



The Potential of Establishing an Environmental Metaverse within Mongolia's Ministry of Foreign Affairs Overseas Development.

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Abstract

The advent of the Metaverse has presented novel opportunities for diplomatic institutions to redefine their public diplomacy strategies. This academic overview examines the use of social media influence within the Metaverse by the Ministry of Foreign Affairs (MFA) Multi-Factor Authentication to enhance their operations, particularly in the realms of their embassies and consulates worldwide. It explores the theoretical framework of public diplomacy in the digital age, the emergence of this technology, and the potential benefits and challenges associated with its adoption in the foreign service. The study explores security provisions and protocols which ought to be included to illustrate the safety mechanisms within the architecture of such both technological and revolutionary implementation of MFA frameworks prior to being applied to sensitive areas within a government's overseas missions' diplomatic apparatus. The study draws upon existing research to discuss how social media influencers can be leveraged to communicate national interests, foster cultural understanding, and facilitate virtual diplomatic engagements. It concludes by suggesting potential avenues for future research to evaluate the effectiveness and implications of these innovative practices, forward planning, therefore, retaining the security provisions already mentioned, in regard to highly sensitised information within a country's foreign affairs ministry. In recommendation, this research has determined that the Metaverse and its future development would be of benefit and play great importance within Mongolia's Ministry of Foreign Affairs' infrastructure in years to come.

Literature Review

The rise of digital technologies and the increasing importance of environmental diplomacy have led to a transformation in how states conduct their international affairs. The concept of the environmental metaverse, a virtual space dedicated to environmental governance and diplomacy, presents an innovative opportunity for Mongolia's MFA (Multi-Factor Authentication) to enhance its overseas development efforts. This literature review will examine the potential of establishing an environmental framework within the MFA by comparing the effectiveness of virtual versus physical embassies. The thesis will be guided by the following research question: What are the strategic, economic, and environmental benefits and challenges of establishing an environmental metaverse for Mongolia's MFA overseas development initiatives?

i) Virtual Diplomacy and the Environmental Metaverse

The term "environmental metaverse" encapsulates the integration of environmental governance within a virtual world. Research by Deibert and Rohozinski (2010) introduces the concept of "virtual diplomacy," which utilizes digital platforms to facilitate international dialogue and cooperation. The environmental tech extends this concept by creating a dedicated virtual space for environmental policy discussions, negotiations, and knowledge sharing. This section will review literature on the effectiveness of virtual diplomacy in addressing environmental issues, the role of technology in diplomacy, and the theoretical frameworks that underpin the idea of the environmental metaverse.

ii) Case Studies of Virtual Embassies

To understand the practical application of the environmental metaverse, the thesis will examine existing case studies of virtual embassies. Notable examples include the virtual Swedish Embassy in Second Life, which serves as a platform for public diplomacy and cultural outreach, and the Maldives' virtual embassy, which addresses the urgent issue of climate change. These case studies will highlight the potential benefits and limitations of virtual embassies in terms of cost savings, environmental footprint reduction, and diplomatic engagement. The review will also analyse how these examples can be adapted to an environmental context.

iii) Strategic Benefits

The strategic advantages of an environmental version of technological discipline include the ability to reach a broader audience, foster collaboration between governments, NGOs, and the private sector, and enhance Mongolia's visibility in international environmental forums. Literature by Manuel (Castells 2010) on the network society and Manuel Lim's (2011) work on the role of social media in diplomacy will be reviewed to explore how a virtual presence can complement traditional diplomatic strategies. Additionally, the review will consider the potential for the environmental metaverse to serve as a tool for public diplomacy, enhancing the country's soft power and advocating for its environmental policies.

iv) Economic Considerations

Transitioning from physical to virtual embassies could yield significant economic savings for Mongolia, a country with limited financial resources. Research on the cost-effectiveness of virtual embassies by Hocking (2005) will be analysed to evaluate the potential for cost reduction without compromising diplomatic efficacy. Moreover, the review will consider the economic implications of reducing the carbon footprint of diplomatic missions and how virtual platforms can support sustainable business practices and investment opportunities in the green sector.

v) Environmental Implications

The environmental benefits of a virtual embassy are central to the thesis. Studies on the ecological footprint of traditional diplomatic missions, such as those conducted by the European Union (EU) and the United States, reveal the high carbon emissions and resource consumption associated with maintaining a physical presence. The environmental metaverse could mitigate these impacts by reducing travel, energy consumption, and physical waste. Literature on the environmental benefits of virtual meetings and events will be examined to quantify the potential ecological savings of a virtual embassy.

vi) Challenges and Limitations

While virtual diplomacy offers numerous advantages, challenges such as security, digital divides, and the potential for misinformation must be acknowledged. The review will explore these issues through the lens of existing research, for example on the risks and opportunities of digital diplomacy. Additionally, the paper will consider the unique challenges faced by Mongolia in terms of digital infrastructure, internet penetration, and the digital literacy of its diplomatic workforce.

vi) Summarisation

The literature review will synthesize the findings to provide a comprehensive understanding of the potential of establishing an environmental metaverse within Mongolia's MFA. The analysis will reveal whether a virtual approach to environmental diplomacy can effectively address the strategic, economic, and environmental challenges faced by the country. The thesis will conclude with recommendations for the implementation of an environmental communicative technology and the integration of virtual diplomacy into Mongolia's broader overseas development strategy.

1. Introduction

It is written that "Successful diplomacy is an alignment of objectives and means." (Ross, 2024). The means in this case is connected to the notion of the metaverse, which has picked up considerable momentum in recent times. It promises to redefine our experiences in a rapidly digitizing world. At the most fundamental level, the metaverse is a step toward fulfilling the original vision of the internet as an immersive virtual space in which users inhabit and interact with one another and with the virtual environment in real time. This idea has breathtaking implications for all human endeavours and is being chased by several global tech companies.

1.2 Some early imaginative thinkers have suggested that this evolution of digitalisation may also bring about major policy changes in areas such as international relations or climate diplomacy.

1.3 Virtual stakeholders can benefit from the Environmental Metaverse, just as those who inhabit the physical world presently do. On this truly global scale, government officials, environmentalists, local communities, and international partners can virtually meet in this digital space to try to make sense of and find collaborative, knowledge-based solutions to contemporary, interdisciplinary environmental problems. 'Problem-based immersive learning centered around the world's contemporary environmental challenges along with fostering an appreciation for the interdisciplinary nature of potential solutions emerges as a central organizing theme of the Environmental Metaverse.' In other words, this digital platform will also serve as an instructional space—think of this new evolved tool as a virtual classroom. Learning in this way not only allows deeper engagement with the Earth's vital systems but also enables participants to become co-designers of the next iteration of the human experiment. I see it as something that could greatly empower environmental diplomacy, allowing those making decisions and those experiencing the decision 'on the ground' to virtualize decisions and problem-solving in a way that might allow for better interdisciplinary engagement and a wider appreciation for the nature of contemporary environmental challenges.

1.4 In addition, Mongolia enjoys a unique landlocked position between the two major powers of China and Russia, which opens up special diplomatic opportunities. An Environmental Metaverse could provide Mongolia with a yet another way of placing itself at the leading edge of something—in this case, environmental diplomacy—in which it has special cause to seek a lead. As a regional, and also a global, good, the Environmental system that could be established would not only give Mongolia a special role on the ecological issue that is of concern to all of us; it would also give those issues the special regional focus afforded by an Environmental tech apparatus situated right in the middle of Northeast Asia.

1.5 Globally however, what was once confidential and solely managed by the state has broadened. Non-state actors assume greater roles with the growing use of digital platforms that emphasize dialogue creation. Advocates of public diplomacy frequently contend that the fundamental idea is 'public' and that engaging with the public has become central to diplomacy. Consequently, the development of virtual platforms by the "Second Life" platform was motivated by the necessity to connect with a broader audience. The utilization of social media as a tool for public diplomacy via Twitter, Facebook, Instagram, and even TikTok is increasingly common. We continue to navigate this technological 'shock' while determining how to make use of the new digital-social platform. Consequently, the emergence of the metaverse increases the intricacy of public diplomacy.

