Adaptive Scenario Planning Development for Indonesian Digital Health Industry: Case Study of Export Support Services (ESS) in Promoting UK Companies Entering Indonesia

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ABSTRACT: The COVID-19 pandemic, once an unpredictable yet plausible future event, has proven to be a reality, highlighting the urgent need for adaptation. Factors such as varying Universal Health Coverage (UHC) maturity, limitations in healthcare infrastructure, and unpredictable private sector moves, including venture capital investments, add to the uncertainty. Like the COVID-19 pandemic, Brexit was another unpredictable yet plausible event that has become a reality. Export Support Service (ESS), a UK Department for Business and Trade (DBT) initiative, assists UK SMEs in expanding beyond the EU post-Brexit, including Indonesia's digital health sector. The study refines its strategy to navigate the market's complexities through adaptive scenario planning. This study identified 25 key factors shaping Indonesia's digital health future and developed three scenarios: "Cherry Blossom Park," "Volcano Eruptions Amidst a Forest," and "High-Tech Greenhouse in a Desert." Each scenario explores implications and opportunities, providing strategic guidance for ESS.

KEYWORDS: Inductive Scenario Framework, Indonesia Digital Health, Scenario Planning.

I. INTRODUCTION

COVID-19 was a key turning point for digital health, driving a telemedicine boom, remote monitoring, and accelerated regulations globally and in Indonesia. Indonesia's National Health Insurance (BPJS) and the e-Health Blueprint have integrated digital health into the healthcare system, responding to an aging population and shifting towards patient-centric care, as seen in future hospital digitization scenarios (Koebe et al., 2023). Technological advancements like genomic sequencing, AI diagnostics, predictive analytics, blockchain for health records, 5G, and VR are reshaping the healthcare industry. Private sector investments, including startups and venture capital, further fuel these innovations (O'Neil, 2022).

These factors have further bolstered the uncertainties faced by the Export Support Services (ESS) based in Indonesia, a UK government trade promotion body, as they cope with existing challenges in boosting the presence and market share of UK digital health companies in Indonesia.

ESS is a UK Government initiative created in response to Brexit, aimed at supporting UK businesses, particularly Small-Medium Enterprises (SMEs), in international trade to support the ambitious target to achieve £1 trillion in exports by the end of the decade, a 'race to £1 Billion export' strategy (DBT, 2024)1. ESS provides tailored services to help UK companies navigate challenges and foster trade relations in emerging markets like Indonesia across many sectors including digital healthcare (DBT, 2024)2.

The mix of both external and internal business challenges raises concerns about ESS's long-term business development strategy in facing unpredictable and uncontrollable uncertainties. Recognizing the rapidly evolving digital health landscape, past trends are outdated, and current trends may already be too late to capitalize on. ESS's current approach has left the UK's presence and market share relatively insignificant, highlighting the need for a more forward-looking strategy.

ESS should reframe and re-perceive its existing strategic approach to be more resilient and effectively navigate and respond to evolving market conditions, ensuring sustained success over the long term. This strategy will not only help UK companies navigate uncertainty but also position them to stay ahead of the competition as the future evolves.

The following are the key focal issues in this research:

1. What are the main driving forces and the key uncertainties that shape the future of Indonesia's digital health sector?
2. What are the plausible scenarios that can happen in 2035 for Indonesia's digital health sector?

3. What is the most suitable strategy framework for any identified scenarios for ESS Indonesia to cope with Indonesia's digital health development in 2035?

II. LITERATURE REVIEW

This literature review aims to explore how the study contributes to previous research on digital health transformation in emerging markets, particularly by utilizing foresight methods to enhance decision-making and strategic planning processes.

A. Past Research on Digital Healthcare Transformation in Emerging Markets

Globally, countries are facing challenges in adopting digital transformation to the conventional healthcare system. Manoj et al. (2024) explored digital governance and health system transformation in India, highlighting the need for capacity building, awareness generation, and robust policies to overcome challenges like limited infrastructure and digital adoption hesitancy. Meanwhile, Gupta et al. (2024) analyzed the impact of the ArogyaSetu app on India's digital health transformation, finding that it positively influenced stakeholders, improved governance, and supported the development of dynamic capabilities within the healthcare system. In Italia, Esposito et al. (2023) emphasized the need for future telemedicine in pediatrics to involve active patient participation from the planning stages, ensuring personalized, predictive, and preventive care that brings healthcare services closer to families. Sumarsono (2020) highlighted the need for strengthened distance communication, enhanced academic networks, and active collaboration among national and international stakeholders to improve e-health services in Indonesia, with a particular focus on telemedicine and the integration of various institutions for effective implementation and evaluation. Separately, Saputra et al. (2022) proposed a comprehensive post-pandemic recovery strategy for Indonesia's digital health transformation, emphasizing the need for mapping challenges, aligning solutions with the Global Strategy on Digital Health 2020–2024, engaging diverse stakeholders, and continuously evaluating and improving interventions.

In Latac and Caribbean, Werutsky et al. (2021) identified challenges in cancer research and innovation in Latin America and the Caribbean, including limited academic resources, dependency on public funding, and regulatory complexity, while highlighting emerging technologies like artificial intelligence and big data as key opportunities to advance cancer control efforts. Stucke (2019) discussed key challenges in digital health transformation for emerging markets, including capacity and access, infrastructure and data, health workforce, patient education and awareness, and quality and safety, while exploring how health technology can address these gaps and scale up effectively.

The studies across emerging markets, including Indonesia, highlight digital health's potential to enhance healthcare systems but also reveal varied challenges. They recommend strengthening policies and regulations for faster implementation but mainly addressing short- to medium-term trends without considering unpredictable long-term futures.

B. Scenario Planning and Its Role in The Digital Health and Relevant Industry

Akhlaghinia et al (2018) highlighted the influence of Big Data and Cloud as two key factors in shaping Iran's future digital health. Choi et al (2022) defined 7 key drivers that shape South Korea's digital health industry in the future including 1) the acceptability of data utilization; 2) the level of data literacy; 3) the status of healthcare data regulation; 4) the healthcare data system; 5) medical costs; 6) the convergence of ICT and biotechnology; and 7) the utilization of data in medical services. Meanwhile, Deloitte (2020) outlined how 4 key factors: 1) Government involvement in healthcare; 2) Care delivery evolution; 3) Consumer engagement in healthcare; and 4) New healthcare entrants and innovations will shape the future of the healthcare industry in the United States. Separately, Broenneke et al (2021) highlight 7 key driving forces that will shape Germany's future digital health in 2035 that includes: 1) Digitalization and Legal Frameworks; 2) Fast-Track Procedures; 3) Individualized, Integrated Treatment Pathways; 4) Interoperability and Data Use; 5) Data Protection and Consent Reform; 6) New Professional Fields; and 7) European Data Space).

In Indonesia, foresight studies in the digital health industry are still limited. Yulianti (2022) identified Government Policy and Free Trade as the two key factors shaping the future of the pharmaceutical industry in 2026.

The studies above offer valuable insights into the driving forces shaping the future of digital health in various markets. However, there is a notable scarcity of research on the future of digital health in Indonesia. This research aims to fill this gap by exploring potential future developments and complementing existing studies.

C. Scenario Planning vs Delphi Method vs Real Options Analysis vs Forecasting

The Delphi Method is a useful method to get insights from experts when there is limited information on specific areas (Fish et al, 2005). In this study, the future is considered an area with limited information, therefore an iterative process and social learning from the framework are highly regarded in contributing to this study process. ROA framework, on the other, is suitable for areas that require high certainty and accurate data and information for providing a well-informed option of strategies or conducting certain assessments on financial investments and projects (Bowman et al, 2001).

Contingency planning addresses a single uncertainty by developing plans for a specific exception or scenario (Thierauf, 2001). Choularton (2007) distinguishes three types of contingency planning: scenario-based contingency planning, preparedness planning, and all-hazards emergency planning. Scenario-based planning focuses on specific scenarios and is often used by humanitarian organizations and UN agencies. Preparedness planning builds on these scenarios and is utilized by governments and NGOs. Allhazards emergency planning is typically employed by national and civil defense agencies in developed countries. Contingency planning is most effective when the emergency preparedness structure is communicated through a comprehensive, all-inclusive approach (Choularton, 2007).

In situations with significant uncertainty and change, past high-cost surprises, and a lack of strategic thinking or new opportunities, scenario planning techniques are particularly helpful (Garvin & Levesque, 2006). While both forecasting and scenario planning aim to anticipate and prepare for future events, they are often confused. Forecasting creates possible futures, while scenario planning develops possible and potential ones (Lindgren & Bandhold, 2009).

Since the future is unpredictable, scenario planning is based on the idea that risks could materialize in various ways, as illustrated by the scenarios that emerge from the process. Unlike other approaches, scenario planning considers multiple uncertainties simultaneously and explicitly states that the outcomes may be perceived subjectively (Schoemaker, 1995).

