Assessing Challenges in the Implementation of Digital Services by the NUG: A Sociotechnical Framework Perspective.

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Abstract. This research investigates the challenges encountered by the National Unity Government (NUG) of Myanmar in delivering digital services amidst the complex socio-political landscape shaped by the 2021 military coup. Employing a sociotechnical framework, the study examines the interplay of technical systems and social dynamics in NUG's initiatives across health, education, and financial services. Digital services such as Telekyanmar, Nway Oo University, and Spring Development Bank are analyzed as transformative tools for governance and public engagement. Despite their potential, these services face critical obstacles, including internet connectivity issues, cybersecurity threats, power shortages, resource constraints, and digital literacy gaps, particularly in rural and conflict-affected regions. The study also highlights the importance of inclusivity, with attention to ethnic and cultural diversity, emphasizing the need for localized solutions and multilingual accessibility. Using mixed-method research, the analysis incorporates in-depth interviews, surveys, and secondary data to capture diverse perspectives from stakeholders, technology experts, and the public. Findings reveal significant adoption barriers stemming from security concerns, trust issues, and lack of infrastructure. Moreover, the public's willingness to engage with NUG's digital services is deeply influenced by their perception of the government's legitimacy, inclusivity, and responsiveness to marginalized communities. The study underscores the importance of building trust and enhancing public access to digital platforms through community-centered approaches, targeted digital literacy initiatives, and robust cybersecurity measures. By addressing these challenges, the research offers actionable policy recommendations to optimize NUG's digital governance. It calls for investment in digital infrastructure, capacity-building programs, and international collaborations to support the sustainability and effectiveness of these services. The findings provide critical insights into how digital governance can serve as a tool for resilience, inclusivity, and legitimacy in the face of authoritarian oppression, advancing the broader goals of democracy and transitional justice in Myanmar.

Keywords. Digital Governance, National Unity Government (NUG), Sociotechnical Framework, Public Service Delivery, Digital Inclusion
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1. Background

Immediately after the military coup in Myanmar, the Committee Representing Pyidaungsu Hluttaw (CRPH) swiftly emerged on February 5, 2021, comprising 17 elected parliament members with a mission to resist the illegitimate seizure of power. Building on the CRPH's mandate, the National Unity Government was formed on April 16, 2021, with 17 ministries to function as a parallel government. At the heart of the NUG's establishment of ministries is the inclusion of public servants and students who participated in the Civil Disobedient Movement (CDM) by integrating CDMers within the bureaucratic system of respective ministries.

These ministries aim to provide alternative governance services in opposition to the State Administration Council's controlled ministries, which aligns with the NUG's overarching objective of running a parallel government. These ministries are currently providing innovative public services in the digital space, as seen in services like Tele Kyan Mar (online clinic services) by the Ministry of Health, Spring Development Bank (online

banking service), NUG Pay (money wallet service), and Nway Oo Lottery (lottery service) by the Ministry of Planning, Finance, and Investment, and Myanmar Nway Oo University (alternative education services) by the Ministry of Education. However, as a parallel government, significant challenges and constraints are witnessed while delivering such public services in the digital space. Persistent security threats, resource constraints, public awareness gaps, and fear and concerns about utilizing such digital tools among the public hinder the capacity and effective deployment of NUG's e-services. Hence, in the current situation where SAC-controlled ministries are not providing fair and secure public services, in addition to people's unwillingness to cooperate with SAC's ministries, the public and international community need to understand alternative public services provided by NUG. Therefore, a comprehensive, detailed research report is necessary for the public to clearly understand NUG's services and the challenges and barriers hindering the effective deployment of NUG's digital services.

Innovations that improve service delivery to citizens pointed out the role of government in enhancing service delivery to improve public administration. Government services refer to the activities and functions governments undertake to address the needs of their citizens and improve societal welfare. This can underscore the importance of innovative practices in the public sector that make government operations more efficient and responsive to the needs of the public. By adopting new technologies and simplifying administrative processes, governments can enhance the quality and accessibility of public services, thereby increasing public satisfaction and trust in government institutions. These services are integral to building a healthy relationship between governments and citizens, focusing on transparency, efficiency, and the effective management of public resources. This Study emphasizes that improving government services is not only about enhancing operational efficiency but also about ensuring that these services are citizen-centered, addressing the specific needs and conditions of the population.

Digital government, also known as e-government or virtual government, involves the use of the internet and other information technologies to influence governance. It generally refers to the creation and provision of information and services within the government and between the government and the public, utilizing various information and communication technologies(Fountain JE.,2001). The post-coup political scenario is highly associated with digital arena where digital resistance is central with mobilization for movement and protesting are mostly done through online and on the other hand, the digital oppression is done by the SAC such as tracking, doxxing and misinformation campaigns. While traditional digital government services in other countries are developed either through expanding or accelerating the physical services out of well-structured physical state institutions, NUG and its digital services emerged initially from online without any well-structured physical state institutions.

The NUG has faced criticism for allegedly operating primarily online, which some argue could limit its effectiveness and outreach, especially in regions with poor internet connectivity or in rural areas where digital literacy is lower. This criticism highlights the challenge of providing governance and essential services through digital means alone, particularly in a country with diverse needs and varying levels of infrastructure. While many of the NUG's ministries provide services digitally, several crucial services, especially those related to health, home affairs, defense, and humanitarian efforts, are offered in person, which is vital for reaching all demographics and ensuring inclusivity(Appendix A). The strategic mix of digital and in-person services aims to leverage technology to enhance reach and efficiency while maintaining a physical presence in areas where it is most needed. This balanced approach is especially crucial in regions controlled or influenced by the NUG, where the provision of in-person services helps to cement its legitimacy and effectiveness as a governing body amidst challenging circumstances. According to research limitations, this paper focuses on only three ministries: the Ministry of Health, the Ministry of Planning, Finance, and Investment, and the Ministry of Education, which is currently at the forefront of providing public services in the digital space. The study will use a sociotechnical framework to examine how technological systems interact with Myanmar's current political and social environment. While digital governance in conflict-affected region is increasingly studied, there remains a significant gap in understanding how alternative governance structures like NUG in Myanmar deliver digital public services under authoritarian pressures. This paper addresses these gaps by explicitly examining both the socio-political and technological challenges through a sociotechnical framework.