1.6 The present external environment doesn't always simplify the job. Particularly after the pandemic, virtual interactions have taken the place of traditional business methods and are recognized as the new standard. The concept of the metaverse as a digital upgrade, has been around for over 20 years, but it gained broad acceptance only in 2021. By the close of 2021, it appeared that "metaverse" was the most frequently cited term in modern discussions.

1.7 In the case of Mongolia's foreign affairs office, this latest technological implementation and interventions could significantly benefit from the implementation of a metaverse system throughout its embassies and consulate sections globally for several key reasons, which include enhancing diplomatic engagement, promoting economic and cultural ties, providing innovative consular services, and fostering a sustainable presence.

1.7.1 Enhanced Diplomatic Engagement: The new application allows for immersive and interactive communication across vast distances. According to a report by the Australian Strategic Policy Institute, "Diplomacy in the Metaverse: Opportunities and Challenges" (ASPI, 2022), embassies in the virtual world can facilitate real-time diplomatic meetings and cultural exchanges that are more engaging and personal than traditional video conferencing. For example, Mongolian embassies could host virtual events, such as cultural festivals, political briefings, and economic forums, allowing global participants to interact with each other in a more lifelike setting, thus enhancing the effectiveness of diplomatic efforts. This can lead to stronger international relations and cooperation.

1.7.2 Promotion of Economic and Cultural Ties: A metaversal presence can serve as a digital showcase for Mongolian culture, traditions, and business opportunities. This virtual environment can be used to promote tourism, trade, and investment by creating experiences that immerse users in Mongolian life. For instance, the country could create virtual exhibits of its natural landscapes, historical sites, and unique cultural practices, potentially attracting more international visitors and investors. Moreover, by hosting virtual trade shows and economic summits, Mongolia can connect with global businesses and entrepreneurs, fostering international partnerships. (Ayhan, K. 2022).

1.7.3 Innovative Consular Services: By offering consular services in the metaverse, Mongolia can improve accessibility and efficiency for its citizens and foreign nationals. This could include virtual visa appointments, passport renewals, and information sessions on travel requirements. A metaversal system would allow for real-time assistance and support, reducing the need for physical visits to embassies and consulates. This is particularly beneficial for those living in remote areas or countries with limited Mongolian diplomatic representation. The use of blockchain technology within this form digitalisation can also enhance the security and verification of digital documents. (Lee, A. 2021)

1.7.4 Fostering a Sustainable Presence: A metaverse system can help Mongolia reduce its carbon footprint by minimizing the need for physical travel and reducing the resources required to maintain and operate traditional diplomatic missions. By transitioning to a virtual environment, the country can significantly cut down on costs associated with real estate, utilities, and other operational expenses. Additionally, it can allow for the participation of more people in diplomatic engagements without the environmental impact of international flights and meetings. (Rigillo, M.P. 2022).

1.7.5 Education and Public Diplomacy: The new form of technology can serve as an educational tool for disseminating information about Mongolia's history, politics, and society. Virtual classrooms and educational programs can be established to educate foreign audiences about the country, thereby enhancing its soft power and global image. This aligns with the concept of public diplomacy, where countries seek to influence international public opinion and build a positive brand identity.

1.7.6 Accessibility and Inclusivity: A new system can make diplomatic and consular services more accessible to people with disabilities, as well as those who are unable to visit physical embassies due to geographic or political constraints. This inclusive approach can help Mongolia engage with a broader audience and enhance its reputation as a progressive nation committed to serving all its citizens and the international community (Riordan, S. 2022).

1.7.7 Staying Competitive in the Digital Age: As the world becomes increasingly digital, countries that fail to adapt risk being left behind. By establishing a presence in the metaverse, Mongolia can demonstrate its commitment to innovation and technological advancement, which are crucial factors in international affairs. This can lead to increased respect and recognition on the global stage and may even attract international tech companies and talent to invest in the country. (Cohen, S. 2022).

1.8 Implementing a metaversal system in Mongolian embassies and consulates globally would require careful planning and investment in digital infrastructure. However, the potential benefits in terms of enhanced diplomatic engagement, economic growth, and cultural exchange make it a strategic move for the nation's foreign affairs. It is essential for Mongolia to embrace new technologies to remain competitive and relevant in the 21st-century global landscape.

2. Methodology

2.1 Using a mixed-method approach, this research aims to find out the potential of establishing an Environmental Metaverse within Mongolia's Department of Diplomacy. The four countries cited are Switzerland, South Korea, United States and European Union.

2.1.1 The established Department of Diplomacy, under the Khan Khentii campus of the National University of Mongolia, which was founded in 1942, located in Ulaanbaatar, has a great potential to use this newly-gained knowledge to build an Environmental Metaverse. The perfect combination of science, art, and diplomacy can use this transdisciplinary knowledge to better understand the path toward building this novel environmental governance tool.

2.2 Questions answered within this paper are:

- I. Which nations have implemented this digital metaverse within Foreign Relations policy?
- II. How has this blend of both technology and form of diplomacy assisted 21st Century international relations' dialogue?

- III. What will Mongolia's Institute of Foreign Affairs both learn and gain from such apparatus framework Ecologically, and within the use of Social Media platforms?

3. Results and Discussion 1.

Qualitative

i) Sample nations that have generally applied the "Metaverse"

3.1 The technological metaverse represents a new concept for international relations diplomacy which has not reached its full potential. Several countries across the globe have initiated exploration of virtual reality (VR) and augmented reality (AR) along with other advanced digital technologies to boost their diplomatic activities.

The following countries represent some examples of nations that have adopted this approach and discussed in detail in this paper:

3.1.2 Switzerland became one of the first nation to establish a virtual embassy through its Second Life online platform which demonstrated diplomatic use of the metaverse. Users who visited the platform during its launch in 2007 could meet Swiss diplomatic avatars while discovering information about the country.

3.1.3 South Korea actively supports its "Digital New Deal" initiative by establishing a "Metaverse Alliance" to discover opportunities in virtual reality and augmented reality technology. The country demonstrates its dedication to lead international discussions about digital collaboration through this initiative which does not serve as a direct diplomatic instrument.

3.1.4 Additionally via its Virtual Island Summit in 2020 the U.S. State Department conducted international meetings and conferences on virtual platforms. The U.S. uses digital spaces to enhance diplomatic engagement through these initiatives that stop short of creating a complete metaverse as a transformative platform.

3.1.5 With virtual reality technology the EU participates in digital diplomacy by providing training to diplomats and running outreach programs. The EU participates in metaverse discussions through its examinations of digital governance and international cooperation.

ii) "Second Life" Virtual Community Platform – Could have Changed Everything...

Qualitative Data

3.2 An American tech entrepreneur Philip Rosedale who founded Linden Lab, which develops and hosts the virtual world Second Life, was founded in 1999 and has now transitioned from gaming to advanced virtual communications involved in sectors like marketing to executive meetings leading to the diplomatic sphere, (Second Life, 2025).

3.3 Now we have seen many nations apply this modern development in communications to foreign affairs apparatus for web negotiations before the delegations meeting finally in person. (Linden Lab, 2024).

3.4 A virtual Diplomatic Island was created by the Linden Lab, to facilitate companies focussing on "Green" related exposure.

iii) Countries that have adopted Second Life:

3.5 Maldives, North Macedonia, Philippines and Sweden have opened a virtual embassy on Diplomacy Island. Sweden in fact, started an embassy exposing cultural exchange and art. (Diplomacy.edu, 2007).

All the consular services denoted from the virtual to the physical relating to “Second Life” technological advances, are illustrated more clearly overleaf (Table 1., APPENDIX I).