Scenario planning involves imagining various what-if scenarios, anticipating unforeseen events, and using decision analysis to navigate optimistic and pessimistic futures. This approach helps firms design and implement strategic plans when these scenarios start to materialize, making them more prepared, adaptable, and effective, unlike organizations that rely on a single master plan and often lag behind competitors for being 'the late adopters' or 'followers' with relatively low market shares.

Scenario planning involves several components that work together to create a comprehensive and multifaceted view of the future. Figure 1 below visualizes the workflow process and the relationship between these components (Garvin and Levesque, 2006).
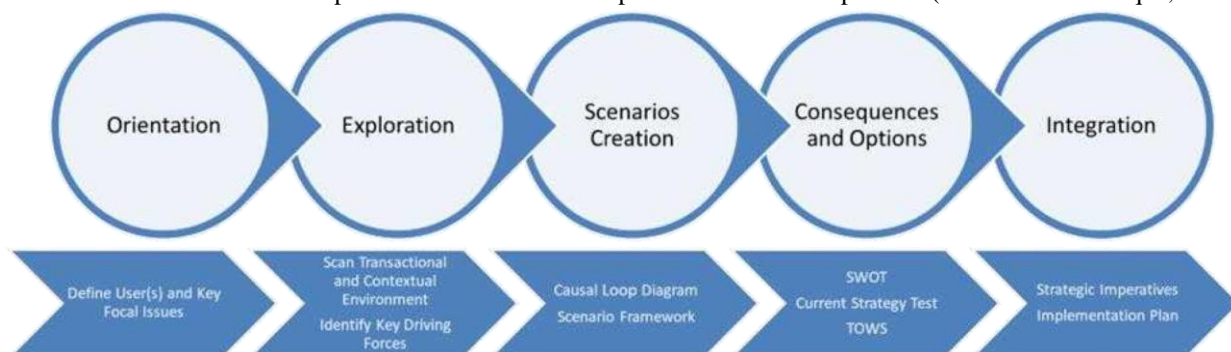

Figure 1. Scenario Planning Workflow (adapted for this study from Garvin and Levesque, 2006).

In this research, ESS currently improving its existing strategy in increasing the UK companies' presence and market shares in Indonesia's digital health market.

D. Strategy Formulation Framework (TOWS, Intensive Strategies)

The TOWS (Threats-Opportunities-Weaknesses-Strengths) Matrix helps managers develop four strategy types: SO (StrengthOpportunities), leveraging internal strengths to capitalize on external opportunities; WO (Weaknesses-Opportunities), improving internal deficiencies by utilizing external opportunities; ST (Strength-Threats), using strengths to mitigate external threats; and WT (Weaknesses-Threats), defensive strategies to reduce weaknesses and avoid threats. WT strategies are excluded from this thesis as they do not align with ESS's KPIs of increasing the UK companies' presence and market shares (Weihrich, 1982).

Intensive strategies, including market development, market penetration, and product development, demand significant effort when companies aim to strengthen their competitive position with current products (David, 2011). Market Development involves introducing current products and services to new geographical regions, and expanding the company's market reach. Market Penetration focuses on increasing the market share of existing products or services in current markets, leveraging strong positioning to capture more of the market. Product Development aims to boost sales by enhancing or adjusting existing products and services. This strategy often requires substantial investments in research and development to innovate and meet evolving customer needs. ESS uses these intensive strategies as a basis of a strategic approach recommendation to UK companies pursuing opportunities in the market.

E. Conceptual Framework

To investigate the business strategies to increase UK market share in Indonesia's digital health sector, the conceptual framework is intended to test whether the ESS current strategy will still be relevant against different scenarios produced and later identify suitable strategies that work with all or some scenarios that could include market development, market penetration, and product development. Business performance such as market share and UK brand presence can then provide feedback to adjust and improve existing strategies (Hourani, 2017). The conceptual framework is illustrated below in Figure 2.
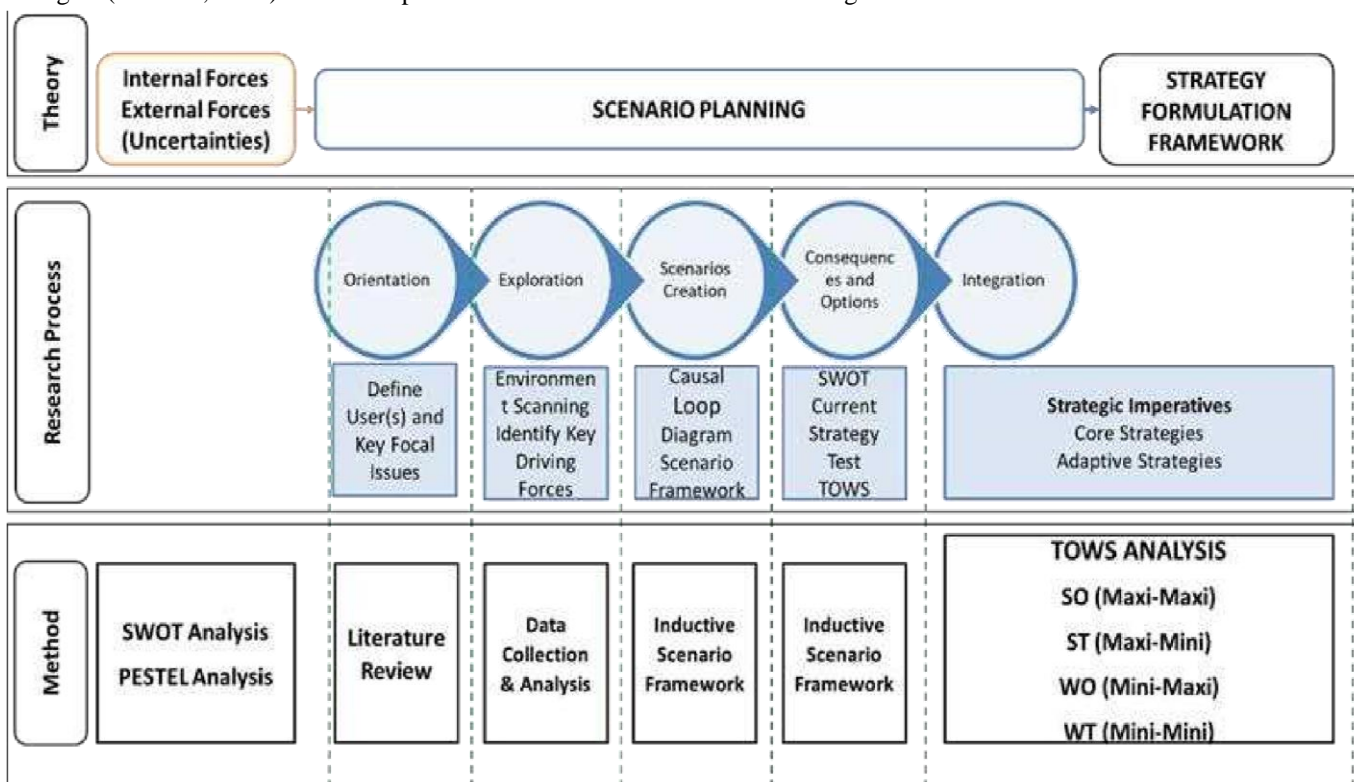

Figure 2. Conceptual Framework.