2. Research Objectives

1. To examine the key digital services and initiatives implemented by the National Unity Government and their contributions to modernizing administrative functions and improving citizen service delivery.
2. To identify the challenges and barriers hindering the adoption and effectiveness of the National Unity Government's digital tools and services.

3. Methodology

This study employed a mixed-method approach integrating qualitative and quantitative data from primary and secondary sources. Primary data collection included semi-structured, in-depth interviews using purposive

sampling. Key informants comprised 1-2 representatives from each of the three targeted NUG ministries, selected based on their minimum six months' experience and active involvement in digital public service initiatives. Interviews were conducted both face-to-face in Maesot and Chiang Mai, Thailand, and online, reflecting practical considerations such as accessibility and security constraints. Additionally, two digital technology experts from relevant non-governmental organizations, each possessing at least one year of professional experience, provided specialized insights into technical and operational challenges. An online survey was administered to 100 participants across diverse age groups and geographical locations, aiming to gauge public perceptions and adoption barriers. Respondents were classified into two groups: those familiar and actively engaging with NUG's digital services, and those who were not. Subsequently, three respondents from each category were selected for follow-up interviews to delve deeper into their experiences, concerns, and the factors influencing their engagement with digital services. Secondary data analysis complemented primary data, utilizing reports from NUG ministries, CRPH, NUCC, and relevant academic articles and media sources. The integration of these diverse data sets facilitated a comprehensive analysis, clearly aligning methodological choices with the study's sociotechnical framework and objectives.

4. Understanding e-government and digital service delivery of governments

The evolution of e-government has changed how governments connect with individuals, providing better services and greater transparency. Various terms are used to characterize the phenomenon of government using Information and Communication Technology, such as 'e-governance,' 'online government,' 'one-stop government,' and 'digital government' (Andersen and Henriksen 2006). E-government is more than just a set of tools for citizens to interact with their government; it also changes the production structure, whether in services or information and reshapes communication across institutions. This creates new ways for governments to communicate with the people they serve (Gibreel and Hong, 2017). E-government entails using information technology to improve connections with residents, corporations, and other government entities. Its goals include improving the delivery of government services to residents, boosting communication with business and industry, empowering citizens through information access, and attaining more effective government administration (World Bank 2005, cited by Gibreel and Hong 2017). West (2004) described e-Government as "the delivery of information services online via the Internet or other digital means" (p. 16).E-government is the use of information and communication technologies to improve the delivery of government services, increase efficiency, and promote citizen participation (Heeks, 2006). E-government efforts provide various benefits, including more openness, decreased corruption, better public service delivery, and higher citizen engagement (Bekkers & Homburg, 2007). However, obstacles remain, such as the digital divide, cybersecurity threats, and opposition to change within government institutions (Dawes, 2008). According to Awen, et.al (2013), the definition of e-government is explained accordingly.

The success or failure of digital governance service initiatives can be evaluated through two primary dimensions, the implementation of these systems by government organizations and their subsequent adoption by citizens (Gil-Garcia & Flores-Zúñiga, 2020). Success, in this context, is often defined by the extent to which the digital service in the government system meets its intended objectives within the planned timeframe and budget (Fortune & Peters, 2005). However, the inherent complexity and multifaceted nature of digital service projects make them particularly challenging and susceptible to failure (Glyptis et al., 2020). Digital Services led by government projects are intricate due to their scale, the integration of various technological components, and the need for alignment with existing bureaucratic processes. This complexity introduces significant risks, making these projects prone to failure (Gunawong & Gao, 2017). Indeed, many digital services initiatives by the government fail to achieve their objectives, resulting in the inability to deliver the anticipated benefits (Madsen, Berger, & Phythian, 2014).

Numerous factors contribute to the high failure rate of e-Government projects. These include poor planning and inappropriate implementation, often linked to technical, social, organizational, cultural, and human behavioral aspects (Choi & Chandler, 2020). The United Nations has identified several specific reasons for these failures, such as a lack of understanding of citizens' needs, inadequate infrastructure, ineffective service delivery, lack of stakeholder trust, and issues related to marketing and confidentiality (United Nations, 2008). Additional factors include unclear objectives, failure to engage stakeholders, lack of cost-benefit analysis, and insufficient evaluation mechanisms (United Nations, 2020).The failure of digital government service projects can have several detrimental consequences, including loss of institutional credibility, wasted time and financial resources, increased costs, loss of trust, and persistent resistance to change in future public sector initiatives (Twizeyimana & Andersson, 2019). Heeks (2003) emphasizes that neglecting the environmental, organizational, and social contexts in which e-government systems operate often leads to unrealistic implementations and low acceptance by citizens, further increasing the likelihood of failure. It is important to adopt a comprehensive approach that considers both technical and social dimensions to mitigate these risks. Effective e-government projects require clear objectives, robust planning that ensures the audience feels secure about the direction and management of the project, and active engagement with all stakeholders. Understanding and addressing the specific needs of citizens, ensuring adequate infrastructure, and building trust through transparent and effective service delivery are essential components for success. Furthermore, continuous evaluation and adaptation based on feedback and changing circumstances can enhance the resilience and effectiveness of e-Government systems.