4. Negative reactions on this form of technological advancement

According to a paper published by a law faculty in Indonesia, there seems to be some drawbacks of have such technology in in foreign affairs as virtual embassies cannot fully replace physical ones. The paper argues that VR’s performance of the functions is ineffective as it operates only one or a few functions.

4.2 Through this interpretation, the exclusive creation of non-physical embassies, the case of Barbados’ metaverse embassy like virtual embassies and particularly metaverse embassies, it is unfeasible because they cannot carry out various essential functions of a diplomatic mission. It was then clearly determined that States cannot depend only on creating non-physical embassies and must pursue other approaches. (Zhahira, T., et al. 2023).

4.3 The employment of technological services in an embassy can have several negative effects, including security risks, privacy concerns, and potential for misuse or failure of technology. Below are a few examples with references:

a) Security Risks:

4.4 The use of technology can expose an embassy to various security threats such as cyber-attacks, data breaches, and espionage. Sensitive information can be compromised if the technology systems are not sufficiently secured.

- According to the U.S. Department of State's Office of Inspector General, "Embassies and consulates are increasingly targeted by sophisticated cyber threats that can compromise sensitive information and disrupt operations" (U.S. Department of State, 2019, p. 2).
- Referred to by Kshetri in 2017, Cyber espionage and cyberattacks were a growing concern for embassies worldwide, as they had handled sensitive information and communication that would have been of interest to foreign governments and other malicious actors.

b) Privacy Concerns:

4.5 Technological advancements can lead to the collection and storage of large amounts of personal data, which may raise concerns about the privacy of individuals, including both employees and the general public who interact with the embassy.

- "The use of digital surveillance technologies by embassies can infringe on the privacy of individuals within the host country and may lead to tensions in diplomatic relations" (G. Berridge *et al.* p. 45).
- The European Union has expressed concerns over the privacy implications of U.S. embassies using biometric data collection, stating that "such practices can raise significant concerns regarding the respect of privacy and data protection rights of individuals" (European Data Protection Supervisor, 2013, p. 10).

c) Misuse of Technology:

4.6 Embassy staff may misuse technological resources for unauthorized purposes, which can have serious diplomatic and legal consequences.

4.6.1 A study by the Association of Certified Fraud Examiners found that "misuse of technology is a significant problem in the public sector, including embassies, often leading to the unauthorized disclosure of sensitive information and other forms of fraud" (ACFE, 2018, p. 34).

d) Technological Dependence:

4.7 Over-reliance on technology can make an embassy vulnerable to system failures, which can disrupt critical diplomatic functions and communication.

4.7.1 In a report on the risks of technology in diplomacy, the Australian Government's Department of Foreign Affairs and Trade noted that "over-reliance on digital communications can result in a loss of traditional diplomatic skills and an increased vulnerability to system failures or outages" (DFAT, 2017, p. 8).

e) Technological Divide:

4.8 The use of advanced technologies can create a divide between employees who are tech-savvy and those who are not, potentially leading to inefficiencies and reduced collaboration.

4.8.1 An embassy's reliance on technology can also exacerbate existing disparities between employees who are comfortable with new technologies and those who are not, creating a technological divide" (G. Berridge, p. 47).

f) High Costs and Maintenance:

4.9. The implementation and maintenance of technological services can be expensive, especially considering the need for up-to-date security measures and the frequent turnover of staff who require training.

4.9.1. The Government Accountability Office (GAO) in the US reported that "the cost of upgrading and maintaining technology systems at overseas posts is significant, and the Department of State faces challenges in effectively managing and prioritizing these investments" (GAO, 2018, p. 1).

5. Specific Considerations in the Application of the “Metaverse” in a Country’s Foreign Office International Operations.

g) Strategic Considerations for Discussion:

5.1 Strategic Objectives of Implementing a Metaverse System: The strategic objectives of implementing a foreign office Metaversal system can be numerous and multifaceted, encompassing various domains such as diplomacy, international relations, trade, culture, and security. Below are some potential strategic objectives derived from literature and expert insights:

5.2 Enhanced Diplomacy and Soft Power Projection: A foreign office Metaverse system can serve as a virtual platform for governments to conduct diplomatic engagements and enhance their soft power (Nye, 2004). It can facilitate immersive and interactive experiences that showcase a country's culture, heritage, and achievements to a global audience, fostering better understanding and positive perceptions.

5.3 Global Engagement and Collaboration: The Metaverse can be used to host international conferences, summits, and cultural events, providing a more inclusive and accessible environment compared to physical venues. This can lead to increased collaboration and networking opportunities among diplomats, policymakers, and international stakeholders, contributing to more effective global governance (Kurzweil, 2005).

5.4 Crisis Management and Communication: In times of international crisis, a Metaverse system can offer a secure and real-time communication platform for diplomats and decision-makers, allowing them to negotiate and coordinate responses without the need for physical travel. It can also serve as a tool for public diplomacy, providing timely and accurate information to a global audience and countering misinformation (Rawnsley, 2021).

5.5 Economic Expansion and Trade Promotion: The Metaverse can be leveraged to promote trade and investment by creating virtual trade fairs, business networking spaces, and educational platforms that showcase a country's economic capabilities and opportunities. This can lead to increased export and investment opportunities and help in the negotiation of trade agreements (McKinsey & Company, 2021).

5.6 Consular Services and Citizen Engagement: Providing virtual consular services within the Metaverse can significantly improve the accessibility and efficiency of such services for citizens living abroad. It can also serve as a virtual hub for diaspora communities, enhancing their engagement with the home country and facilitating their participation in cultural and civic activities (Papacharissi, 2010).

5.7 Cybersecurity and Digital Governance: By establishing a presence in the Metaverse, foreign offices can actively participate in shaping the digital governance frameworks and cybersecurity policies that will underpin future international relations. This can help protect national interests and ensure that the country plays a leading role in the global digital landscape (Kshetri, 2021).

5.8 Capacity Building and Training: This digital upgrade can be used to train diplomats and other foreign service officers in various skills, including language training, cultural awareness, and negotiation tactics. It can also serve as a platform for conducting joint exercises and training with international partners, fostering better inter-agency coordination and cooperation could achieved.

5.9 Research and Intelligence Gathering: A new technological presence can facilitate the monitoring and analysis of international trends, public opinion, and emerging issues. This can inform foreign policy decisions and provide early warnings of potential crises or opportunities for engagement (Arquilla & Ronfeldt, 2001).

5.10 Public Diplomacy and Influence: The Metaverse offers innovative ways to communicate and engage with foreign publics, enhancing a country's brand and influencing perceptions abroad. This can be achieved through educational programs, cultural exchanges, and public campaigns that resonate with diverse international audiences (Cull, 2009).

5.11 Innovation and Technological Leadership: By embracing the modernity of tech advancement, foreign offices can demonstrate a country's commitment to innovation and technological advancement. This can help attract talent, investment, and partnerships in the digital sector, contributing to economic growth and strategic positioning (Kurzweil, 2005).

5.12 Implementing a foreign office Metaverse system requires careful consideration of ethical, legal, and security issues. Governments must ensure that they uphold international norms and protect the privacy and rights of users within this new digital environment (Kshetri, 2021).

5.13 In summary, the strategic objectives of implementing a foreign office technological upgrade include enhancing diplomacy, fostering global engagement.

h) Technological Infrastructure for a Metaverse in Foreign Offices and Overseas Embassies:

To implement a metaverse in a country's foreign offices and overseas embassies, a robust technological infrastructure is essential. This new communicative form of innovation is a virtual space where users can interact and collaborate in real-time, would require advanced hardware, software, and network systems to support these activities. The following are the key components of such an infrastructure:

5.13 Castronovo's paper in 2022 stated that High-Performance Computing and Storage was inclusive of Powerful servers and data centres were necessary to handle the vast amounts of data and computational needs generated by the virtual environment. These systems would support the rendering of the 3D spaces, the interactions between users, and the storage of virtual assets and records.