III. RESEARCH DESIGN AND METHOD

To answer the research questions outlined earlier, the author developed the research design framework by implementing the Scenario Planning approach below in Figure 3.
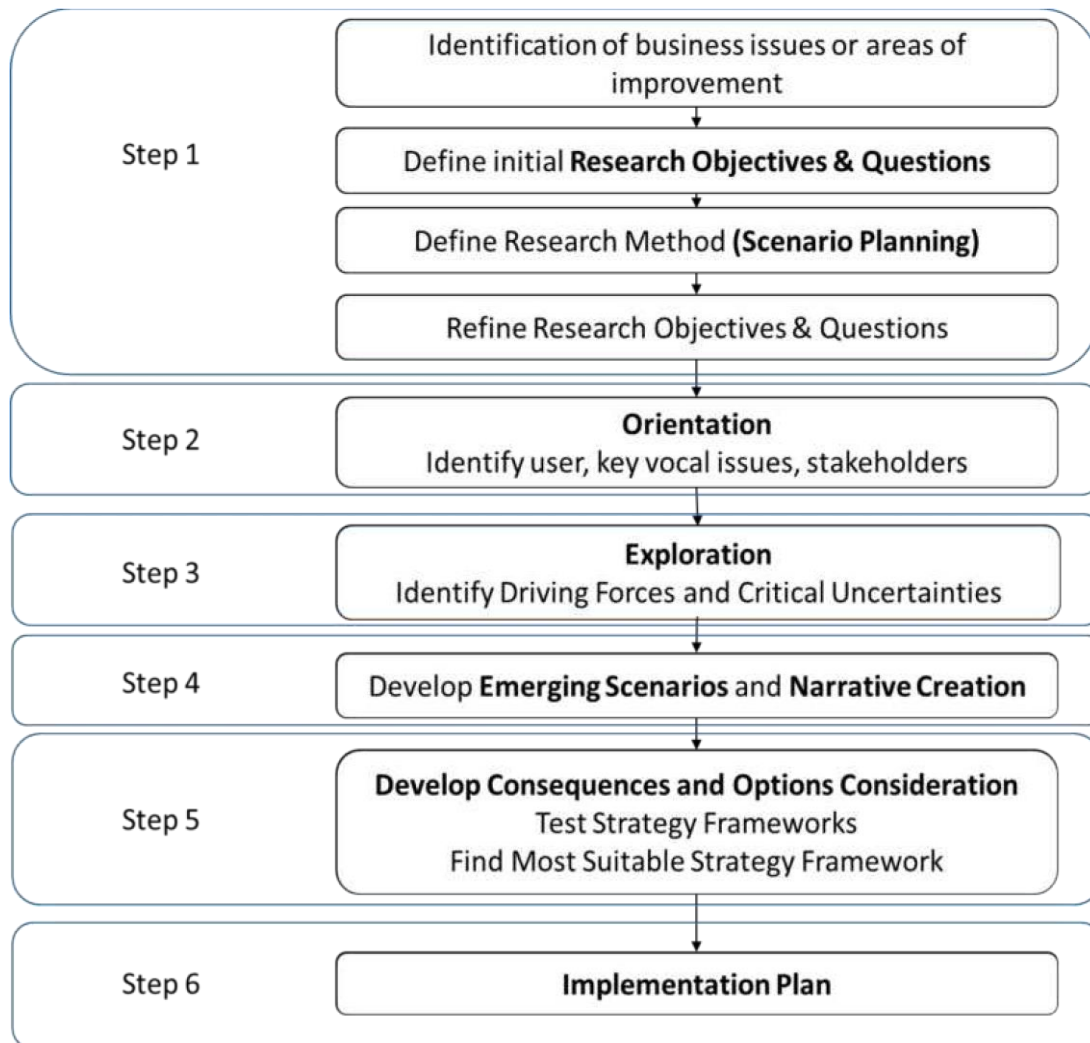
Fig 3. Research Design

The data collection and analysis method throughout all phases of the Scenario Planning methodology is outlined in the following figure.
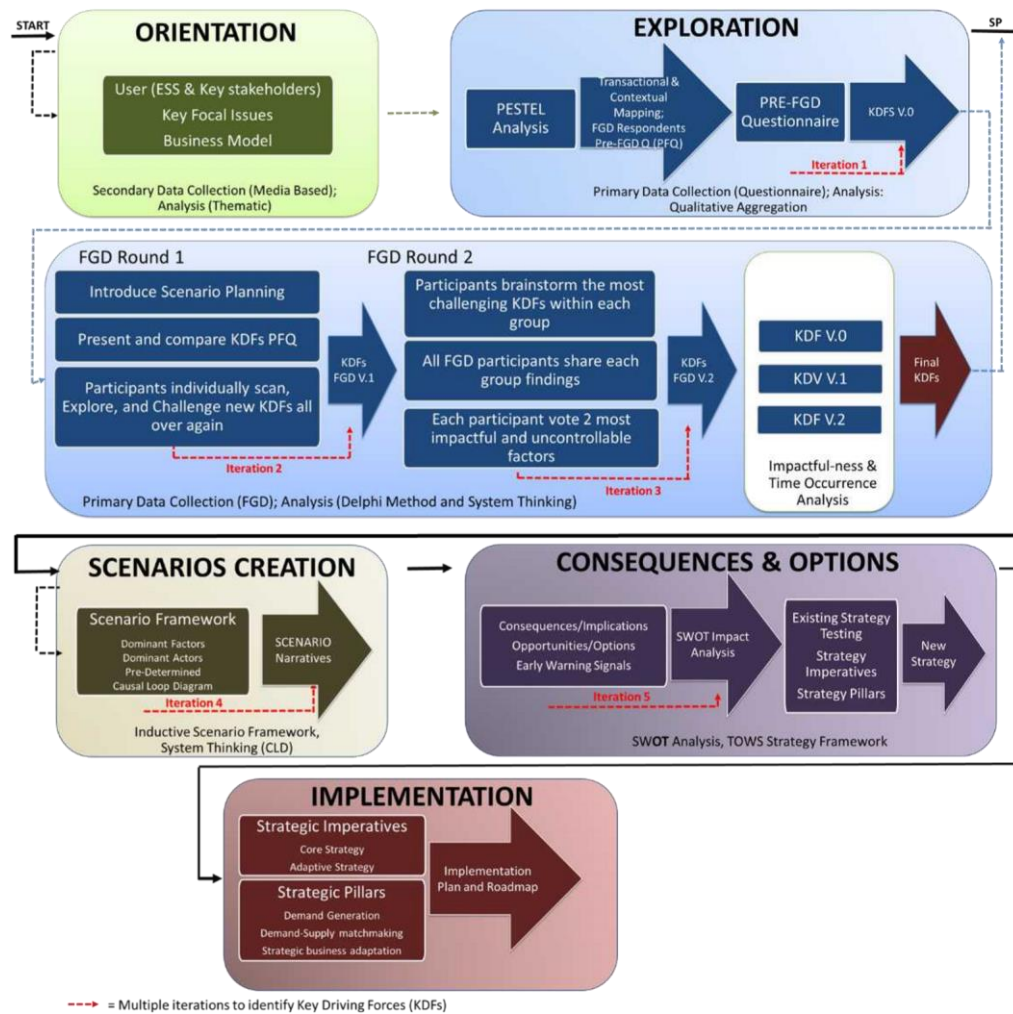
Fig 4. Data Collection and Analysis – Scenario Planning Exploration Stage

IV. FINDINGS

A. Stage 1 - ORIENTATION

To begin with, this research emphasizes the exploration of the key focal issue: 'What are the main driving forces and the key uncertainties that shape the future of Indonesia's digital health sector?' By synchronizing the key focal issues and the ESS's mission and objectives, the next key focal issues are: 'What are the plausible scenarios that can happen in 2035 for Indonesia's digital health sector?' and 'What is the most suitable strategy framework for any identified scenarios for ESS Indonesia to cope with Indonesia's digital health development in 2035'.

B. Stage 2 - EXPLORATION

The Exploration sub-chapter begins with a PESTEL (Political, Economy, Social, Technology, Environmental, and Legal) analysis assessing the correlation between internal factors and stakeholders within the transactional environment of Indonesia's digital health. It is then followed by scanning the contextual environment to identify actors and factors shaping the digital health sector. Further, an online questionnaire will be shared with the key FGD respondents to identify Driving Forces that shape the future of Indonesia's digital health. An offline FGD will then be conducted to test, re-scan, and compare any new or missing KDF from the questionnaire sent earlier by leveraging social learning from the FGD. The author then creates three inductive Scenario Framework from selected KDF to produce contrasting yet challenging scenarios, their respective CLD, and relevant scenario titles.

There were 11 questionnaire submissions received from the key FGD participants who later joined the offline FGD attended by 30 participants, ranging from internal ESS and UK Department for Business and Trade (DBT) Jakarta as the parent organization, local distributors, industry and professions associations, digital health experts, regulators, Non-Government Organizations, digital health consultants, and social communities.