Digital government services are typically classified into four primary categories or dimensions government-to-government (G2G),government-to-citizen (G2C), government-to-employee (G2E), and government-to-business (G2B). Yildiz (2007) expanded this classification by introducing two additional categories: government-to-civil societal organizations (G2CS) and citizen-to-citizen (C2C). According to Joseph (2013), e-Government services are designed and categorized based on the stakeholders or stakeholder groups involved in interactions with the government for whom the particular service is provided. Furthermore, e-Government is often organized according to the level of administration, such as local, state, or federal in some countries, or municipal, county, or regional in others (Joseph, 2013). Governments implementation of digital services is a multifaceted challenge involving the interplay of social, technical, and political dimensions. The NUG, amidst its struggle for legitimacy and control, faces unique challenges in deploying digital services to its citizens.

To comprehensively address the gaps identified above, recent studies highlight additional critical considerations in digital governance during conflict scenarios. Recent literature highlights the critical role digital governance plays in conflict and fragile state contexts, stressing that digital transformation in such environments must consider social, political, and technological dimensions comprehensively (Gunawong & Gao, 2017; Glyptis et al., 2020). Studies by Twizeyimana and Andersson (2019) emphasize how digital governance initiatives can significantly enhance public trust and transparency but also underscore substantial risks, including cybersecurity threats, digital divides, and infrastructure deficits. Comparative research on digital service delivery during political crises further indicates that neglecting stakeholder trust, especially in conflict-affected areas, undermines the success and sustainability of digital services (Choi & Chandler, 2020; Shackelford, 2020). Furthermore, prior studies on digital government failures suggest that common causes include inadequate stakeholder engagement, insufficient infrastructure planning, and limited attention to sociopolitical dynamics (Madsen, Berger, & Phythian, 2014; Dawes, 2008). Additionally, Shackelford (2022) reinforces the need for robust cybersecurity and digital literacy interventions, critical for protecting digital communications in volatile political contexts. This body of literature collectively underlines that effective digital governance, particularly in politically unstable environments like Myanmar, necessitates a balanced sociotechnical approach, explicitly addressing trust, inclusion, infrastructure, and security simultaneously (Damodaran et al., 2005; Hussaini, 2021).

4. Socio-technical framework in e-government or digital services delivery of governments

In the context of digital government services, the socio-technical framework sheds light on the intertwined challenges of implementing digital initiatives. Governments face a balancing act involving technical infrastructure, human agents, and organizational processes, all operating within broader social and political contexts. For instance, the NUG of Myanmar confronts unique challenges in deploying digital services amidst ongoing struggles for legitimacy and control. This highlights the importance of addressing social dimensions like trust, inclusion, and engagement alongside technical innovations (Heeks, 2006; Baek, Kim, & Lee, 2018).Collaborative services, where individuals collectively fulfill unmet needs, illustrate the socio-technical framework in action. When bound by a sense of community, these interactions form a collaborative community, a socio-technical system where social and technical elements mutually reinforce one another in a “virtuous circle” (Trist, 1981; Baek, Kim, & Lee, 2018). For such systems to thrive, planning must encompass data collection, problem diagnosis, and co-design strategies, ensuring solutions are user-centered and culturally responsive (Choi & Chandler, 2020; Joseph, 2013).The socio-technical approach highlights critical challenges in digital governance. Overemphasis on technical elements such as interface design at the expense of social factors like community trust and engagement often leads to suboptimal outcomes (Heeks, 2003; United Nations, 2020). Additionally, human behavior’s variability complicates the design of predictable social interactions, necessitating conditions that foster organic relationship-building rather than attempting to control it (Dawes, 2009).

Despite these hurdles, the socio-technical framework offers significant opportunities. It provides a holistic methodology to evaluate social and technical variables, enabling the creation of sustainable, resilient, and inclusive solutions. For the NUG, this means addressing technical challenges like poor infrastructure and cybersecurity threats while fostering social dimensions such as digital literacy and cultural inclusivity (Goldfinch, 2007; United Nations, 2008). Literature on e-government often prioritizes technological aspects, neglecting the social dimensions critical to successful implementation. The socio-technical paradigm bridges this gap, advocating for a balanced approach where organizational culture, stakeholder engagement, and user behavior are integrated with technology infrastructure (Bostrom & Heinen, 1977). This perspective is essential for developing e-government initiatives that align with citizen needs and governmental goals. For instance, Damodaran et al. (2005, as cited in Hussaini, 2021) stress the importance of combining communication and technological procedures to meet both citizen expectations and local government requirements. Similarly, Hussaini (2021) identifies three key dimensions for e-government implementation environmental (e.g., policies and legislation), organizational (e.g., managerial capabilities and culture), and technological (e.g., readiness and data management) highlighting the need for a socio-technical lens in planning and execution. The socio-technical framework provides a robust foundation for designing e-government services that are resilient, inclusive, and effective. By addressing both social and technical dimensions, governments can create systems that not only meet technical benchmarks but also foster trust, engagement, and sustainability. For the NUG and other governments, embracing this framework

means learning from past failures, leveraging holistic methodologies, and navigating the complex interplay of societal, technical, and political factors.

