuss Strengthening Regional Health Architecture. Retrieved from (<https://en.antaranews.com/news/291954/asean-ministers-discuss-strengthening-regional-health-architecture>).

12. The ASEAN. 7 December 2022. Digital Infrastructure for Universal Health Care in ASEAN. Retrieved from (<https://theaseanmagazine.asean.org/article/digital-infrastructure-for-universal-health-care-in-asean/>).

resources, knowledge and technologies can lead to more efficient health solutions that benefit the entire region<sup>13</sup>.

## 2.2. European Perspective: Striving for Coherent E-health Integration

The European Union's vision for e-health is ambitious, seeking to transcend national boundaries and create a unified digital healthcare ecosystem. This vision is encapsulated in the EU Commission's Communication on the digital transformation of health and care, which sets forth three critical priorities: secure cross-border access to citizens' health data, fostering personalised medicine through a shared data infrastructure, and empowering citizens with digital tools for health management and interaction with healthcare providers. The Communication outlines actionable steps to achieve these goals, reflecting a commitment to advancing healthcare through digital innovation<sup>14</sup>.

The EU's mHealth policy reflects this broader objective, intending to use mobile technologies to improve healthcare delivery and patient outcomes. The creation of the EU mHealth Hub demonstrates this commitment by fostering research, innovation, patient safety, and data protection while aiming for interoperability across the continent's health systems<sup>15</sup>. This vision is deeply embedded in the European Health Data Space (EHDS), which aims to facilitate the accessibility, exchange, and secure handling of health data within the EU. EHDS is focused on empowering individuals in managing their health data, supporting the usage of health data for enhancing healthcare services, and fostering a collaborative environment for health-related research and policy-making<sup>16</sup>.

Recent legislative measures in Germany, including the Digital Act and the Health Data Use Act, are emblematic of efforts within individual EU countries to align with the EHDS. These laws aim to digitise health records and introduce e-prescriptions by 2024, bolstering Germany's contribution to the EU's digital healthcare harmo-

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13. Stoumpos, Angelos I., Fotis Kitsios, and Michael A. Talias. 2023. Digital Transformation in Healthcare: Technology Acceptance and Its Applications. *International Journal of Environmental Research and Public Health* 20, no. 4: 3407. DOI: (<https://doi.org/10.3390/ijerph20043407>).

14. European Commission. Shaping Europe's Digital Future - eHealth. Retrieved from (<https://digital-strategy.ec.europa.eu/en/policies/ehealth>).

15. CORDIS EU Research Result. 2022. Health for All: European Mobile Health Hub. Retrieved from (<https://cordis.europa.eu/article/id/441971-health-for-all-european-mobile-health-hub>).

16. EU Commission. European Health Data Space. Retrieved from ([https://health.ec.europa.eu/ehealth-digital-health-and-care/european-health-data-space\\_en](https://health.ec.europa.eu/ehealth-digital-health-and-care/european-health-data-space_en)).

nisation efforts. Furthermore, the Hospital Transparency Act will enable German patients to access comprehensive information about hospital services, echoing the EU's dedication to transparent and patient-focused healthcare<sup>17</sup>.

These legislative developments in Germany are part of a larger narrative within the EU, where varying levels of digital adoption and the need for standardisation across borders present ongoing challenges. The push for an integrated e-health and mHealth ecosystem within the EU faces obstacles such as disparate technological adoption rates, regulatory discrepancies, and the complexities of cross-border data exchange. To address these problems, the EU seeks to improve the coherence of digital health initiatives, emphasising the need of improving patient care through digital transformation. This journey is marked by collaborative efforts to harmonise legislative frameworks, promote technical interoperability, and ensure equal distribution of digital health benefits across all member states<sup>18</sup>.

### 3. MOBILE HEALTH: BALANCING OPPORTUNITIES AND RISKS

Certain technologies stand out for their potential influence as the digital transformation of healthcare develops. Among these, mHealth stands out as a particularly significant achievement. While e-health encompasses a wide spectrum of digital health projects, mHealth focuses on taking advantage of mobile devices' accessibility and flexibility. As the global use of mobile devices has increased, it is easier to reach patients directly through their smartphones and tablets. Given the potential for direct patient interaction and the issues that mobile platforms present, it is critical to look more into the worldwide effect and challenges of mHealth, which has the potential to enhance health outcomes and minimise healthcare expenses<sup>19</sup>.

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17. Jennings, Jordan. 2023. Germany's Gearing up for European Health Data Space (EHDS) Compliance. Taft Privacy & Data Security Insights, Retrieved from (<https://www.privacyanddatasecurityinsight.com/2023/10/germanys-gearing-up-for-european-health-data-space-ehds-compliance/#page=1>).

18. European Commission. Shaping Europe's Digital Future - eHealth. Retrieved from (<https://digital-strategy.ec.europa.eu/en/policies/ehealth>).

19. Ni, Zhao, Martini, S., and Spaulding, Erin M., et al. 2023. Editorial: Future Trends and Directions of Using mHealth Strategies to Prevent and Treat Cardiovascular Diseases. *Frontiers in Public Health*. DOI: (<https://doi.org/10.3389/fpubh.2023.1246918>).