5.14 Advanced Networking: High-speed and low-latency internet connections are crucial for seamless communication and interaction within the metaverse. The embassies would need to be equipped with cutting-edge networking technologies such as 5G, fibre-optic connections, and potentially satellite links to ensure reliable and secure data transmission across international borders (Kurzweil, 2020).

5.15 Virtual Reality (VR) and Augmented Reality (AR) Devices: VR headsets, AR glasses, and haptic devices would allow users to immerse themselves in the metaverse, interact with others, and manipulate digital objects. These devices should be compatible with the chosen metaverse assigned platform and provide a high-quality user experience (Bailenson, 2021).

5.16 Metaverse Platform: The selection of an appropriate platform for creating and hosting the upgraded technology is vital. This could involve using existing platforms like Decentraland, Sandbox, or Horizon Worlds, or developing a custom solution that meets the specific needs of the diplomatic missions. The platform should support interoperability, scalability, and customization (Yuan, 2021).

5.17 Cybersecurity Solutions: Given the sensitive nature of diplomatic communications, the metaverse would require sophisticated cybersecurity measures. This includes encryption, firewalls, intrusion detection systems, and regular security audits to protect against data breaches, unauthorized access, and cyber-attacks.

i) Security Measures for a Metaverse in Foreign Offices and Overseas Embassies:

5.18 Access Controls: Implement strict authentication and access controls to ensure that only authorized personnel can access this newly formed metaverse. This may include multi-factor authentication, biometrics, and secure tokens to verify user identities.

5.19 Data Encryption: All data transmitted within the new system should be encrypted to prevent interception by unauthorized parties. Additionally, sensitive information stored within the virtual environment should be encrypted at rest and in transit to protect against data breaches.

5.20 Secure Communication Channels: Establish encrypted and secure communication channels for diplomatic conversations and negotiations within the metaverse. This may involve the use of secure messaging apps or the creation of private, encrypted spaces for meetings (Kurzweil, 2020).

5.21 User Training and Awareness: Train diplomats and staff on the best practices for securely using the metaverse, including how to identify and report suspicious activities or potential security threats. Regularly update them on the latest cyber threats and security protocols.

5.22 Incident Response Plan: Develop a comprehensive incident response plan that outlines procedures for handling cybersecurity incidents within the metaverse domain. This plan should include protocols for reporting, containment, and recovery from potential breaches or disruptions.

5.23 Regular Security Audits and Updates: Conduct regular security audits to identify and address vulnerabilities within the metaverse infrastructure. Keep the system's software and hardware updated with the latest security patches and firmware to mitigate known risks.

5.24 Physical Security: Protect the VR/AR devices and other hardware from theft or tampering. Secure the premises where these devices are used and ensure that the physical infrastructure supporting this innovation is also protected from unauthorized access.

5.25 Compliance with International Law: The metaverse must adhere to international laws and regulations regarding data privacy, intellectual property, and cybersecurity. This includes ensuring that the virtual environment is not used for illicit activities or espionage.

5.26 International Collaboration: Work with other countries and international organizations to establish common security standards and protocols for metaverse diplomacy. This can help in creating a more secure and trustworthy virtual diplomatic space.

5.26.1 In summarisation, implementing a new digital system in foreign offices and overseas embassies would require a combination of advanced technological infrastructure and stringent security measures. The technological infrastructure would involve high-performance computing, advanced networking, and the necessary VR/AR devices. Security measures would encompass access controls, data encryption, secure communication channels, user training, incident response planning, regular audits, physical security, and compliance with international laws. By carefully considering these aspects, countries can enhance diplomatic engagements and protect sensitive information in a rapidly evolving digital landscape.

j) Cultural Exchange and Public Diplomacy in the Metaverse Reality

5.27.1 Cultural Exchange and Public Diplomacy in the Metaverse refer to the use of virtual reality environments to facilitate international communication, cultural understanding, and diplomatic relations between countries. By implementing a metaverse within a country's foreign offices and overseas embassies, these entities can leverage immersive digital platforms to engage with individuals from around the globe, thereby extending their public diplomacy efforts and fostering cultural exchange in innovative ways.

5.27.2 The concept of the metaverse, a term coined by science fiction writer Neal Stephenson in his 1992 novel "Snow Crash," describes a collective virtual shared space, created by the convergence of virtually enhanced physical reality and physically persistent virtual space, including the sum of all virtual worlds, augmented reality, and the internet (Stephenson, 1992). In the context of cultural exchange and public diplomacy, the metaverse offers a new dimension for countries to showcase their culture, values, and policies without the physical constraints of traditional diplomatic engagements.

5.28 Implementing a metaverse in foreign offices and overseas embassies can enhance public diplomacy through the following ways:

5.28.1 Virtual Cultural Events and Exhibitions: Embassies can host virtual cultural events such as art exhibitions, music performances, and educational programs that allow users from different countries to interact and experience the host country's culture in an immersive environment (Cull, 2009). These events can be accessed by anyone with an internet connection, thus reaching a broader audience and fostering cross-cultural understanding.

5.28.2 Language Learning and Education: Virtual language centres can be established where people can learn the language of the host country, interact with native speakers, and participate in cultural lessons. This educational aspect of the metaverse can promote cultural diplomacy and encourage people to engage with the host nation on a deeper level.

5.28.3 Economic and Trade Promotion: The metaverse can be used to create virtual trade fairs and economic zones where businesses from the host country can showcase their products and services to a global audience. This can facilitate international trade and investment opportunities.

5.28.4 Diplomatic Meetings and Conferences: Diplomats can hold virtual meetings and conferences in the metaverse, reducing the need for physical travel and associated costs while still maintaining face-to-face interaction in a secure and controlled environment.

5.28.5 Citizen Engagement: Virtual embassies can provide a platform for citizens of the host country to interact with their government representatives and receive consular services without physically visiting the embassy. This can enhance the relationship between the government and its diaspora, as well as provide a more accessible and user-friendly experience.

5.28.6 Public Relations and Branding: Countries can create engaging and informative virtual spaces within the metaverse to communicate their national narratives, achievements, and values, thereby enhancing their public image and influencing international perceptions.

5.28.7 Collaborative Projects and Partnerships: The metaverse can serve as a space for international collaboration on various projects, such as environmental initiatives, scientific research, and cultural preservation. This can lead to stronger diplomatic ties and shared achievements.

5.28.8 Researchers in the West have noted that the potential for public diplomacy in the metaverse is vast. By creating immersive experiences, countries can effectively communicate their soft power assets and engage with international audiences in a more personal and impactful way. For example, the United States has experimented with using virtual reality for public diplomacy purposes through its American Spaces initiative, which includes virtual programs and online platforms for cultural exchange, in this case voiced by the US Department of State a decade ago.

5.29 However, there are challenges and considerations that must be addressed when implementing the metaverse in diplomatic contexts. These include ensuring data privacy and security, addressing digital divides, and navigating the complex legal and political implications of virtual sovereignty. It is essential for foreign offices and embassies to develop comprehensive strategies that align with their broader public diplomacy objectives and adapt to the evolving nature of virtual engagements.

5.30 to summarise, the integration of the metaverse into cultural exchange and public diplomacy efforts can significantly enhance a country's ability to engage with international audiences, foster cultural understanding, and promote its interests abroad. By leveraging this technology, countries can create innovative and inclusive spaces for diplomatic outreach and cooperation.

6. Mongolia's Ministry of Foreign Affairs and Economic Cooperation and Trade Promotion within a Future Diplomatic and Consular Metaverse.