5. The National Unity Government and its digital services delivery

On February 1, 2021, Myanmar's military conducted a coup, deposing the democratically elected government. In reaction, elected MPs and activists founded the National Unity Government in April 2021 to restore democracy and confront the military junta (International Crisis Group, 2021). The NUG has used digital tools to connect with citizens, organise resistance actions, and rally worldwide support. These initiatives adhere to e-government principles by utilising ICTs to improve governance and public involvement in extreme circumstances (Thawnghmung, 2021).The areas of control and influence are classified according to the governing groups that hold power over them. The areas under the major cities are primarily governed by the SAC .These areas typically encompass major urban centers like Yangon and Mandalay and government-based cities like Naypyidaw. In contrast, mixed areas experience a variable level of authority exerted by the SAC, local militias, PDF, and Ethnic Resistance Organizations(EROs), resulting in zones characterized by frequent conflict and instability. The NUG and PDF operating areas refer to the regions where the NUG composed of deposed legislators and their supporters, and their associated defense forces are currently active, for example, Sagaing Region, Magway Region, and some part of Mandalay Region. These areas are not publicly disclosed because of the covert nature of their activities and frequently coincide with EROs controlled area. Areas under the control of the EROs are governed by ethnic groups that have established their own administrative and security systems. The border areas are of utmost importance because of their strategic positioning along Myanmar's borders with neighboring nations. Gaining control over these regions can be exceptionally intricate, as it requires managing a combination of EROs, local PDFs, and Myanmar Military, and occasionally dealing with influences from neighboring states, such as Chin State-Mizoram/India,Karen/Kareni/Mon/Eastern Shan -Thailand, Northern Shan/Kachin- China.(Appendix - B) These regions are crucial due to factors such as trade and migration and are often characterized by security difficulties.

The NUG's usage of social media and encrypted communication platforms highlights the socio-technical concept of collaborative optimisation. These platforms have helped mobilise protesters, disseminate information, and coordinate operations across disparate networks (Gerbaudo, 2018).A socio-technical perspective emphasises the importance of comprehensive cybersecurity measures. The military dictatorship has targeted the NUG with cyber-attacks and monitoring, emphasising the necessity of securing digital communications and protecting critical information. This entails not just adopting technical solutions but also educating people on cyber hygiene and safe online behaviour. The digital gap presents a serious obstacle to the NUG's e-government projects. Access to technology varies greatly throughout Myanmar, with rural and marginalised people frequently missing dependable internet access (World Bank, 2021). To promote inclusive participation, the NUG address these discrepancies through digital literacy initiatives and measures to increase internet access. Before the coup, Myanmar was making progress towards e-government services. The government initiated a number of projects to digitise public services, improve internet infrastructure, and increase digital literacy among residents (UNDP Myanmar 2020). The emphasis was on promoting transparency, decreasing corruption, and improving public service delivery through digital means.

The 2021 coup drastically slowed Myanmar's progress towards a digital government. The SAC shut down the internet, limited access to social media platforms, and tightened surveillance of digital communications (Access Now, 2021). These policies hampered the NUG's and other pro-democracy organizational capacities to rally support and coordinate resistance efforts. The NUG has been able to keep its operations and communication channels running by utilising cloud-based technologies and decentralised networks. In order to gain foreign support, the NUG has created online platforms for citizen involvement, digital fundraising campaigns, and virtual diplomacy activities (Thawnghmung, 2021).To address the issues of the digital divide, efforts must be taken to improve Myanmar's digital infrastructure. This involves increasing broadband access, enhancing internet reliability, and providing affordable connectivity to all individuals. International relationships and investments can help achieve these objectives (World Bank, 2021). Digital literacy is required for effective citizen engagement in e-government efforts. Programmes targeted at developing digital skills, particularly in rural and marginalised populations, can empower residents to engage with digital government services and participate in the democratic process (UNDP Myanmar, 2020). The NUG and Myanmar's digital government projects continue to prioritise cybersecurity. Implementing strong cybersecurity procedures, cultivating a cyber-aware culture, and working with international specialists can all help to reduce cyber attacks and secure important information (Shackelford, 2022). The NUG's dependence on digital tools to support its governance and resistance operations exemplifies the actual use of e-government ideas in a crisis situation. By taking a socio-technical perspective, the NUG can optimize its digital strategy to improve public involvement, ensure cybersecurity, and bridge the digital gap. Future study should continue to investigate these patterns, particularly in circumstances of political instability.

5.1 NUG Ministry of Education's Efforts in Providing Alternative Education Services in Digital Way

Despite operational limitations, the Ministry of Education of the NUG continues to offer sustainable alternative education services to support students participating in the CDM. The NUG's interim educational services can be primarily divided into two categories: digital education and on-ground education, both of which are often interconnected. The enrollment of students in these services is largely dependent on their access to the internet

and the security situation in their respective areas. Regarding on-ground education, it has been reported that more than four thousand schools have been established in liberated areas, providing in-person learning opportunities. While the SAC education system operates in major cities, the NUG's education system is active in liberated zones. It would be inaccurate to claim that students in urban areas are exclusively enrolled in SAC-affiliated schools and universities. At the outset of the Spring Revolution, SAC's education system was significantly disrupted by a large-scale CDM movement, leading to the establishment of interim education providers under the NUG and the development of alternative education systems. Many students in major cities, particularly at the higher education level, have actively resisted the education system of SAC by joining the CDM and enrolling in institutions affiliated with the NUG or other independent educational entities providing alternative services. The NUG's MoE offers education services across basic education, higher education, and vocational training. For basic education, schools in liberated and ethnic areas are providing in-person learning, while digital education services via online schools are also crucial for ensuring continuous access to education. The MoE oversees currently oversees sixty five online schools, which must be officially recognized and comply with the Ministry's information and technology security guidelines. These online schools offer education from kindergarten (KG) to grade 12, with curricula tailored to different regions of the country.