The 25 KDFs identified in Fig 5 below, are presented in impactful-ness and time occurrence matrix and ranked based on voting consensus done at the FGD.
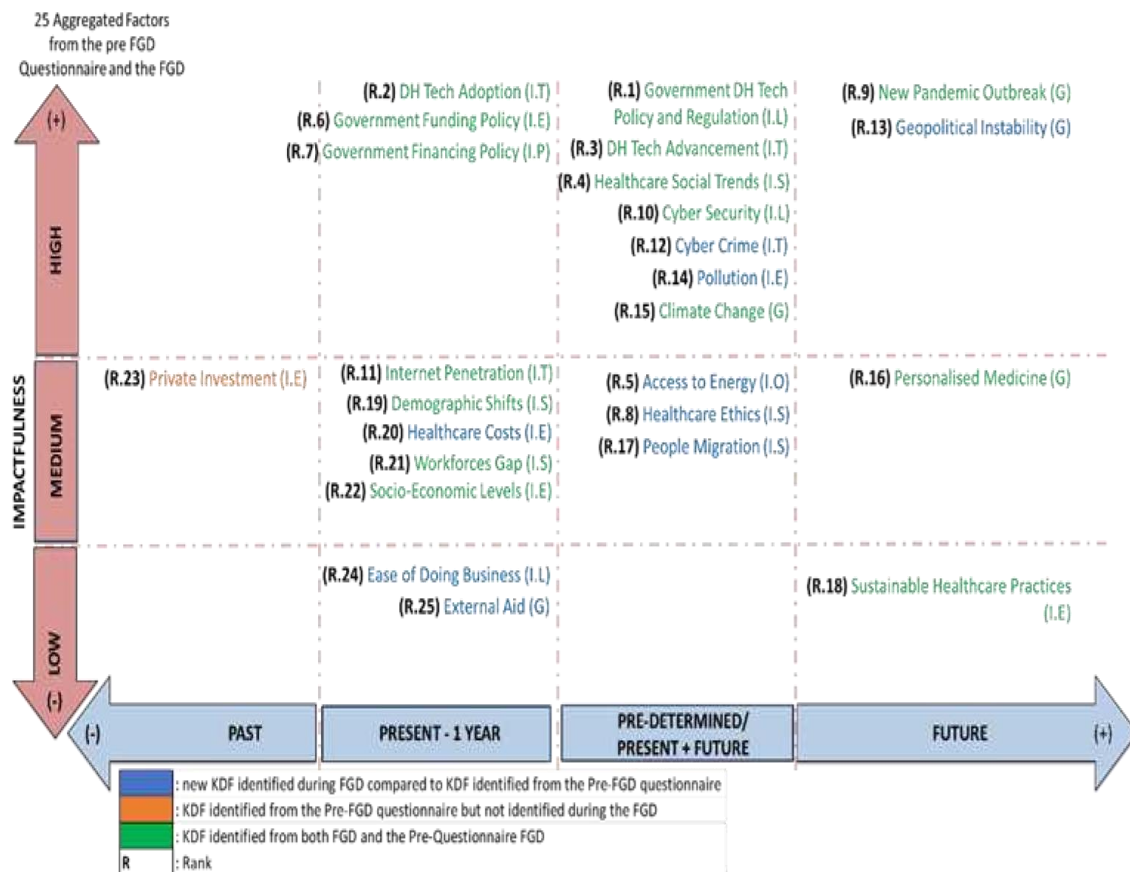

Fig.5. 25 Aggregated KDFs of Indonesia's Digital Health sector, presented in Impactful-ness & Time Occurrence matrix collected from the Pre-FGD Questionnaire and the FGD.

The 25 KDFs identified earlier will form the formation of the inductive scenario framework (Figure 6) which includes a Causal Loop Diagram (CLD (Figure 7) to build the base of the system and demonstrate how the selected shocking/disruptor factors influence it especially targeted factors at the end of the scenario (Haraldsson, 2004). Contrary to the deductive method, the inductive method allowed for a more creative, richer exploration of Indonesia's potential future by incorporating a wider array of influential factors, ensuring that the complexities and "vibes" of the strong KDFs were fully represented in the scenarios (Kahane, 2012).

Inayatullah (2013) emphasized that the double variable method developed by Galtung (1998) is excellent for strategy development; however, it is crucial to debate the key variables, a similar experience faced by the author during the FGD session. Its weakness is that no outlier scenario is developed. A careful consideration of Dator's (1979) four alternative futures was taken into despite the decision to take off the Steady State future as it represents a balance in the economy, the nature of a balanced, softer, and fairer society. The other three scenarios include Continued Growth, Collapse, and Transformation are represented by Cherry Blossom Park, Volcano Eruptions Amidst a Forest, and the High-Tech Greenhouse in a Desert respectively.
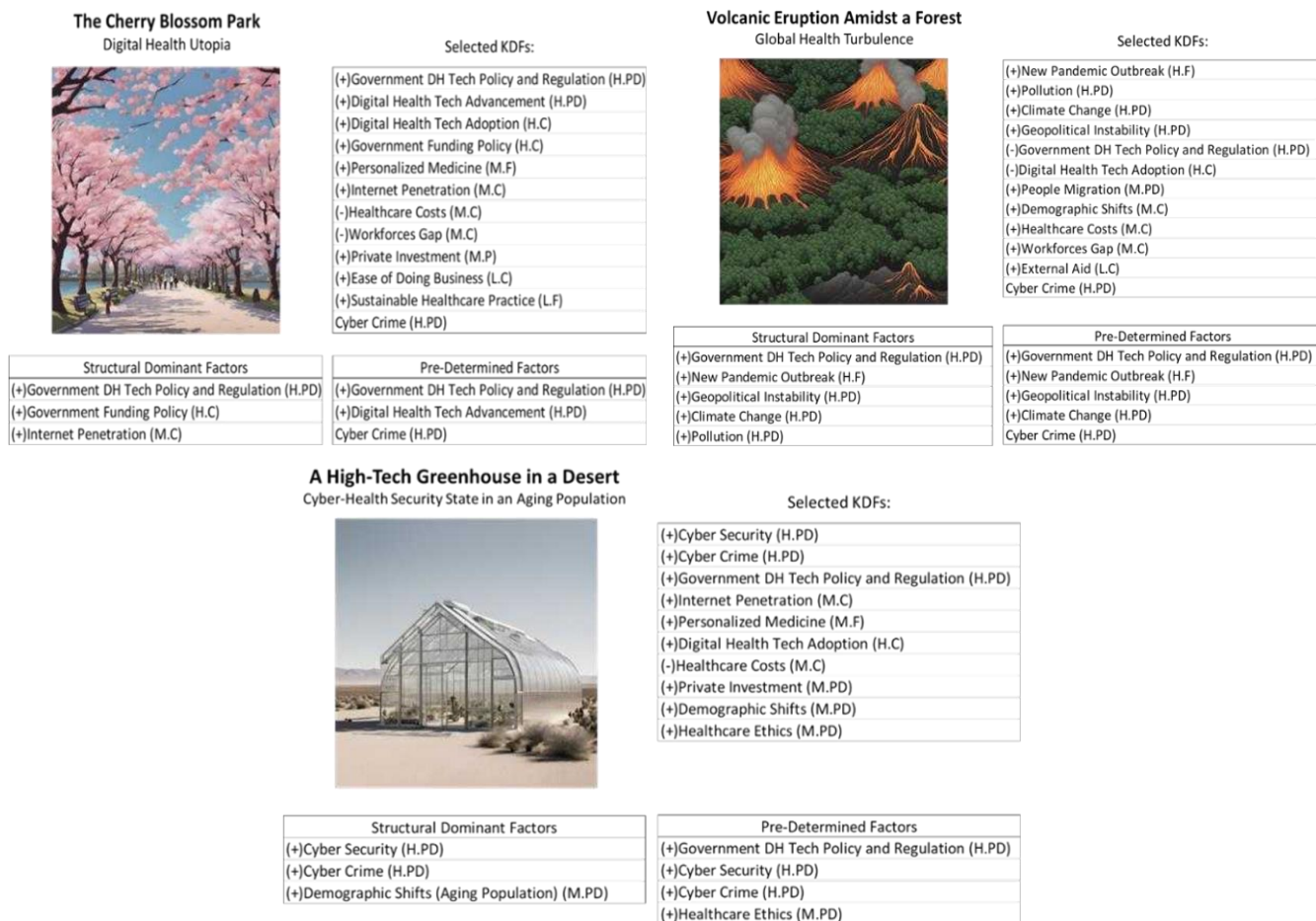
Fig. 6. Scenario Framework

The name "Cherry Blossom Park" was chosen to evoke a sense of growth and transformation, similar to how cherry blossoms signify renewal and beauty. This name reflects the scenario's focus on Indonesia's blossoming into a leader in digital health, symbolizing the positive outcomes and vibrant progress achieved through technological and policy advancements.