6.1 Economic Cooperation and Trade Promotion in the Metaverse can be understood as leveraging virtual worlds to enhance international trade and investment, foster business relationships, and facilitate collaboration between countries in a more immersive and interactive environment. By implementing a metaverse in Mongolia's foreign offices and overseas embassies, the country can create a unique digital platform to showcase its culture, resources, and business opportunities to the global audience. This innovative approach can help Mongolia expand its trade networks, attract foreign investment, and strengthen its position in the global economy.

6.2 The concept of the metaverse is relatively new but gaining traction in various domains, including international relations and diplomacy. The metaverse is a collective virtual shared space, created by the convergence of virtually enhanced physical reality and physically persistent virtual reality, including the sum of all virtual worlds, augmented reality, and the internet (Lee, 2021). This digital environment allows users to interact with each other and with digital objects and representations of the real world in a realistic and engaging manner.

6.3 In the context of economic cooperation and trade promotion, the metaverse can serve as a virtual exhibition hall, conference centre, and negotiation platform. It can facilitate trade missions, investor meetings, cultural exchanges, and educational programs without the need for physical presence, thereby reducing costs and time constraints. For instance, foreign companies and investors can visit virtual representations of Mongolian industrial parks, mining sites, or cultural heritage locations to gain insights and make informed decisions about potential partnerships and investments. This virtual presence can help overcome geographical barriers and bridge cultural differences.

6.4 To implement this initiative, Mongolia's foreign offices and embassies can create a dedicated metaverse presence. This could involve the following steps:

6.4.1 Development of Virtual Spaces: Design and develop immersive and interactive virtual spaces that accurately represent Mongolia's economic and cultural landscape. These spaces can include virtual trade offices, exhibition halls, and meeting spaces for diplomatic and business purposes.

6.4.2 Collaboration with Technology Partners: Work with advanced technology companies to build the infrastructure and applications necessary for a smooth and secure metaverse experience. This includes ensuring compatibility with various virtual reality devices and internet connectivity.

6.4.3 Content Creation: Develop engaging content such as virtual tours, presentations, and interactive experiences that highlight Mongolia's unique selling points in terms of trade, investment, and tourism.

6.4.4 Promotion and Engagement: Market the metaverse presence to potential international partners and actively engage with users through virtual events, webinars, and diplomatic engagements.

6.4.5 Policy Framework: Establish clear policies and regulations governing the use of the metaverse for economic cooperation and trade promotion, ensuring adherence to international standards and protecting the interests of Mongolian businesses and users.

6.4.6 Capacity Building: Train diplomats and trade officials to effectively use the metaverse for economic cooperation and trade promotion, including understanding the nuances of digital diplomacy and conducting business in a virtual environment.

6.4.7 Monitoring and Evaluation: Continuously assess the impact of the metaverse initiative on Mongolia's economic cooperation and trade goals, making adjustments as necessary to maximize benefits and address any challenges that arise.

6.5 By embracing the metaverse, Mongolia can enhance its competitiveness in the global market and foster closer ties with international stakeholders. This can lead to increased trade volumes, foreign direct investment, and technological exchange. Moreover, it can also contribute to the country's digital transformation and the growth of its technology sector.

6.6 For this initiative to be successful, it is essential for Mongolia to invest in digital literacy and infrastructure both within the country and in its diplomatic missions abroad. Additionally, the country must ensure that its legal and regulatory frameworks are adapted to address the challenges and opportunities posed by the metaverse, such as data protection, intellectual property rights, and cybersecurity.

6.7 Overall, implementing a metaverse in Mongolia's foreign offices and overseas embassies can serve as a powerful tool for economic cooperation and trade promotion. It can facilitate new forms of international engagement, open up opportunities for businesses, and create innovative ways to showcase the country's potential. However, it requires careful planning, strategic partnerships, and a commitment to adapt to the evolving digital landscape.

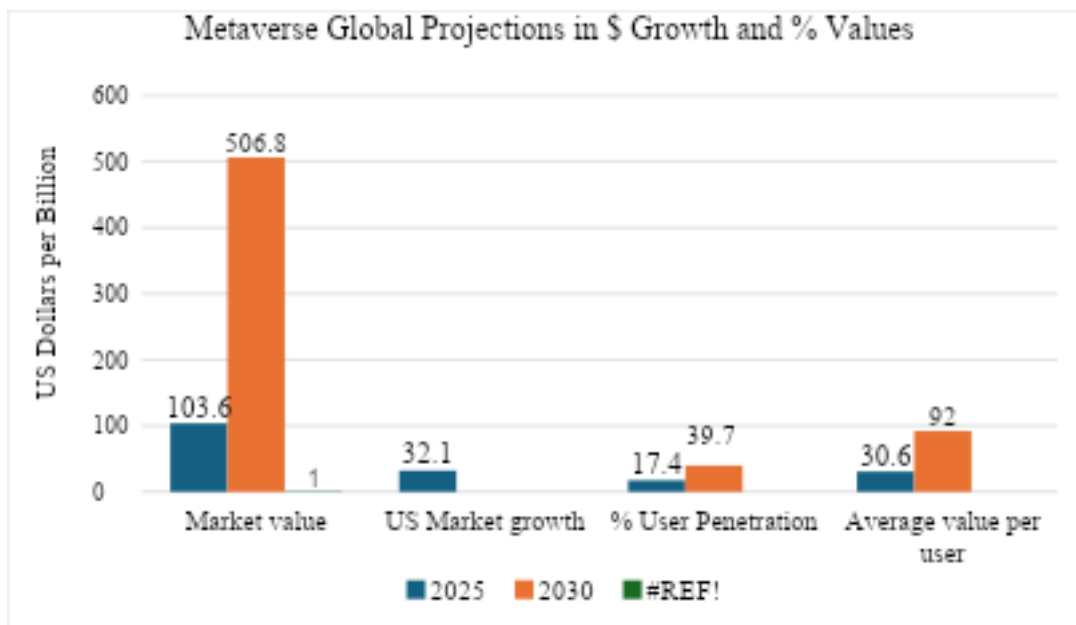
6.8 Mongolia also has to take into consideration the upcoming developments currently in metaverse assistance throughout many industrial sectors inclusive of diplomatic services provided by its overseas embassies and consulates. This is aptly illustrated in the statistical analysis overleaf, which shows the financial market share and percentages of influence in this decade to come.

Results and Discussion 2.

Quantitatively:

k) The Metaverse Projections Globally in Market values by 2030

Figure 1. The metaverse's 5-year projections in added influence globally through 2025 to 2030



Source: Statista, (2024). Metaverse Worldwide

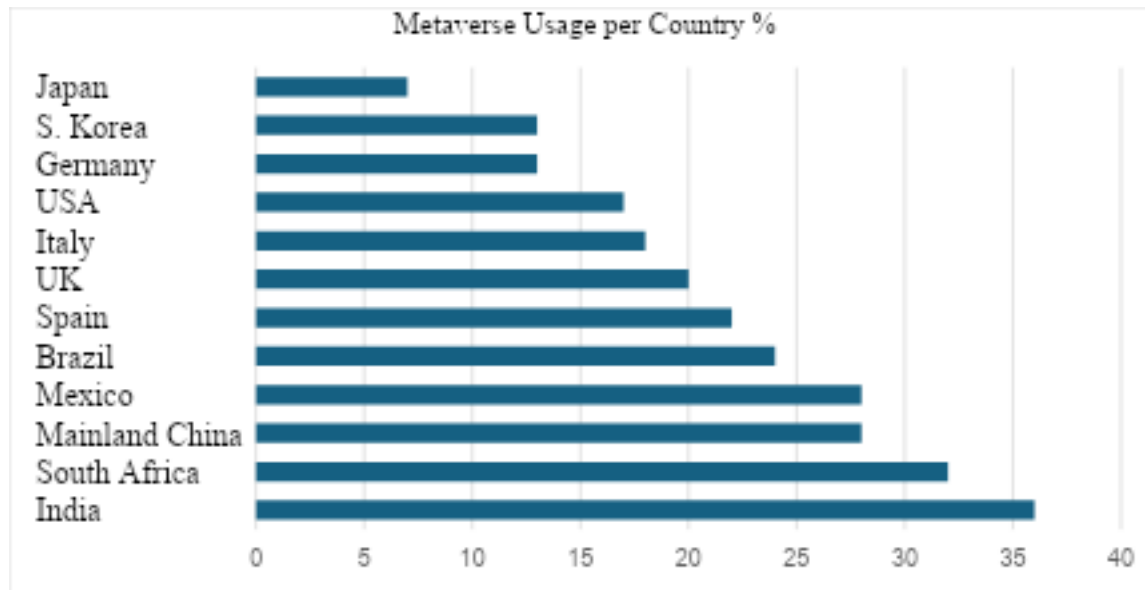
6.9 The graphic represented in Figure 1, denotes that the Metaverse market is projected to reach a value of US\$103.6bn in 2025. Secondly, this market is expected to grow at an annual growth rate (2025-2030) of 37.43%, resulting in a projected market volume of US\$507.8bn by 2030. In 2025, United States generates the most value in the Metaverse market, with an estimated market volume of US\$32.1bn. subsequently, by 2030, the number of users in the Metaverse market is expected to reach 2.6bn users. The data also shows that user penetration is predicted to be 17.4% in 2025 and is expected to increase to 39.7% by 2030, which represents an increase of 22.3%. In addition, the average Value per user (ARPU) is expected to be US\$92.0.