Admissions to NUG educational programs are carefully managed according to security protocols. Guardians or students can initiate contact via social media platforms, where they are required to submit documentation verifying their participation in the CDM. This verification process involves a recommendation letter from a CDM teacher, university, or student council. Students must also complete an admission form, and the Ministry provides video tutorials for each step, including how to anonymize identities and avoid sharing sensitive personal information. The curriculum provided by the MoE is designed for home-based learning, though schools have the academic freedom to adopt various curriculums. Some schools utilize non-formal curriculums, social science-focused syllabi, and others in ethnic areas adopt curricula that align with local languages, cultures, and political contexts. Many schools follow the curriculum recommendations of the NUG, which emphasize the development of good citizenship and respect for diversity. This decentralized and flexible approach to curriculum design contrasts sharply with the centralized, Burmanization-driven curricula of the SAC, which have faced widespread criticism.

The teaching methods in online schools are student-centered and highly innovative, utilizing digital tools. Traditional textbooks have been replaced by digital resources such as videos and animations. For example, in biology lessons, teachers use digital videos to explain concepts like plant growth, encouraging students to engage in hands-on activities such as planting and documenting their progress on a digital platform for teacher evaluation. This innovative, experiential approach contrasts with the rote memorization methods used in SAC's education system. For assessment and certification, students who complete grade 12 can take the Basic Education Completion Assessment (BECA), conducted by the MoE. This certification is essential for further educational or career opportunities. The BECA is conducted online with students required to use their cameras. In 2023, more than 60,000 students participated, with over 50,000 passing, though some faced challenges due to technical issues and instances of fraud(Interview with Headmaster of Myanmar Basic Online School,21 July 2024). For lower-grade assessments, mid-term and year-end exams are primarily conducted via Google Forms, with questions in multiple-choice, fill-in-the-blank, or short-answer formats. As for technical difficulties, exams may be provided in PDF format, and some are administered via Telegram calls. In addition to exams, students are assessed throughout the year through assignments, presentations, and homework submitted via Google Classroom and Google Drive. Student performance is evaluated holistically, factoring in test scores, attendance, participation, and overall conduct, which differs from SAC's system, which is heavily reliant on exam results alone.

The NUG's efforts to provide alternative higher education services are especially significant, as university students have played a central role in the CDM and the Spring Revolution. Student and teacher unions from various universities have established interim councils to offer alternative educational opportunities in collaboration with the MoE. These councils attempt to provide degree and certificate programs across various disciplines. In addition to pre-existing institutions such as arts and science universities, medical colleges, and technical colleges, new institutions affiliated with the NUG have been created. For the 2024-2025 academic year, 59 degree programs from 17 universities will be offered through online platforms, including a Learning Management System.

For assessment and quality assurance, students are required to earn credits by completing assignments, projects, and class participation. For instance, students at Wunzin Online University must submit a thesis under the supervision of their professors to earn credits for graduation. These students also have the opportunity to present their research at international conferences, such as those in the United States, in connection with their university. At vocational institutions like Spring Film Academy, students must complete 12 courses per year, earning 3 credits per course, with a final project, such as producing a film, required for graduation. To complete their studies, students must maintain 75% class attendance and meet credit requirements(Interview with a CDM Professor working at online higher education institution affiliated with the Ministry of Education, National Unity Government of Myanmar, 23 July 2024).To overcome the issue of CDM students' lacking opportunities to proceed to further education by bridging into international universities, the MoE is attempting to link and sign Memorandum of Understandings (MoUs) with international universities. The ministry has successfully signed MoUs with regional and international universities that results in allowing students to continue their education at such institutions. MoE's efforts in overcoming accreditation challenges via providing digital education service fills the gap of lacking further education and employment issues that a majority of youths are facing as a socio-economic issue happened after the post-coup scenarios.

Analyzing the digital education service of NUG through a sociotechnical lens highlights the interplay between technological strategies and socio-political contexts. The NUG's digital and on-ground education systems serve not merely as alternative educational platforms but also as tools of sociopolitical resistance, strengthening resilience amid political instability and security threats. The establishment of decentralized, flexible curricula and student-centered methodologies directly responds to the centralized and authoritarian of SAC education model, promoting academic freedom and educational integrity. Furthermore, digital platforms embody Education 5.0 principles by integrating adult learning methodologies, lifelong learning practices, and home-based education approaches, effectively adapting to Myanmar's diverse socio-cultural contexts. Nevertheless, the effectiveness of these services hinges critically on internet accessibility, digital literacy, and user trust, emphasizing the need to continuously balance technological innovations with social considerations to sustain engagement and legitimacy.

5.2 NUG Ministry of Health's Digital Healthcare Services

Driven by a robust population of healthcare workers participating in the CDM, the Ministry of Health (MoH) of NUG stands out as a pivotal institution in the provision of both digital and on-ground healthcare services. The NUG's Ministry of Health provides four interlinked healthcare services: on-ground, emergency, primary, and online care. Despite security challenges, it operates a structured health system reaching 198 townships (60% of Myanmar), especially in revolutionary-controlled areas. From April 2021 to March 2024, it treated over 1.1 million outpatients, performed 40,169 surgeries, and managed 4,140 referrals. Services are supported by 77 hospitals, 377 clinics, and 250 mobile units. Emergency care and the National Immunization Programme are key in conflict zones, with school health services reaching 962 schools. These efforts reflect the MoH's broad and resilient healthcare delivery. However, due to research limitations, this paper will focus specifically on the ministry's online healthcare services.