"Volcano Eruptions Amidst a Forest" name was selected to metaphorically represent the explosive and cascading challenges faced by Indonesia and the world in this scenario. Just as a volcanic eruption disrupts and transforms its surroundings, the compounded crises of a persistent pandemic and escalating climate change dramatically disrupt and overwhelm existing systems and infrastructures. The "forest" symbolizes the complex and interconnected nature of these global challenges, where every disruption—like an eruption—has widespread and interconnected impacts on the environment, society, and healthcare systems. "A High-Tech Greenhouse in a Desert" title was chosen to symbolize Indonesia's ability to thrive and innovate despite a challenging environment. Just as a greenhouse provides a controlled, nurturing space for growth in an otherwise harsh desert, Indonesia's digital health advancements and robust cybersecurity measures represent a flourishing sector amid the complexities and difficulties of a rapidly evolving global landscape. The "high-tech" aspect reflects the advanced technologies driving this success, while the "desert" signifies the tough conditions—such as cybersecurity threats and demographic shifts—that the country has navigated to achieve its pioneering status in digital health.
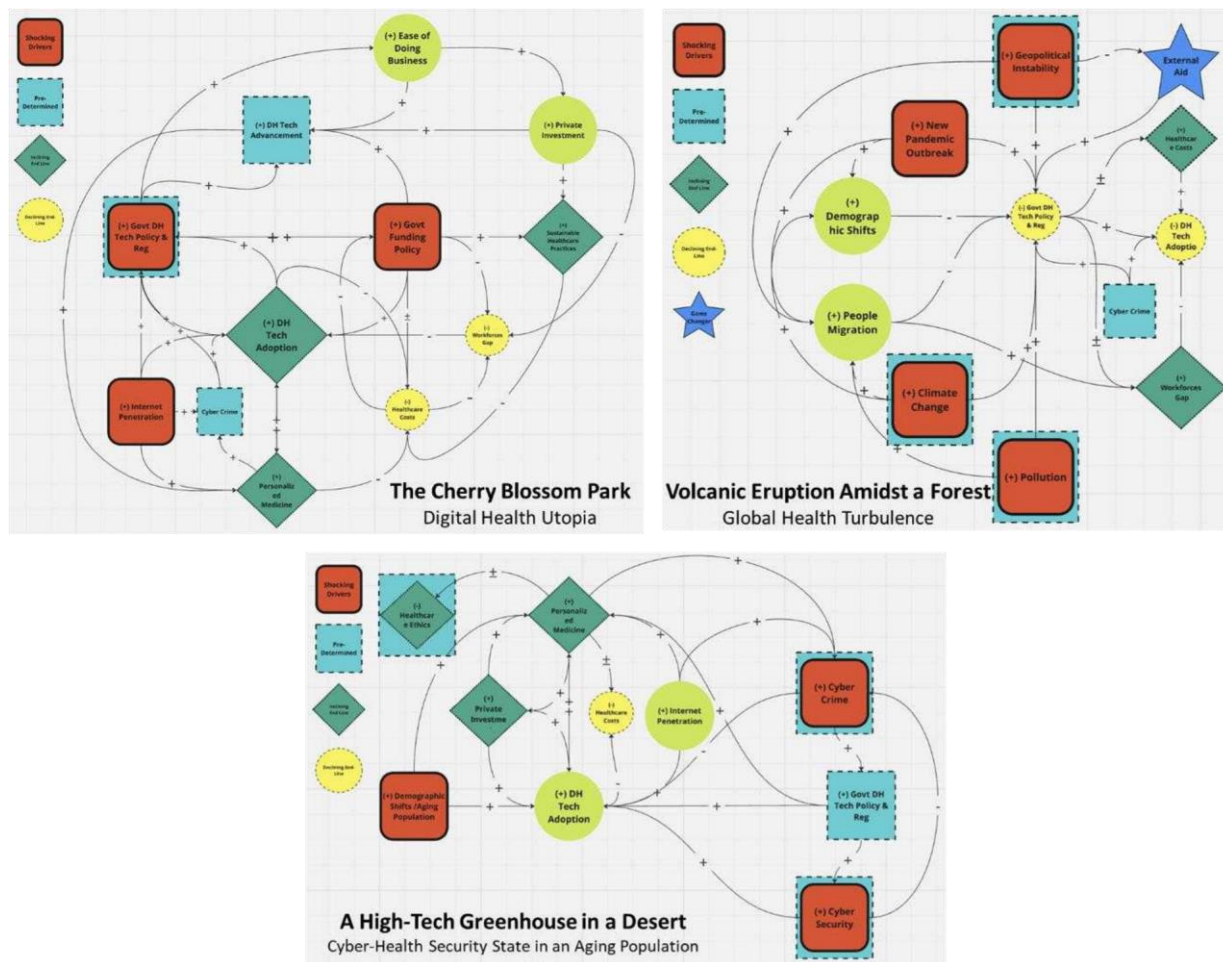
Fig 7. Causal Loop Diagram

C. Stage 3 - SCENARIOS CREATION

During this stage, three plausible scenarios were created based on three different scenario frameworks produced earlier consisting of the combination of shocking factors, dominant actors, and pre-determined factors. Three scenario narratives produced for the digital health industry in Indonesia in 2035 are:

1) The Cherry Blossom Park.

In 2035, Indonesia has become a global model for digital health adoption and innovation. The healthcare quality had significantly improved, costs were reduced, and the workforce was adept at managing the demands of digital health. The public was wellinformed and engaged with these technological advancements.

Throwback five years earlier, Indonesia embarked on a transformative journey to revolutionize its healthcare system through digital health. Recognizing the immense potential of digital health in improving healthcare outcomes and reducing costs, the government, led by the Policy Maker (Health Ministry) and with strong backing from the National Parliament's Commission IX, laid out a comprehensive policy framework. This policy emphasized increasing private investment in wearables and the Internet of Things (IoT), promoting personalized medicine, and enhancing the ease of doing business in the digital health sector.

In early 2030, the Indonesian government allocated substantial funds to support digital health initiatives with support from the Ministry of Finance and National Health Insurance (BPJS). This funding was pivotal in developing telemedicine services, AI-driven diagnostic tools, and stringent cybersecurity measures. In a remote village in West Papua, a telemedicine pilot project transformed healthcare delivery. Through government-funded telemedicine hubs, villagers accessed specialist consultations without the need for

long and arduous travel. A local midwife, trained in digital health, monitored pregnancies and chronic conditions with the help of wearable devices. A few years later, maternal and infant mortality rates in the village had dropped significantly.

By mid-2030, the government launched a nationwide initiative to upskill the healthcare workforce. Partnerships with international universities and tech companies facilitated advanced training programs. These programs, supported by Academic and Research Institutions and Tech Companies and Platforms, focused on integrating digital health technologies, such as AI-powered diagnostic tools and electronic health records, into everyday healthcare practices. By late 2030, the first cohort of healthcare professionals completed their training, ready to implement these new skills.

In late 2030, public awareness campaigns kicked off, leveraging social media, television, and community events. These campaigns, orchestrated by Civil Societies and Telecommunications Companies, highlighted the benefits of digital health technologies, such as wearables and IoT devices, showing real-life success stories. As awareness grew, adoption rates soared, and more people began taking proactive steps in managing their health. Later in the year, a nationwide campaign called "Sehat Dari Ujung Jari" used influencers and celebrities to promote digital health technologies. Stories of people managing their chronic illnesses with wearables and IoT devices flooded social media. These campaigns demystified technology and encouraged widespread adoption, especially among the elderly population.

The government actively sought to position Indonesia as a leader in digital health innovation. By early 2031, collaborations with leading tech firms and research institutions were established, turning Indonesia into a testing ground for cutting-edge digital health advancements. Numerous trials and investments followed, with backing from Private Investors & Venture Capitals and International Organizations (ADB, World Bank), solidifying Indonesia's reputation as a hub for innovation.

Recognizing the risks associated with digital health, and learning from the Pusat Data National cyber security case in 2024, the government implemented robust cybersecurity standards in early 2031. These measures, developed by the National Cyber and Crypto Agency (BSSN) and Cyber Security Companies, protected patient data and safeguarded against cybercrime. Regular audits and updates ensured that these standards kept pace with evolving threats.

Jakarta's bustling metropolitan hospitals introduced AI-driven personalized medicine in 2033. Patients received treatment plans tailored to their genetic profiles and lifestyle. For instance, a diabetic patient received dietary recommendations and exercise routines designed specifically for their metabolism, resulting in better health outcomes and reduced hospital visits.

The nation's journey was not all smooth. A significant cyberattack in 2032 targeting a major hospital chain was swiftly thwarted thanks to the robust cybersecurity measures implemented by the government. This incident highlighted the importance of digital security and led to even stricter regulations and more advanced protection protocols, ensuring patient data remained secure.

By 2035, Indonesia's healthcare landscape had been transformed through strategic investments, robust policies, and a strong focus on innovation and sustainability. The swift adoption of digital health technologies had significantly decreased healthcare costs, making quality healthcare more affordable for the entire population. The combined efforts of Parliament Commission IX, KOMINFO & BAKTI, BPOM, Trade Bodies or Industry Associations, Indonesia Medical Association (IDI), Digital Transformation Body (DTO), and Local Partners/Distributors ensured the success of this transformation, setting a benchmark for other nations to follow.

2) Volcano Eruptions amidst a Forest

In 2035, Indonesia is grappling with the compounded challenges of a persistent pandemic and the escalating impacts of climate change, each exacerbating the other in a web of interconnected crises. The lack of effective digital health technologies, funding scarcity, and competing priorities worsen the healthcare crisis. While external aid provides some relief, the long-term effects of these compounded crises will be profound, necessitating sustained global cooperation and innovative solutions to rebuild and strengthen healthcare systems worldwide.

The year 2029 marked a pivotal and harrowing period in global history. It began with the emergence of a new, highly contagious strain of COVID-19, dubbed COVID-29. The initial panic was amplified when genetic modification techniques, hastily used to create a vaccine, resulted in unforeseen and severe side effects. Uncontrolled clinical trials intended to fast-track the vaccine's deployment instead led to widespread health complications, exacerbating the pandemic.