However, in addition to this potential, mHealth introduces new obstacles and hazards that must be carefully controlled<sup>20</sup>.

### 3.1. ASEAN Perspective: Addressing the Digital Divide with Measured Optimism

In the ASEAN region, mHealth initiatives offer promising avenues for bridging healthcare gaps. While smartphone penetration rates and mobile internet connectivity are burgeoning, leading to optimistic projections, there remains a notable digital divide across and within countries. For instance, Singapore's HealthHub app is a pioneering example, providing a one-stop portal for personal health records and information<sup>21</sup>. However, initiatives like these are contrasted by the challenges in countries like Myanmar, where mobile network access and health infrastructure are limited<sup>22</sup>. The health system in Myanmar has been severely disrupted by civil unrest and military attacks. This has led many internally displaced people to seek medical assistance in neighbouring countries due to limited access to health services and supplies in Myanmar<sup>23</sup>. Telemedicine programmes in the Philippines targeting distant populations<sup>24</sup> and Indonesia's mobile maternal healthcare are two examples of mHealth's impact in ASEAN<sup>25</sup>. Despite these advances, efforts must continue to assure fair access and address the severe digital divide, which, if not addressed, has the potential to worsen health inequities.

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20. Moreno-Ligero, Marta, Lucena-Anton, D., and Salazar, A., et al. 2023. mHealth Impact on Gait and Dynamic Balance Outcomes in Neurorehabilitation: Systematic Review and Meta-analysis. *Journal of Medical Systems*.

21. Smart Nation Singapore. HealthHub. Retrieved from (<https://www.smartnation.gov.sg/initiatives/health/healthhub/#:~:text=HealthHub%20is%20a%20Singaporeans%E2%80%99%20%E2%80%9Cdigital,take%20control%20of%20their%20health>).

22. Kyaw, Hnin Kalyar, Kyu Kyu Than, Karin Diaconu, and Sophie Witter. 2023. Community Stressors and Coping Mechanisms in Accessing the Health System During a Double Crisis: A Qualitative Case Study from Yangon Region, Myanmar. *International Journal for Equity in Health* 22, 39. DOI: (<https://doi.org/10.1186/s12939-023-01851-4>).

23. Chen, Wei-Ti, Chengshi Shiu, Franco R Lee, Saiyud Moolphate, and Myo Nyein Aung. 2023. Infrastructure Collapsed, Health Care Access Disrupted, Myanmar People with Chronic Diseases Are in Danger. *Journal of Global Health*. DOI: (<https://doi.org/10.7189/jogh.13.03002>).

24. Macariola, Aitana Dy, and Theara Mae Capacion Santarin, et al. 2021. Breaking Barriers Amid the Pandemic: The Status of Telehealth in Southeast Asia and its Potential as a Mode of Healthcare Delivery in the Philippines. *Frontiers in Pharmacology* 12. Retrieved from (<https://doi.org/10.3389/fphar.2021.754011>).

25. Asian Development Bank. 2022. Care for Mothers and Their Children. Project Result / Case Study, September 16. Retrieved from (<https://www.adb.org/results/indonesia-private-sector-improving-health-care-mothers-and-their-children-0>).

The Asian Development Bank's reports on digital technology in healthcare provide insight into these disparities, highlighting the need for continued investment<sup>26</sup> and strategic policy-making<sup>27</sup>. However, the road to mHealth in ASEAN is filled with difficulties. As a result, there is a risk that, in the absence of effective treatments, mHealth will unwittingly increase health disparities<sup>28</sup>.

Despite the challenges, mHealth in ASEAN holds significant promise for improving healthcare access and outcomes. To capitalise on this potential, a concerted effort is needed from governments, the private sector, and the international community to bridge the digital divide. Strategic investments and policies tailored to the unique needs of each ASEAN country can drive forward a more inclusive and equitable healthcare future, ensuring that technological advancements in healthcare serve everyone, not just the few.

### 3.2. EU Perspective: Regulatory Innovation and Equity

In the European Union, mHealth is recognised as an innovative complement to traditional healthcare systems, aiming to enhance the quality and accessibility of care. The EU's dedication to health innovation is evident through initiatives that seek to harmonise the integration of mHealth across member states, acknowledging the diverse landscape of healthcare needs and digital capabilities<sup>29</sup>.

Nevertheless, the uptake of mHealth across the EU is not uniform, with adoption rates varying significantly.<sup>30</sup> For example, while northern EU countries may exhibit higher engagement with mHealth apps, southern and eastern regions are slower in adoption, often due to both regulatory hurdles and infrastructural limitations. Policy harmonisation is imperative to address the disparate mHealth adoption rates, aligning the regulatory frameworks to foster a more cohesive e-health eco-

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26. Asian Development Bank. Digital Technology. Retrieved from (<https://www.adb.org/what-we-do/topics/digital-technology/overview>).

27. Asian Development Bank. Health in Asia and the Pacific. Retrieved from (<https://www.adb.org/what-we-do/topics/health>).