6.9.1 Therefore, upon reflection, the Metaverse market holds significant potential worldwide, with this market presently booming worldwide, this is attributed to likeminded countries as the United States, China, and Japan, leading the way in terms of technological advancements and user adoption and application.

6.10 The global Metaverse market is undergoing substantial expansion and evolution, driven by the accelerating advancements in technology and the burgeoning accessibility of virtual reality. This phenomenon is captivating individuals due to the immersive and interactive nature of the experiences it provides. The Metaverse serves as an innovative arena for social interplay, enabling users to engage in a multitude of activities such as socializing with peers, participating in virtual events, and exploring novel digital terrains. The allure of customizable avatars and the capacity to forge unique virtual identities further enhances its appeal, catering to a human desire for self-expression that may be constrained in physical contexts. As seen in Figure 2, we can see

from the share of online users who are indeed favourable with the metaverse being applied in notable countries in 2024.

Figure 2. Online users who see favourability in Metaverse technology as of 2024



Source: Share of online users excited about using the metaverse in selected countries in 2024. (Statista 2025).

6.10.1 As it can be seen, the graphic displays a dozen have implemented the Metaverse within its technological infrastructure. Unsurprisingly, the BRICS+ members lead the way averaging 29.6% implementation, therefore, within their foreign affairs offices also. Surprisingly, a tech nation as Japan, has only a token representation of only 7% Metaverse in its application.

6.11 Referring to consumer inclinations within this domain are shifting towards a quest for innovative forms of connection and engagement. The Metaverse's ability to offer entertainment, educational pursuits, and commercial opportunities is a significant catalyst for this shift in preference. It is noteworthy that one of the prominent trends in this market is the intertwining of real-world components with virtual environments, which aims to create an even more immersive and authentic experience for users. This integration is propelled by the desire to leverage the immense data available in the physical world to enhance the virtual realm. Technological advancements such as motion-tracking virtual reality headsets exemplify this trend, as they facilitate a more lifelike and interactive experience by incorporating users' real-world movements into virtual spaces.

6.11.1 Moreover, the emergence of virtual economies is another notable trend within the Metaverse market. These economies enable transactions of digital assets, including attire, accessories, and virtual real estate, thereby opening new avenues for commercial entities to monetize their offerings and services in the digital sphere. The utilization of blockchain technology is gaining traction in this context, as it promises secure and transparent dealings within these virtual economies.

6.12 In addition, localized conditions play a distinctive role in shaping the Metaverse market's trajectory across different countries. For instance, in nations with a prevalent gaming culture, there is likely to be an elevated demand for immersive gaming scenarios within this latest technology. Conversely, in regions where physical space is scarce, the allure of virtual real estate and the establishment of digital communities may be more pronounced. Cultural nuances also play a pivotal part in dictating the types of experiences that resonate with users and thus influence the market's progression.

6.13 Underpinning the growth of the Metaverse market are several macroeconomic factors. The increasing affordability and prevalence of technology have broadened the participant base for the Metaverse. Furthermore, as disposable incomes rise, individuals are more inclined to invest in such virtual experiences. Governmental policies and regulations also exert a significant impact, as they can either foster innovation and investment in virtual reality technologies through supportive measures or impose constraints that may hinder market growth. Consequently, a nuanced understanding of these interplaying elements is essential to grasp the complex dynamics and potential of the Metaverse market on a global scale -especially in line with Mongolia's diplomatic apparatus and its future considerations within its foreign and domestic servicing to foreign nationals visiting the country and assisting its citizens via embassy/consular services overseas.

k) International Standards and Virtual Embassy (Specifically Barbados)

6.14 Referring to Barbados, it became the first country to establish an embassy in a metaverse environment, and in 2021 it established the "Barbados Virtual Embassy". This environment not only allows you to visit it, but also allows you to conduct proposals, projects and cultural events of the Barbadian government in a virtual environment. The Barbados Virtual Embassy supports multifaceted activities such as mutual information exchange, business cooperation, live discussion, and tourism promotion with many countries around the world. The number of users of Barbados' virtual embassy services increased by 18% in the third quarter of 2022.

6.15 Additionally, South Korea is also gaining successful experience in establishing a virtual embassy. The country has opened its own cultural base and tourism centre in a virtual environment and is using it as a tool for international relations. South Korea's diplomatic projects in the metaverse saw a 30% increase in the first quarter of 2023, reflecting market growth in the virtual diplomatic environment.

6.16 The United Arab Emirates is focusing on the innovative expansion of traditional diplomacy in the field of diplomatic missions in metaverse. These examples show potential models involved.

Quantitative.

Table-1. Comparison of e-governance indices of countries

Countries	Population (as of 2025)	E-Government Development Index	Law and legal framework (e-participation & policy)	Development of Internet infrastructure	Explanation
Estonia	1.3 million	0.915 (High)	Excellent (High personal data protection)	High (Fiber, Mobile 4G/5G)	The world's leading digital government country.
USA	332 million	0.921 (Very High)	Good (Data governance policy improved)	Very good	Technology infrastructure is good, but unequally accessible.
China	1.4 billion	0.796 (High)	Strong control and serious censorship	High (in urban areas)	Public services have improved, but there is little transparency.
Singapore	5.9 million	0.962 (Very High)	Very good (AI & Smart Nation Law and Policy)	Very High	Innovation and digital governance model country.
South Korea	52 million	0.956 (Very High)	Good (Cybersecurity, e-democracy)	Excellent (world leader)	Rapid digitalization and high citizen participation.

Source: Explanation of the E- Governance Index (EGDI 2023)

6.17 Explanation of the E-Governance Index (EGDI)

- Estonia, South Korea and Singapore – have developed highly rated and intelligent public services.
- China – infrastructure has developed, but electronic engagement and transparency are relatively low. Although China is highly developed in urban areas, it differs in rural and remote areas.
- U.S. – high index, but regional disparities and income inequality are observed.
- Countries like Estonia and Singapore are clearly superior to others in terms of online legal regulation.
- The U.S. and South Korea also perform well, but there are differences in legislative and enforcement.
- The PRC has a lot of state control and censorship, which hinders citizens' online participation.
- Singapore and South Korea have the highest speed and accessibility.
- Estonia's infrastructure has improved, covering even rural areas.

- The U.S. has good infrastructure, but rural areas see differences.

7. Academic Overview of Environmental and Sustainable Development Initiatives in Mongolia and the Prospective Integration of a New Technological Metaverse within its Ministry of Foreign Affairs Apparatus Applied to Embassies and Consulates Services Globally.