As governments worldwide grappled with the escalating health crisis, attention diverted from the ongoing clean energy transition. Coal-powered plants, seen as a quick solution to meet the surging energy demands, remain the primary energy source, leading to unprecedented air and water pollution levels. Cities like Jakarta and New Delhi reported record-breaking pollution indices, while

respiratory diseases surged among their populations. The Ministry of Energy and Mineral Resources, facing immense pressure to meet energy demands, had to make tough decisions, often prioritizing short-term solutions over long-term sustainability.

Simultaneously, climate change accelerated dramatically. By mid-2029, extreme weather events became the new norm, including severe droughts in Africa, catastrophic heatwaves in Europe, and unrelenting hurricanes in the Americas. The environmental degradation compounded the pandemic's effects, as diseases spread rapidly through contaminated water and polluted air. In South Asia, the monsoon season brought unprecedented flooding, contaminating water supplies and leading to outbreaks of waterborne diseases such as cholera and dysentery.

As the world struggled with the health and environmental crises, geopolitical instability further strained global resources. The conflicts in Ukraine and Palestine-Israel escalated, despite multiple ceasefire attempts. These conflicts triggered massive migrations, as people fled to safer regions with better healthcare access and income opportunities. Europe and North America saw significant increases in refugee populations, creating cultural and social tensions. The influx of migrants overwhelmed healthcare systems and infrastructure, particularly in countries like Germany and Canada, where the healthcare system was already stretched thin.

In Indonesia, cities like Surabaya and Medan became hotspots for internal migration. People from rural areas, severely affected by the pandemic and environmental degradation, flocked to urban centers seeking better healthcare and job opportunities. The sudden population surge led to overcrowded hospitals and clinics, with many unable to receive timely medical attention. The Ministry of Health, The Indonesia Medical Association (IDI) and Healthcare Providers struggled to keep up with the increasing demand, often finding themselves overwhelmed and under-resourced.

The demographic shifts within the healthcare workforce added another layer of complexity. By late 2029, it was evident that fewer young people were pursuing careers in healthcare. The pandemic, coupled with widespread disinformation, had deterred many from entering the field. Additionally, those who did choose healthcare careers often lacked the necessary skills to handle the multifaceted challenges posed by the pandemic and climate change. The Digital Transformation Body (DTO) and Tech Companies and Platforms attempted to provide digital training programs, but these efforts were hindered by funding limitations and the immediate need for traditional healthcare services.

Healthcare workers who were on the frontlines faced immense pressure and risk. Many became infected, leading to a significant reduction in available healthcare professionals. The gap widened as digitally skilled health workers were redirected to support traditional care, leaving their technological expertise underutilized. Cyber Security Companies worked tirelessly to protect digital health infrastructure from Cyber Criminal Organizations, but the constant threat of cyberattacks added to the stress on the system. Amidst this chaos, governments worldwide struggled to deploy digital health technologies effectively. In early 2030, several countries, including Indonesia, formulated policies to allocate funds for digital health. However, these policies were often contradictory and underfunded due to competing priorities and the pressing need to address the immediate pandemic crisis. It became clear later that scaling up digital health technologies was fraught with challenges. Successful pilot projects struggled to transition into large-scale implementations. Funding scarcity, limited healthcare infrastructure, and the relentless pressure on healthcare resources hampered these efforts. The National Cyber and Crypto Agency (BSSN) strived to ensure data security, but progress was hindered by the lack of integration and support from other sectors.

As the pandemic dragged on, healthcare costs skyrocketed. Governments, struggling with depleted budgets, revoked funding for general health services, leaving the public to bear the brunt of medical expenses. By 2033, many people faced financial ruin due to excessive healthcare costs. In countries like Indonesia, the lack of a robust health insurance system exacerbated the situation, with families spending their life savings on medical care. The National Health Insurance (BPJS), facing immense pressure, tried to cover as much as possible but often struggled to meet the increasing demands.

Amidst these dire circumstances, external aid from developed countries bilaterally or multilaterally grew significantly to boost government efforts in tackling the pandemic and climate change issues. Notable contributions came from the United States, Japan, and the European Union. Some aid specifically targeted increasing digital health adoption as a cost-effective way to deliver healthcare services. By 2035, several digital health initiatives, funded by external aid and supported by Private Investors & Venture Capitals, began to show promise in remote and underserved regions. The Ministry of Foreign Affairs played a crucial role in negotiating and securing this aid, ensuring it was effectively utilized to rebuild and strengthen the healthcare system.

The importance of global cooperation and innovative solutions became evident during this crisis period. Think tanks and Trade Bodies or Industry Associations advocated sustainable and integrated approaches to address the combined pandemics and climate

change challenges. Local Partners/Distributors and Surrounding Communities played pivotal roles in implementing and adapting these solutions to local contexts, demonstrating resilience and resourcefulness in the face of unprecedented challenges.

3) A High-Tech Greenhouse in a Desert

In 2035, Indonesia successfully navigated the complex interplay of digital health, cybersecurity, and demographic shifts. Indonesia stood at the forefront of a digital health revolution, a beacon of innovation in Southeast Asia. The nation had embraced digital health technologies with sincerity, significantly boosting adoption rates. Conventional healthcare practices were being overshadowed by cutting-edge digital solutions, thanks to widespread internet penetration across the archipelago.

The early 2030s saw a surge of new companies offering digital health services. Names like MedTech Nusantara and DigitalCare Indonesia became household staples, providing everything from telemedicine to AI-driven health diagnostics. This shift was driven by both the public and private sectors, which invested heavily in digital health infrastructure to ensure even the most remote islands had access to quality healthcare. Private Investors & Venture Capital played a crucial role in funding these initiatives, while the Ministry of Communication and Informatics worked to improve digital infrastructure nationwide.

With the rapid growth of digital health, cybersecurity has become a top priority for everyone, including the government. By 2032, Indonesia had adopted international cybersecurity standards and fostered collaborations with academia, private sectors, and incubation hubs. The National Cyber and Crypto Agency (BSSN) and Cyber Security Companies were at the forefront of these efforts. Despite these efforts, cybercrime continued to evolve. In 2033, a major cyber-attack targeted the health data of thousands of Indonesians, sparking widespread fear. Indonesia National Police (POLRI) launched an extensive investigation into the attack, which was rumored to have been orchestrated by disrupted traditional healthcare businesses or as a ploy to accelerate digital health adoption. Regardless of the cause, the incident reignited concerns over health data privacy and protection. Consequently, the healthcare data insurance industry saw substantial growth, providing new layers of protection for consumers.

In response to the escalating cyber threats, the Indonesian government took decisive action. By 2034, strict digital health policies and regulations were in place. The Policy Maker (Health Ministry), in collaboration with Parliament Commission IX, developed comprehensive regulations. The government worked closely with data centers, internet provider associations, and Telecommunications Companies to combat cyber-attacks. These measures were designed to safeguard the burgeoning digital health ecosystem and ensure the benefits of digital health could be enjoyed without compromising security.

The demographic landscape of Indonesia was also changing. An aging, yet tech-savvy population demanded high-quality, personalized healthcare services. This demographic shift put additional pressure on the healthcare system but also spurred innovation. Senior Citizen Associations advocated for better healthcare services tailored to the needs of the elderly. Personalized medicine became a major trend, with tailored health solutions becoming increasingly popular. Influencers in this field flourished, securing lucrative contracts with Healthcare Providers and promoting personalized health services to their followers.

The Ministry of Social Affairs played a pivotal role in addressing the needs of vulnerable populations during this transformation. They ensured that social welfare programs were aligned with the digital health revolution, providing support and resources to those most in need. Their initiatives included training programs for caregivers and subsidies for low-income families to access digital health technologies.

As digital health technologies became more prevalent, ethical issues came to the forefront. Data privacy, equitable access to healthcare, and the fair allocation of resources were critical concerns. The emphasis on cybersecurity sometimes clashed with ethical considerations like patient autonomy and data privacy, prompting new ethical guidelines and debates. Non-Government Organizations (NGOs) and Trade Bodies or Industry Associations led discussions on these ethical considerations, ensuring that the rapid advancement in digital health did not compromise fundamental rights.

Interestingly, the widespread adoption of digital health led to a decrease in overall healthcare costs. This reduction incentivized the government to focus on other areas, including attracting investment in digital health technologies such as IoT, wearables, and personalized medicine. By 2035, Indonesia had become the leading digital health investment destination in ASEAN, drawing interest from international investors and fostering a thriving ecosystem of innovation. Wearables Manufacturers and Tech Companies and Platforms found Indonesia a fertile ground for testing and deploying their latest technologies.