28. Duine, Maaïke. 2023. Summary Report APE 2023, 10–12 January, Berlin, Germany Berlin Re-Visited: Building Technological Support for Scholarship and Scientific Publishing. Information Services & Use.

29. European Commission. 2023. Digital Health: Commission and WHO Launch Landmark Digital Health Initiative to Strengthen Global Health Security. Press release, June 5. Retrieved from ([https://ec.europa.eu/commission/presscorner/detail/en/ip\\_23\\_3043](https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3043)).

30. European Commission. 2019. eHealth Adoption in Primary Healthcare in the EU is on the Rise. Report/Study, June 18. (<https://digital-strategy.ec.europa.eu/en/library/ehealth-adoption-primary-healthcare-eu-rise>).



system across the EU. Engaging stakeholders from various sectors – healthcare providers, technology firms, and patient advocacy groups – is essential for navigating the regulatory and infrastructural challenges impeding mHealth adoption. Furthermore, investment in digital infrastructure, particularly in regions lagging behind, could enable more equitable access and adoption of mHealth services. Data from the European Commission’s e-health benchmarking reports could help to clarify these adoption patterns and identify areas for targeted improvement<sup>31</sup>.

Despite the existing barriers, mHealth has the capacity to significantly transform healthcare in the EU. The task for legislators, business executives and medical professionals is to collaboratively overcome these barriers to mHealth adoption and maximise its benefits for all residents of the EU.

#### 4. GLOBAL CHALLENGES AND THE WAY FORWARD

The ascent of mHealth is a global phenomenon, yet its adoption is fraught with challenges that transcend regional boundaries. The digital divide is a global issue that poses a substantial obstacle to the efficient implementation of mHealth.

Regulatory issues are a global problem as well. The incorporation of mHealth into healthcare systems necessitates the development of clear and effective regulatory frameworks. These frameworks must address a wide range of challenges, from mHealth application approval to data security and privacy<sup>32</sup>.

Furthermore, the global spread of mHealth creates significant ethical concerns. How can we ensure that mHealth solutions are accessible and beneficial to all, rather than aggravating health disparities? In an increasingly digital environment, how can we ensure patient privacy and security? In this regard, mHealth has enormous potential to improve healthcare delivery and outcomes<sup>33</sup>. Realising this promise, however, necessitates resolving the tremendous problems that come with it<sup>34</sup>.

Addressing these global challenges requires a concerted effort to devise clear, harmonised regulatory frameworks that can accommodate the rapid evolution of

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31. European Commission. 2018. “Benchmarking Deployment of eHealth among General Practitioners Final Report.” DOI: (<https://doi.org/10.2759/511610>).

32. Sleimann, Madelaine and Balcerek., et al. 2023. Health Care Utilization of Adolescent and Young Adult Survivors of Pediatric Hematologic Malignancies in Germany. *European Journal of Cancer Care*. DOI: (<https://doi.org/10.1007/s00432-023-05145-8>).

33. Adibi, Sasan. 2015. *Mobile Health: A Technology Road Map*. Springer International Publishing. DOI: (<https://doi.org/10.1007/978-3-319-12817-7>).

34. Terry, Nicolas P. 2017. Mobile health: assessing the barriers. *Chest* 151(2): 356-361. DOI: (<https://doi.org/10.1378/chest.14-2459>).

mobile technologies while safeguarding patient data. Additionally, strategies must be developed to enhance digital literacy and infrastructure to ensure that mHealth benefits all societal segments.

## 5. CONCLUSION

The digital revolution in healthcare, spearheaded by e-health and mHealth, heralds a transformative era for medical services, underlining the importance of efficiency and patient engagement. This paper has explored the multifaceted nature of mHealth deployment across two distinct regions: the European Union (EU) and the Association of Southeast Asian Nations (ASEAN), each facing unique challenges within their healthcare frameworks.

In the European Union, significant progress has been made in integrating digital health within its varied healthcare systems. However, challenges in achieving uniform adoption and integration of mHealth across its member states persist. The EU's efforts are mainly focused on creating a unified digital healthcare ecosystem, emphasising the need for regulatory harmonisation and equitable access to digital health services. Comparatively, in ASEAN, the approach to digital health is marked by a wide spectrum of legislative developments. Countries like Singapore exhibit advanced mHealth systems, whereas others face challenges in establishing fundamental digital healthcare frameworks, reflecting diverse socio-economic and technological landscapes. This diversity, although presenting challenges, also offers a rich ground for innovation and context-specific solutions that could inform global mHealth strategies.

In conclusion, the advancement of e-health necessitates tailored strategies sensitive to the socio-cultural, economic, and technological contexts of each region. It calls for robust policy frameworks, a steadfast commitment to data security, strategic mHealth adoption, and inclusive stakeholder involvement. The experiences and lessons learned from both the EU and ASEAN serve as valuable references for global stakeholders aiming to develop effective e-health policies. Although the journey toward comprehensive e-health is intricate, the promise it holds for global healthcare is immense and warrants concerted collaboration and strategic vision. Moving forward, the global health community must embrace the lessons from these regions to foster a more connected, efficient, and equitable healthcare future.

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