Telekyanmar, launched on 19 June 2021 by the NUG's Ministry of Health, is a fully online telemedicine service run by CDM healthcare workers. Accessible via Telegram and Facebook Messenger, it provides remote medical consultations to people in Myanmar and abroad. Patients book appointments through its Facebook page and are directed to general clinics via Telegram. Based on symptoms, they may be referred to one of 25 specialist clinics. Physical exams and diagnostic tests are done locally, with follow-up consultations conducted online. Telekyanmar offers a secure, innovative healthcare alternative amid ongoing conflict and limited physical access.

Telekyanmar has the policy of refusing to handle emergency situations, advising patients to contact local hospitals or clinics. However, in critical situations where patients cannot visit physical clinics, Telekyanmar's doctors provide guidance on how to manage the patient's condition. According to a CDM doctor working at Telekyanmar, most users seek initial discussions to understand their symptoms and receive treatment instructions rather than who would like to get medical services that can completely cure diseases such as surgeries. Following consultations, doctors provide prescriptions for patients to purchase medications at local pharmacies and offer ongoing monitoring and treatment in subsequent sessions (Interview with a CDM doctor working at Telekyanmar, the Ministry of Health, National Unity Government of Myanmar,27 July 2024). In its first year, Telekyanmar served patients from 298 townships in Myanmar, with usage increasing each year, reaching 319 townships in its second year (refer to Fig. 1 below). Over three years, the MoH reported that Telekyanmar provided more than 170,000 free consultations, covering 321 out of 330 townships nationwide and Myanmar citizens from 47 different countries.

Fig. 1 – Map illustrating the reach of Telekyanmar users across 319 townships (highlighted in red) between June 19, 2021, and June 6, 2023.[1]

Telekyanmar provides a "Social Media Service," designed to respond to inquiries submitted by users through its social media platforms. This service is particularly suited for individuals seeking general information about diseases and conditions without requiring a detailed medical consultation. Common inquiries include symptoms, causes, and general treatment recommendations for minor conditions such as allergic reactions, constipation, or swollen eyes, etc. The service is especially beneficial for members of the PDF and internally displaced persons (IDPs) in conflict areas, where access to healthcare facilities is limited. When internet access is available, users in these areas can send questions to Telekyanmar, enabling them to receive essential medical guidance remotely.

Telekyanmar supports mental health through two key services: a Primary Mental Health Clinic and a Psychiatric Clinic, offering general and specialized care. It also runs the "Zero-Suicide Campaign," a hotline addressing psychological distress amid Myanmar's crisis. Inter-ministerial coordination enhances care, with the Ministry of Women, Youth and Children providing counseling for gender-based violence survivors via the "Tine Pin Phaw" program and referring severe cases to Telekyanmar. Patients with chronic illnesses are directed to relevant clinics, and those needing legal aid are referred to the Ministry of Justice's "Mhyata Lan Nyun" platform.

The post-coup socio-political landscape in Myanmar has created an urgent need for accessible and affordable public services, particularly in the healthcare sector. Digital health platforms such as TeleKyanmar have emerged as critical socio-technological interventions. A significant proportion of its users are individuals from economically vulnerable backgrounds, many of whom have been further impoverished by the economic instability induced by the coup. Another key user group includes populations residing in rural and conflict-affected areas, where access to conventional healthcare infrastructure such as hospitals and clinics is severely limited. In addition to physical health, mental health services have become increasingly vital in post-coup, especially for individuals affected by conflict and violence. NUG's digital services have stepped in to fill this gap by offering remote psychological support and counseling. Hence, the delivery of NUG's digital services fulfill the needs of post-coup Myanmar society by using technology as a bridge to these essential services. This socio-technological relevance was further witnessed during the April 2025 high-magnitude earthquake. In the wake of this disaster, the NUG's digital platforms deliver non- emergency healthcare, including mental health support, to victims and rescue workers. This eased pressure on SAC-run hospitals which are already overwhelmed with emergency patients, and showed how technology can bridge service gaps and ease the social needs in crisis.

[1] Two Years Activities by Ministry of Health, National Unity Government of Myanmar (From April 2021 to April 2023)https://moh.nugmyanmar.org/wp-content/uploads/2023/06/Eng-Ver_2-Year-Activities-by-MOH-NUG-2021-2023.pdf

5.3 NUG's Ministry of Planning, Finance and Investment's Digital Financial Service Delivery

Digital financial services are another remarkable sector of NUG's digital service delivery. Currently, the Spring Development Bank (SDB) and the NUG pay are in service for bringing alternative financial platforms that are decentralized and operating in digital way. These digital financial services are revolutionary and innovative, established to contribute to the Spring Revolution by providing alternative financial services for the general public instead of saving in the banks in Myanmar, which are under the control of the junta back Central Bank of Myanmar. The public's choice to avoid moving funds into the military-based financial system can weaken that system, and hence, NUG's alternative financial services can be termed a "financial war". Moreover, since frequent cases of junta-controlled bank services monitor, track, and freeze the bank accounts of the users, choosing NUG's alternative financial services can provide safety and privacy.

The SDB, established by the NUG's Ministry of Planning, Finance and Investment and licensed by its Interim Central Bank, provides secure digital financial services to support the resistance and enhance financial access in Myanmar's crisis (Mizzima, 2023). Operating entirely online, SDB offers multi-currency transfers, fixed deposits, stablecoin withdrawals, and remittance services via authorized agents globally. Additional services include digital gold savings, e-lottery sales, and decentralized currency exchanges. It also facilitates real estate sales through the "End of Dictatorship" campaign and offers stock shares via Initial Coin Offering (Interview with SDB Executive, 26 July 2024). Complementing SDB, the blockchain-based NUG Pay mobile wallet enables users to save, transfer, and pay in various currencies, helping SMEs transition to a digital economy.