The healthcare sector was more connected and efficient than ever before, offering high-quality, personalized care to its citizens. Community Health Workers and Home Care Providers utilized digital health tools to extend care to underserved populations. The National Population and Family Planning Board (BKKBN) was instrumental in leveraging digital health to support family planning

and maternal health programs. Their efforts ensured that digital health services were accessible, especially to women and children, aligning with their broader mandate of improving public health outcomes.

The challenges were immense, but so were the opportunities. With continued focus on innovation, collaboration, and ethical considerations, Indonesia's healthcare future promised to be both transformative and inclusive, setting a precedent for the rest of the world.

D. Stage 4 – CONSEQUENCES/IMPLICATIONS AND OPPORTUNITIES/OPTIONS

The analysis of Consequences/Implications and Opportunities/Options for each scenario, to help identify strategies to adapt to these evolving situations are outlined in the following table.

Table 1. Consequences/Implication and Opportunities/Options

Scenarios	Consequences/Implications	Opportunities/Options
Cherry Blossom Park	Budget spare from DH Cost-Saving leaves room for adopting new tech advancement.	Overall budget savings to be invested in DH solution - particularly to acquire UK solutions that are yet to exist or insignificantly implemented in the market.
	Market advancement narrows the technology gap, making Indonesia more receptive to new tech and aligning its healthcare landscape with the UK.	Demand from a new market segment that seeks healthier options such as wellness, well-being, and healthy lifestyles
	A better DH business environment to navigate with, making it more attractive to new UK DH players.	Awareness raising for Indonesia DH market - currently, Indonesia is not a priority market for most UK DH players
	Healthcare prevention/promotion dominates over curative treatment.	Increased demand for healthcare prevention solutions, including AI-driven symptom checkers and wearables for remote consultations and health data collection.
	Indonesia's DH adoption attracts new competition and even stronger efforts from existing competitors (local & foreign).	Position Indonesia as a regional hub, focusing on local presence, manufacturing, and re-exporting as a long-term strategy.
	The traditional distributor route is outdated; investment in the market is now preferred or mandatory.	Match-make UK DH players to a larger pool of local players who can also be the local partners/distributors in the market
Volcano Eruptions Amidst a Forest	Evolving, fragmented policies due to external aid create additional challenges for UK businesses in understanding and complying with local regulations.	Bilateral or multilateral aid programs offer a platform to showcase UK digital health expertise and explore aid-funded business initiatives in digital health regulation.
	Healthcare gaps necessitate extra effort for UK digital health solutions. The market has become cost-sensitive, making UK products less suitable for typical procurement.	Pursue aid-funded business from the initiatives (new project and continuation of existing pilot projects)

	Shifting in the funding and investment directed towards solutions that are seen as critical for managing the pandemic.	DH capacity building for healthcare workforces especially those that utilize Ed-tech and online learning courses (remote learning).
	New market segments within DH solutions in the pharmaceutical industry are open.	Attract UK suppliers for digital health solutions like tracking, data collection, and analysis.
	A new aid-funded business market segment in DH training and training opens.	Pursue aid-funded projects for UK DH players, including modular hospitals and teleconsultation services.
High-tech Greenhouse in a Desert	Prevention and promotion dominate healthcare in Indonesia over curative treatment.	IoT, smart-home care, and wearables for aging populations are new market segments.
	A more integrated and connected healthcare system designed to improve public health level.	Increased competition means more local partners and distributors. Match UK DH players with local entities for collaboration.
	International partners, including the UK, are crucial for R&D collaborations on digital health solutions for Indonesia's aging population.	Strengthen UK-Indonesia cybersecurity cooperation particularly in DH through best practices and international standards.

E. Stage 5 – EARLY WARNING SIGNALS

Further, upon observing the Implications/Consequences and Opportunities/Options, the author produced sets of early warning signals relevant to each scenario, to assist ESS in observing and analyzing drivers that indicate ESS is moving towards one scenario or another (Lindgren & Bandhold, 2003).

Table 2. Early Warning Signals

Cherry Blossom	Volcano Eruptions	High-tech Greenhouse
The government announces new regulations for digital health apps, clarifying data security, privacy, and interoperability guidelines.	Increase in reports of new viral infections with high transmission rates from global health organizations like WHO.	The government announces new regulations for digital health apps, clarifying data security, privacy, and interoperability guidelines.
The government has announced new regulations to create a unified health data system, integrating data from various providers to improve services and reduce fragmentation.	A significant spike in infection rates of respiratory illnesses globally is monitored through health surveillance systems.	The government has announced new regulations to create a unified health data system, integrating data from various providers to improve services and reduce fragmentation.

The government announces new regulations with detailed guidelines for telemedicine, covering remote consultations, data protection, and quality of care.	Reports of new COVID-19 variants with high mutation rates and increased resistance to existing vaccines."	The government announces new regulations with detailed guidelines for telemedicine, covering remote consultations, data protection, and quality of care.
Regulatory Sandbox: 17 business models (clusters) planned. Pilot projects expanded 5-fold from 2024. Inclusive participation rate increased to 90% across industry players.	A stagnant Regulatory Sandbox creates even more frustration for all industry players.	Regulatory Sandbox: Realize at least 80% of 17 planned business models. Expand pilot projects 3-fold from 2024. Increase participant rate to 75% across the industry.
Significant budget increase for digital health transformation, with a 20% annual rise.	Escalation in conflicts in Ukraine and Palestine-Israel, with increased military activity and civilian casualties.	Cyber-attack attempts on healthcare systems surged, but 80% were thwarted by strong cybersecurity measures, resulting in no successful data breaches.
50% of healthcare institutions nationwide adopt ISO 27001 for information security management.	National adoption of ISO 27001 by healthcare institutions is relatively low, at just below 20%.	Over 75% of healthcare institutions nationwide adopt ISO 27001, just below the Cherry Blossom scenario.
Reduction in the time required to start a business to less than 7 days.	Reports of increasing overwhelmed healthcare systems in countries receiving large numbers of refugees, such as Germany and Canada.	More than a 25% increase in cybersecurity training programs for healthcare professionals and IT staff.
Significant improvement in Indonesia's World Bank B-Ready ranking compared to 2024.	Refugee and displaced persons numbers rose significantly, with a 20% increase in migration to Europe and North America.	The elderly population grows to 20% (UNFPA forecast), driving surging demand for personalized and homebased healthcare services.
95% of the national population uses the internet.	Global extreme weather events rise by 30%, with increased frequency and severity of droughts, heatwaves, and hurricanes.	30% increase in the healthcare workforce specializing in geriatric (elderly) care.

Remarkable coverage 85% of the rural population uses the internet	Global temperatures rise consistently, exceeding 1°C above pre-industrial levels.	Digital health startups in Indonesia focusing on the aging population grow by 25%.
Digital health startups in Indonesia grew by 25% from the previous year.	Reports of unprecedented flooding in South Asia, leading to contaminated water supplies and outbreaks of waterborne diseases.	Venture capital funding for digital health exceeds $250 million annually.
Venture capital funding for digital health exceeds $250 million annually.	Reports of significant sea levels rising more than 5mm yearly.	Healthcare data insurance claims grow significantly, reflecting increased awareness of cyber threats.
Healthcare facilities using telemedicine platforms have risen by 50% from the previous year.	Pollution levels in Jakarta and New Delhi reach record highs, with AQI values consistently over 300.	
	Respiratory illnesses and hospital admissions surge by 25% due to air pollution.	

F. Stage 6 - SWOT and TOWS analysis

The author performed a SWOT analysis on each scenario to assess how external factors (Opportunities and Threats) impact ESS's internal Strengths and Weaknesses. This analysis will evaluate the relevance of ESS's existing strategies to each unfolding scenario, as detailed in the following table.

Table 3. ESS' current strategy relevancy testing.

	Current Strategies	CB	VE	HG
1	ESS operates on a supply-led, reactive approach based on inquiries received. ESS has no control over the types of Products/solutions offered.	NR	NR	NR
2	Proactive stakeholder engagement is done by identifying and approaching distributors via cold calls, networking events, LinkedIn Sales Navigator, and attending trade exhibitions - reactive based on inquiries received.	R	R	R
3	Proactive stakeholder engagement is limited to: - opportunities identified by distributors engaged - personal, one-on-one basis, driven by inquiries received. - fewer than 5 contacts with companies that have local manufacturing capabilities in DH.	R	NR	NR

	- associations, importers, distributors, integrators, and the industry supply chain. ESS has fewer than 10 close contacts in these areas.			
4	There are no specific sector or sub-sector priorities.	R	NR	NR
5	Reactive engagement applied to: - Internal Embassy colleagues, such as the UK-ID DH regulatory sandbox - a case-by-case basis or rather reactive driven by inquiries received	NR	NR	NR
6	No engagement applied to: - end-buyers, whether government or private. - donors or aid-funded businesses. - investors or investment companies. - State Owned Enterprises. - UK alumni including Chevening.	NR	NR	NR
7	The marketing and communication campaign is limited to: - one webinar on DH opportunities in Indonesia planned annually, with topics chosen on a case-by-case basis - non-campaign DH raising awareness - underutilized Digital Health Playbook	R	NR	NR

R: Relevant; NR: Not Relevant.