7.1 Despite its rich natural resources, Mongolia faces significant environmental challenges such as desertification, deforestation, and severe climate change impacts. The nation has been actively engaging in environmental and sustainable development initiatives to mitigate these issues and ensure long-term prosperity. This overview will explore the current state of environmental and sustainable development efforts in Mongolia and the potential integration of the Metaverse within its Ministry of Foreign Affairs apparatus.

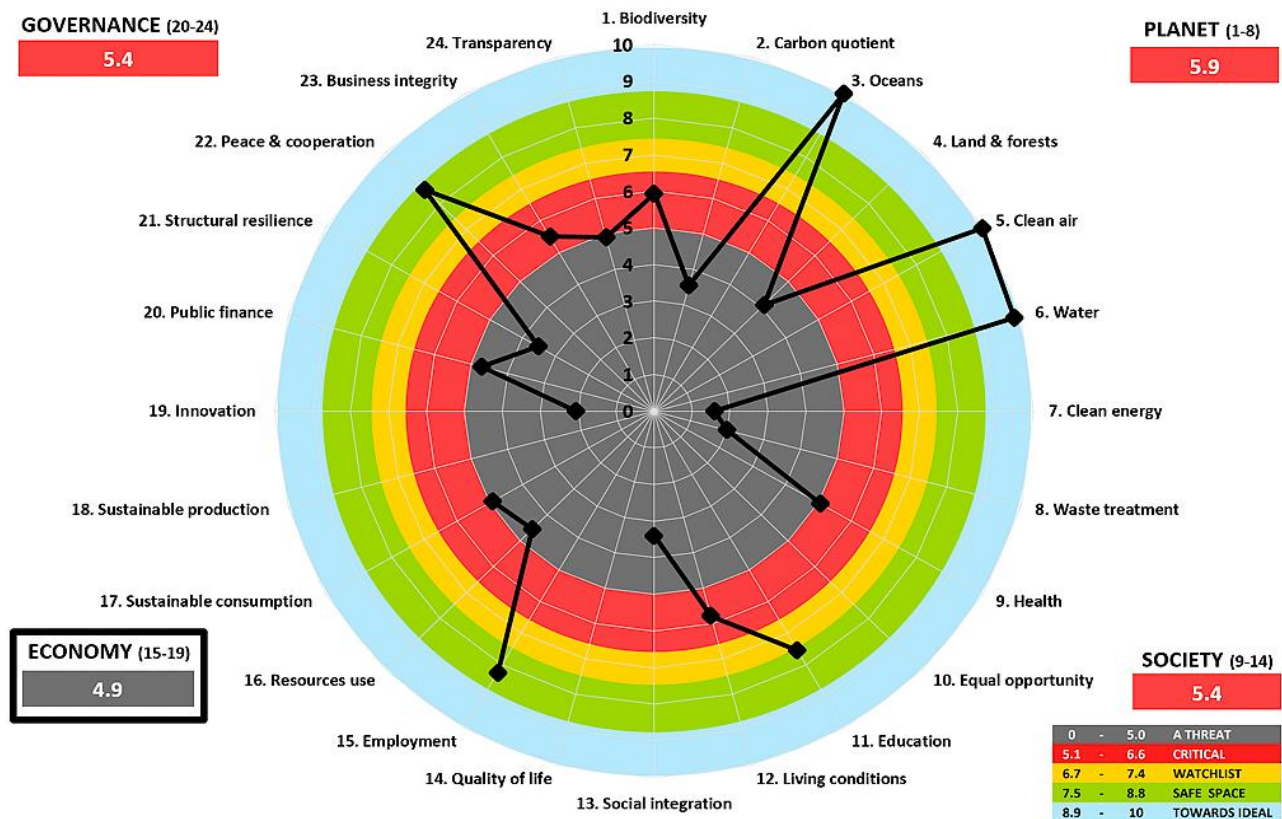
1) Environmental and Sustainable Development Initiatives in Mongolia

7.2 Mongolia, a landlocked country situated between China and Russia, has been increasingly focusing on environmental and sustainable development initiatives to preserve its vast and diverse natural resources and address the challenges of climate change. The country's unique geography, with a vast steppe that is one of the last remaining intact grassland ecosystems, and its significant mineral wealth, present both opportunities and challenges for sustainable growth. The Mongolian government has implemented various policies and strategies to balance economic development with environmental conservation, including the integration of technology in its governance structures.

7.2.1 Just for a little context, pioneering research has for the first time quantitatively assessed the potential of the green economy in Mongolia. A legislative commitment to and investment in sustainable, inclusive economic practices are projected to yield profound transformations by the year 2030. The question remains, however, as to whether the nation is prepared to undertake such a commitment to a sustainable trajectory.

7.2.2 The preliminary survey presented in Figure 3 offers valuable insights into the current distribution of eco-friendly employment opportunities across various sectors of the Mongolian economy. According to these findings, the education sector accounts for 30.3% of all green jobs, manufacturing constitutes 15.9%, mining employs 9.4%, and management occupies 6.2%. Although the high concentration of green jobs in education signifies a forward-looking investment in human capital, there is an anticipation that the distribution will evolve, with an increasing emphasis on sectors that face the most pressing environmental and social sustainability challenges. This is particularly pertinent to the mining industry, given its centrality to Mongolia's economic expansion. (Competitiveness Research Centre 2024).

Figure 3. Mongolia's sustainability gap frame. 2024 Report.



Source: GREEN ECONOMY BAROMETER 2018 MONGOLIA - Economic Policy & Competitiveness Research Centre (2024).

7.3 Returning to Mongolia's technological inclusion, there is in one such initiative with the potential use of a Metaverse within the Ministry of Foreign Affairs' apparatus, which could also revolutionize how the country conducts its diplomatic and consular services as well as domestic ecological framework. The Metaverse is a collective virtual shared space, created by the convergence of virtually enhanced physical reality and physically persistent virtual reality (Kurzweil, 2020). It is a concept that has gained significant attention in the realms of international relations, education, and economics, among others, due to its immersive and interactive capabilities even with its ecological 2030 aims... just a mere thought nonetheless.

7.3.1 Mongolia's environmental and sustainable development efforts have been guided by several key policies and frameworks. The "Green Development Policy" (2010), for instance, emphasizes the importance of integrating environmental considerations into all sectors of the economy and promoting sustainable practices (Government of Mongolia, 2010). Additionally, the country is a signatory to international agreements such as the Paris Agreement, which commits it to reducing greenhouse gas emissions and enhancing its ability to adapt to the impacts of climate change (United Nations Framework Convention on Climate Change, 2015).

7.3.2 In the context of its diplomatic engagements, Mongolia has been an active participant in international forums discussing environmental issues. For example, it has advocated for the "Steppe to Taiga" initiative, which aims to protect the boreal forests and grasslands that span across its borders into Siberia and the Far East of Russia

(Purevjav *et al.*, 2018). Furthermore, the country has established numerous national parks and nature reserves to preserve its biodiversity and combat desertification.

7.3.3 The integration of the Metaverse in Mongolia's Ministry of Foreign Affairs could significantly enhance its environmental and sustainable development initiatives in several ways. First, it could facilitate virtual diplomacy, allowing for more efficient and environmentally friendly international meetings and negotiations. By reducing the need for physical travel, the Metaverse could lower the carbon footprint associated with diplomacy and enhance collaboration on global environmental challenges. Second, it could serve as a platform to showcase Mongolia's natural heritage and environmental stewardship efforts to the international community, thereby fostering greater awareness and potential investment in sustainable projects. Third, the Metaverse could be used for educational purposes, enabling the dissemination of information about Mongolian culture, history, and environmental initiatives to a global audience.