Under the sociotechnical perspective, the widespread adoption of the digital financial services of SDB and NUG Pay underscores a significant shift in public trust and financial behavior in Myanmar. People increasingly prefer these alternative platforms for their perceived security, privacy, and resilience against the SAC surveillance and control, reflecting a collective resistance through financial independence. Furthermore, the blockchain crowdfunding for 2025 April earthquake technology utilized by NUG not only ensures transparency, which is critical in managing humanitarian assistance and contributions to the earthquake and pro-democracy movement, but also enables citizens to contribute without the burdens imposed by traditional financial systems and also aids in protecting citizens from inflationary pressures driven by the military's economic mismanagement. Therefore, these digital financial services embody a dual sociotechnical purpose: empowering citizens economically and reinforcing socio-political resilience through technological innovation.

6. Challenges and Obstacles

Digital governance services under the NUG have emerged as a transformative approach to engaging with citizens, including those in conflict zones, border areas, and internally displaced persons. However, implementing these services is fraught with significant challenges. Due to security concerns, the NUG has largely shifted to online platforms to deliver services, avoiding physical locations that could be vulnerable to military airstrikes and surveillance. Yet, internet connectivity remains a critical obstacle, with widespread shutdowns across 313 townships and limited access in conflict-affected areas such as Sagaing, Magway, and parts of Tanintharyi, where military-controlled providers like Mytel dominate. This not only hinders the provision of digital services like banking, healthcare, and education but also raises concerns about surveillance and privacy. To mitigate these challenges, the NUG has turned to satellite-based internet services like Starlink, enabling connectivity in over 150 areas. However, the high cost of equipment, legality concerns, and inconsistent performance due to limited satellite coverage remain significant barriers. Furthermore, the military's crackdown on alternative connectivity solutions, such as seizing Starlink devices in Thailand, underscores the risks associated with using such technologies.

Myanmar's digital services face major challenges from frequent power outages, especially in cities like Yangon and Mandalay, disrupting device use and digital access. In NUG-controlled areas, reliance on solar panels and generators helps, but rising fuel costs and military fuel restrictions strain infrastructure. Power shortages also hinder basic education more than higher education, which can better adapt to online learning. Additionally, the military's post-coup restrictions blocking social media, VPNs, and surveilling users pose serious cybersecurity risks. NUG platforms like Spring Development Bank are frequent cyberattack targets. Weak digital literacy worsens user vulnerability, highlighting the need for better security measures and user education.

The shortage of skilled IT professionals further complicates the NUG's digital governance efforts. Effective digital transformation relies heavily on technical expertise to ensure secure and sustainable systems, yet Myanmar's digital literacy gap remains a critical barrier. Many public sector workers lack basic digital skills, and the exodus of IT professionals after the coup has significantly depleted the talent pool. Those who remain often work part-time or on a voluntary basis, limiting their capacity to contribute fully to digital governance initiatives. The Ministry of Communications, Information, and Technology (MoCIT) has attempted to fill these gaps by mobilizing volunteers and external technical support. However, the reliance on a small pool of skilled professionals and limited in-house expertise across other ministries underscores the urgent need for capacity-building programs. Long-term sustainability requires structured investments in digital literacy and skills development, alongside efforts to retain and support IT professionals in the face of financial and security challenges.

Security and control challenges are pervasive across digital governance services. The military regime's digital surveillance apparatus includes SIM card registration and mobile banking monitoring, enabling the tracking and targeting of individuals suspected of anti-regime activities. Pro-SAC groups have also weaponized social media

platforms like Telegram to dox and expose pro-democracy activists, leading to arrests and detentions. These actions have created an environment of fear, discouraging many citizens from engaging with NUG services out of concern for their privacy and safety. In response, the NUG has implemented cybersecurity protocols and digital safety training, yet the lack of a unified international database and fragmented digital infrastructure limits the effectiveness of these measures. Strengthening cybersecurity frameworks and promoting digital literacy across the population are critical steps in building resilience against these threats.

User adoption and digital literacy are central to the success of NUG's digital services. While platforms like Telekyanmar offer innovative solutions for healthcare delivery, gaps in digital skills and infrastructure hinder their accessibility. Many students and educators in conflict-affected regions face challenges in accessing online education due to the high cost of devices and data, as well as unreliable internet connectivity. In some cases, communities pool resources to purchase shared devices, while students travel long distances to access areas with better connectivity. Similarly, digital financial services like the Spring Development Bank play a crucial role in facilitating secure transactions, but users often struggle with unfamiliar blockchain technology and limited withdrawal options, undermining confidence in these platforms.

Trust and legitimacy are critical for the broader adoption of digital governance services. The NUG's ability to deliver effective and inclusive services is a key factor in establishing its credibility as a governing body. While the NUG has made progress in engaging ethnic minorities and marginalized groups, historical grievances and cultural barriers remain significant obstacles. Efforts to promote inclusivity through translation services and localized solutions, such as Telekyanmar's Chin Tele App, demonstrate the NUG's commitment to addressing these challenges. However, limited infrastructure and frequent displacement in ethnic areas continue to impede service delivery.

Tab. 1 – People Trust on Digital Governance Services.