The analysis shows that ESS's current strategies are largely inadequate for future changes outlined in the three scenarios. Of the existing strategies, less than 10% will remain relevant if ESS continues as is.

G. Stage 7 – KEY FINDINGS AND RECOMMENDATIONS

Using scenario planning for Indonesia's digital health future, we identified key driving factors, critical forces, plausible scenarios, and their implications, opportunities, and early warning signals. The following key findings address the research questions:

1. Combining PESTEL analysis, pre-FGD questionnaire, and FGD results, 25 key driving factors influencing Indonesia's digital health industry over the next 10 years were identified: Government Policy and Regulation; Digital Health Tech Adoption and Advancement; Healthcare Social Trends; Access to Energy; Government Funding and Financing Policy; Healthcare Ethics; New Pandemic Outbreak; Cyber Security and Cyber Crime; Internet Penetration; Geopolitical Instability; Pollution; Climate Change; Personalized Medicine; People Migration; Sustainable Healthcare Practices; Demographic Shifts; Healthcare Costs; Workforce Skill Gap; Socio-Economic Disparity; Private Investment; Ease of Doing Business; and External Aid.

2. Three plausible scenarios for Indonesia's digital health industry over the next 10 years impact the success of the ESS UK digital health trade campaign: 1). "Cherry Blossom Park": Robust digital health adoption driven by strong government support, reducing healthcare costs and fostering further innovation. 2). "Volcano Eruptions Amidst a Forest": Decline in digital health adoption due to strained policies and external shocks like Climate Change, new pandemics, and geopolitical instability. 3). "High-Tech Greenhouse in a Desert": Rising demand for digital health solutions among a tech-savvy aging population, coupled with increased cybersecurity threats.

3. The research tested the relevance of ESS's current strategies against each scenario, revealing that less than 10% of these strategies will remain relevant in the future if ESS continues with its existing approach.

4. Based on scenario planning results, the research developed two Strategic Imperatives: (1) Core Strategy and (2) Adaptive Strategy. Each includes sub-strategy pillars: a) Core Function Strengthening, b) Strategic Stakeholder Engagement and Alliance Forming, and c) Strategic Business Adaptation. These imperatives will be open and dynamic, adjusting as scenarios evolve based on early warning signals. Detailed implementation is outlined in the Implementation Plan, with annual monitoring of early warning signals.

Each scenario offers a narrative of potential future conditions the company may face. The scenario planning includes implications, options for adaptation, and early warning signals to monitor. Regular monitoring of these signals is crucial for informing stakeholders about emerging scenarios and enabling the company to rapidly adopt the appropriate strategies. The author provides recommendations for alternative strategy imperatives: (1) Core Strategy and (2) Adaptive Strategy. The Core Strategy includes strategies that remain relevant across all future scenarios. It focuses on fundamental actions that ensure sustained relevance and effectiveness regardless of how the external environment changes. The Adaptive Strategy includes tactics specifically designed to address the unique conditions of each scenario. These strategies are flexible and tailored to respond to specific future situations. The paper recommends ESS to implement the Core and Adaptive Strategies through three main pillars over the next 10 years' time:

1) Pilar 1 - Demand Generation - Core Function Strengthening

The Core Function Strengthening strategy enhances ESS's role as a local expert in Indonesia's digital health sector, focusing on growth, innovation, and market leadership. ESS will implement the following activities:

1. Market Intelligence: ESS will track Indonesia's Local Content Policy and investment pipelines, analyzing regulatory updates and policy changes to uncover commercial opportunities and adapt strategies for UK digital health companies.
2. Campaign Adjustment: The UK digital health campaign will feature the UK DH Playbook as a ready-to-deploy resource for crisis management, emphasizing its practical benefits and local partnerships to enhance credibility and showcase the UK's expertise.
3. UK-Facing Webinar: A webinar will reframe Indonesia's Local Content Regulations as a strategic advantage, offering practical insights and success stories to help UK companies view these regulations as opportunities for re-export and competitive gain.
4. Aid-Funded Business Repositories: ESS will develop repositories of successful international aid-funded projects and business opportunities in digital health, providing UK companies with valuable resources to pursue and secure similar projects.

These initiatives are quick to implement and resource-efficient, making them ideal for ESS's proactive campaign in Indonesia's digital health sector during its first year.

2) Pilar 2 - Demand-Supply matchmaking - Strategic stakeholder engagement and alliance forming

To address the growing interest from both Indonesia and the UK, the strategic imperatives focus on strengthening UK-ID relationships and establishing a market presence. Key activities include:

1. Conducting Webinars: ESS will host three webinars to showcase Indonesia's digital health opportunities, featuring insights from the SEP and export opportunities website. These sessions will offer UK digital health companies valuable information on market entry, regulations, and partnerships, boosting engagement and awareness.
2. Developing Close Partnerships: ESS will forge strategic partnerships with local government officials, healthcare providers, technology innovators, and industry associations. This approach will strengthen Indonesia's digital health supply chain through regular meetings and joint initiatives, ensuring alignment with local needs and regulations.
3. Leveraging the UK-ID Digital Health Regulatory Sandbox: ESS will utilize the sandbox to tackle regulatory challenges, improve IP protections, align local content policies with UK standards, and enhance cybersecurity measures. Collaborating with Indonesian authorities and experts, this will help UK companies navigate regulations and achieve compliance.
4. Partnering with Local Legal Firms: To address IP protection issues, ESS will work with local legal firms to strengthen IP rights and ensure compliance with Indonesian regulations. This will provide UK digital health companies with robust legal support, aiding in the protection of innovations and navigation of IP laws in Indonesia.

These strategies, combined with the development of a Strategic Stakeholder Engagement Plan (SEP), offline Trade Missions, and participation in Trade Exhibitions, will position ESS to effectively enhance UK-ID relationships and market presence. While some

activities require minimal funding, others necessitate significant preparation, resources, and HQ approval, with ROI calculations used for evaluation. ESS will conduct periodic reviews to stay alert to early warning signals and adapt strategies as needed.

3) Pilar 3 - In-market Support - Strategic Business Adaptation.

As more UK companies enter the Indonesian market, they will encounter various challenges and opportunities influenced by future scenarios. ESS supports these companies through strategic adjustments to maximize their success. Key strategies include:

1. Utilizing UKEF Support for Large Projects: For projects exceeding $250 million, ESS will leverage UK Export Finance (UKEF) support to engage local distributors and partners. This collaboration offers financial guarantees to mitigate risks and strengthen proposals for major contracts.
2. Facilitating Consortia for Joint Proposals: ESS will facilitate the formation of consortia between UK digital health companies and local partners. This approach will combine expertise and resources to enhance the chances of winning large grants and contracts, addressing critical healthcare needs in Indonesia.
3. Supporting Joint Ventures and Partnerships with SOEs: ESS will assist UK companies in forming joint ventures or partnerships with state-owned enterprises (SOEs) experienced in crisis handling. These collaborations will adapt products to local needs, reduce costs, and boost competitiveness in the Indonesian market.
4. Implementing Flexible Funding Models: ESS will promote flexible funding models supported by strong cost-based analysis (CBA). This strategy will ensure project sustainability, adaptability, and ongoing support, helping UK companies effectively navigate and respond to evolving challenges in Indonesia.

These strategies, which extend from previous pillars, will help UK digital health companies capitalize on opportunities, mitigate threats, and address market challenges effectively.

V. CONCLUSION

A. Key Learning

The author found that the scenario planning methodology allowed ESS to critically assess its existing strategies, excel in addressing unprecedented situations, uncover hidden factors, and incorporate previously ignored elements that were previously overlooked or undervalued. The iterative process with key respondents during the FGD provided valuable insights, triggering a social learning experience, and leading to transformative 'aha' moments and a memorable experience of reframing and reperceiving exercise. The scenario narratives drew the author into a new realm, shifting from a feedback orientation to a forward-looking perspective, marking a profound and mind-shifting experience. Through this process, the author explored implications and opportunities from each scenario and identified over 50% of new strategies that had not been considered before or were previously deprioritized, offering fresh insights and innovative approaches.

B. Future Studies Recommendation

While this study offers valuable insights into how digital health in Indonesia might evolve by 2035, it has some limitations. Although well-defined key driving factors, including future and predetermined elements, were analyzed to create three distinct scenarios, future research may reveal an even more complex landscape. Additionally, since this paper focuses on potential futures for Indonesia's digital health industry, its findings may not be fully applicable to other countries, where scenarios could differ significantly. However, further studies involving a broader range of stakeholders in Indonesia's digital health market or expanding the scope to include the ASEAN region could uncover new challenges and opportunities, enriching the industry's prospects.

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