Survey Aspect	**Percentage / Response**
Efficiency of NUG's Digital Services	65.7% highly trust , 22.9% moderately trust it
User trust on Security Protection of NUG Digital Services	62.9% express high trust, 25.7% moderately trust NUG Digital Services Security Protection
People access to NUG Digital Services	37.1% show moderate access, 37.1% show low access to Digital Governance Services
General Trust in NUG Digital Services	45.7% express moderate trust, 34.3% high trust, 8.6% no trust
Reasons for Non-Use of NUG Digital Services	47.1% cite security issues, 44.3% cite lack of internet access, 4.3% question service quality

These findings suggest that trust in digital governance, particularly in crisis contexts, is contingent on both service quality and accessibility. In Myanmar's conflict-ridden environment, trust is not only a matter of perceived efficiency but also hinges on the capacity of governance structures to ensure secure and equitable access. Analysis of the survey data reveals that users generally have greater confidence in the efficiency and security of the NUG's digital services compared to those who express distrust. In contrast, non-users primarily cite concerns over security, limited internet access, and poor service quality as reasons for not engaging with the services. Additionally, responses indicate an even distribution between moderate and low levels of access to the NUG's digital platforms. These findings suggest that, although there is a significant degree of trust in the NUG's digital initiatives, their long-term success hinges on addressing key practical barriers particularly in terms of security and accessibility which are essential for building and maintaining public trust.

International support plays a vital role in overcoming these challenges. The lack of strong international assistance has limited the NUG's capacity to expand its digital governance initiatives. While some capacity-building programs and training sessions have been offered by international organizations, these efforts remain sporadic and insufficient. Enhanced technical and financial support for internet infrastructure, capacity-building programs, and digital literacy initiatives could significantly strengthen the NUG's digital governance capabilities. Recognizing internet access as a fundamental right and fostering global partnerships would not only address existing gaps but also enhance the resilience and legitimacy of the NUG's efforts to govern effectively in a politically fragmented Myanmar. By addressing these interconnected challenges, the NUG can build a more inclusive and sustainable digital governance system to support the country's transition toward democracy and stability.

7. Conclusion

This research reveals the complex challenges faced by the NUG in implementing digital services within

Myanmar's volatile socio-political landscape. Utilizing a socio-technical framework, this paper illustrates how technical and social factors interact to influence the success of digital governance initiatives. On the technical side, challenges such as inadequate internet infrastructure, frequent power outages, cybersecurity threats, and a shortage of skilled IT professionals hinder the scalability and accessibility of NUG's services. On the social side, barriers including low digital literacy, trust deficits, and cultural diversity, particularly in ethnic regions, impede user engagement. These challenges are compounded by Myanmar's conflict-ridden environment, where military surveillance and repression create a climate of fear that further discourages the adoption of digital tools. This section synthesizes the findings by explicitly linking the empirical evidence gathered from interviews, surveys, and secondary data with the theoretical components of the sociotechnical framework. Key barriers identified such as trust deficits, infrastructural inadequacies, and security challenges are discussed in direct relation to their impact on service adoption and legitimacy, thereby offering sharper and more coherent conclusions.

Despite these obstacles, the NUG has demonstrated remarkable resilience and innovation in its digital initiatives. Telekyanmar offers critical healthcare services, including mental health support and suicide prevention. Similarly, the Ministry of Education has provided alternative educational opportunities through digital platforms such as the Learning Management System and Moodle. These efforts have enabled students in conflict zones and ethnic areas to access flexible curricula tailored to their cultural and linguistic needs. Financial solutions such as the SDB and NUG Pay highlight the government's commitment to transparency and accountability, fostering trust among users despite the operational risks posed by cyberattacks and military control.

The research highlights how the NUG can strengthen its digital governance by improving internet access, cybersecurity, and digital literacy particularly in marginalized areas. Collaboration with ethnic groups and international partners is key to inclusivity and resource support. Despite security-related research limitations, the study underscores the NUG's progress in using technology to deliver essential services. A clear digital roadmap and transparent donor engagement are crucial to building legitimacy and attracting investment. These findings offer both practical strategies and broader insights into digital governance in conflict settings, showing how innovation can advance democracy and resilience amid crisis.

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Appendix A

National Univerity Government Service area

Ministry	Service Mode	Details	Area Noted
Ministry of Defense	In-Person	Security services in controlled areas	NUG Controlled areas
Ministry of Health	Mixed (Digital/In-Person)	Physical hospitals, mobile health units, Tele Kyan Mar	Sagaing, Magway, Kayah, Karen, Kachin,Thanintharyi
Ministry of Planning, Finance, and Investment	Digital	Online lottery, banking, mobile wallet	Online
Ministry of Foreign Affairs	In-Person	Physical representative offices	International locations
Ministry of Education	Mixed (Digital/In-Person)	Physical basic education, online higher education, matriculation exam systems	NUG controlled areas/ Online
Ministry of Home Affairs and Immigration	In-Person	Birth certificates, local administration, security	NUG controlled areas
Ministry of Federal Union Affairs	Digital	Policy foundation and coordination	Online
Ministry of Humanitarian Affairs and Disaster Management	In-Person	Humanitarian aid	NUG controlled area,ERO controlled area and Border Area.
Ministry of Human Rights	Mixed (Digital/In-Person)	Human rights protection, data collection, online training, Human rights reporting, International Advocacy	NUG controlled area,ERO controlled area and Border Area.
Ministry of Natural Resources and Environmental Conservation	Mixed (Digital/In-Person)	Conservation efforts, forestry, online activities	NUG Controlled Area
Ministry of International Cooperation	Digital	International cooperation	N/A
Ministry of Women, Youths, and Children Affairs	In-Person	Gender-based violence, youth development, protecting and promoting women's rights	NUG controlled areas, ERO controlled areas and border areas
Ministry of Labour	Digital	Labour affairs, union coordination	online

Ministry of Justice	Mixed (Digital/In-Person)	Court hearings, legal advice, marriage services	NUG controlled areas
Ministry of Communications, Information & Technology	Digital	Telecommunications and IT services	Online
Ministry of Electricity & Energy	Digital	Energy services	N/A
Ministry of Commerce	Digital	Online training	Online

Appendix B

Areas of Controlled (Newyorktimes,2024)