7.3.4 However, there are challenges associated with the adoption of such emerging technologies. These include digital divide issues, data security, and the need for robust digital infrastructure to support the Metaverse's functionality. Additionally, the environmental impact of the Metaverse itself must be considered, as it could potentially increase energy consumption and e-waste if not managed sustainably. Nonetheless, the Mongolian government's interest in innovative technology suggests a commitment to exploring the potential of Metaverse technology as a tool for sustainable development.

7.3.5 The implementation of the Metaverse within Mongolia's diplomatic network could serve as a model for other countries seeking to leverage digital technology for environmental governance. It would require collaboration with international partners and investment in the necessary infrastructure to ensure that the technology is accessible and beneficial for all stakeholders. Researchers have highlighted the importance of considering the environmental, social, and economic dimensions of technological innovation to achieve sustainable outcomes.

7.4 In summary, the integration of the Metaverse in Mongolia's embassies and consulates could provide an innovative and effective means of promoting environmental and sustainable development initiatives on a global scale. While there are challenges to be addressed, the potential benefits of enhanced diplomatic engagement, education, and environmental advocacy could significantly contribute to the country's sustainable growth and international influence. Further academic inquiry into the governance and ethical implications of such technology in the context of environmental policy and international relations would be valuable for understanding the full scope of its impact.

m) Mongolia's Educational possibilities?

7.5 Mongolia, as a sparsely populated country with vast rural areas and a growing interest in technology, has the potential to significantly benefit from the adoption of a metaverse in its education system. Here are some aspects of Mongolia's potentiality in integrating the metaverse into education:

7.5.1 Access to Quality Education: A metaverse can help bridge the digital divide between urban and rural areas by providing equitable access to quality educational resources and expertise. Students from remote regions can attend virtual classes, participate in collaborative projects, and access advanced learning materials without the need for physical infrastructure.

7.5.2 Language Learning: The metaverse can offer immersive language learning environments where students can interact with native speakers and practice in real-life situations, which is particularly useful in a country with a unique language like Mongolian. It can also facilitate the learning of other languages such as English, which is essential for global communication and opportunities.

7.5.3 Cultural Exchange and Global Awareness: By connecting with educational institutions and students worldwide, Mongolian students can engage in cultural exchanges and gain a deeper understanding of global issues, fostering a more interconnected and informed society.

7.5.4 Personalized Learning: The metaverse allows for personalized learning experiences where students can learn at their own pace, choose subjects that interest them, and receive individual attention from AI-powered tutors or teachers from anywhere in the world.

7.5.5 Skill Development: The metaverse can offer specialized training programs in various fields, such as technology, healthcare, and environmental science, which are essential for Mongolia's economic development and align with its national priorities.

7.5.6 Interactive and Engaging Content: The immersive nature of the metaverse can make learning more engaging and interactive, potentially increasing student motivation and retention of information, especially in subjects that are traditionally considered less engaging.

7.5.7 Resource Efficiency: Virtual classrooms and educational materials can significantly reduce the cost of textbooks and other physical resources, making education more sustainable and accessible to a broader range of students.

7.5.8 Collaborative Learning: Students can work together on projects in the metaverse, regardless of their geographic locations, fostering teamwork and collaboration skills that are vital in the modern workforce.

7.5.9 Teacher Training and Professional Development: The metaverse can serve as a platform for teachers to receive training and professional development opportunities, enhancing their skills and updating their knowledge in line with international standards.

7.5.10 Innovation and Creativity: By providing a platform for educational experimentation and innovation, the metaverse can encourage the development of new teaching methods and educational content that are tailored to Mongolia's unique context.

n) There are also challenges to consider:

7.6.1 Digital Infrastructure: To fully realize the potential of the metaverse, Mongolia needs to improve its internet connectivity and digital infrastructure, especially in rural areas, to ensure that all students have access to the necessary technology.

7.6.2 Technological Literacy: Both teachers and students need to be trained in using the virtual tools and environments effectively, which requires investment in digital literacy programs.

7.6.3 Cultural and Linguistic Adaptation: Educational content in the metaverse must be culturally sensitive and available in the Mongolian language to be truly inclusive and effective.

7.6.4 Data Security and Privacy: Safeguarding student data and privacy in a virtual environment is crucial and requires the implementation of robust cybersecurity measures.

7.6.5 Equity and Accessibility: Ensuring that all students, regardless of their economic background, have access to the necessary technology to participate in the metaverse is essential to avoid exacerbating existing inequalities.

7.6.6 Balance with Traditional Learning: Care must be taken to balance the use of technology with traditional classroom learning to maintain social interactions and human connections that are critical for holistic education.

7.6.7 By addressing these challenges and capitalizing on its potential, Mongolia could leapfrog traditional barriers to education and provide innovative learning experiences that prepare its youth for the future.

8. The Utilization of Social Media Influence in the Ministry of Foreign Affairs' Embassies and Consulates

8.1 Public diplomacy has evolved significantly with the rise of digital media. Social media platforms have become central to the way states conduct international affairs, providing new channels for diplomatic engagement and communication with diverse publics (Cull, 2011). The Metaverse, a collective virtual shared space created by the convergence of virtually enhanced physical reality and physically persistent virtual reality, promises to further transform diplomatic practices. This paper aims to analyse how the MFA - Multi-Factor Authentication can utilize social media influencers within the Metaverse to enhance its embassies' and consulates' operations globally.

o) Theoretical Framework:

8.2 The conceptualization of public diplomacy in the digital age emphasizes the importance of engagement and the co-creation of content with various stakeholders, including non-state actors such as social media influencers. The traditional one-way communication model has shifted towards a more participatory approach, where governments interact with audiences and shape perceptions through dialogue and shared experiences - and how technology has enabled many people around the world to have a more direct and real-time communication in policy conversations with their governments and with one another. (Esser, V. 2012). Influence in the digital realm is increasingly decentralized, with influencers playing a crucial role in shaping public opinion and behaviour.

p) Influencers as Digital Diplomats:

8.3 Social media influencers have the potential to become 'digital diplomats' within the Metaverse, acting as bridges between governments and the public. Their authenticity, credibility, and extensive online reach enable them to effectively communicate national narratives and policies to international audiences. By partnering with influencers, MFAs (Multi-Factor Authentication) can tap into their established communities and leverage their influence to achieve diplomatic objectives such as image building, cultural promotion, and consular services.

q) Benefits of Influencer Usage:

- i. Increased visibility and outreach: Influencers can amplify diplomatic messages and events to a broader audience, particularly the younger generation, who are more likely to be active in the Metaverse.
- ii. Enhanced cultural exchange: Virtual cultural events and exchanges within the Metaverse can be organized and promoted by influencers, fostering greater understanding and appreciation of national cultures.
- iii. Improved accessibility: The Metaverse can make diplomatic services more accessible to a global audience, including those in remote or conflict-affected areas, by providing virtual consular support (Kurzweil, 2010).
- iv. Cost-effectiveness: Digital engagements in the Metaverse sphere may reduce the need for physical diplomatic presence, thus lowering operational costs.

r) Challenges and Considerations:

- a. Credibility and trust: Ensuring the authenticity of influencers and their content is critical to avoid misinformation and maintain the reputation of the MFA.
- b. Control and coordination: Managing the narratives and activities of influencers can be challenging due to the decentralized nature of the Metaverse.
- c. Security and privacy: Protecting sensitive information and maintaining diplomatic protocols in a virtual space requires robust security measures and clear guidelines.

d. Technological disparities: The digital divide may limit the effectiveness of Metaverse diplomacy in reaching less tech-savvy or less connected populations.

s) Case Studies and Previous Research:

While the Metaverse is still in its nascent stages, early examples of diplomatic presence in virtual worlds, such as Second Life, provide insights into the potential of such environments. Researchers have studied the use of social media by diplomats and the effectiveness of digital public diplomacy campaigns, suggesting that influencer engagement can significantly enhance visibility and impact (Cull, 2011). However, empirical studies on the use of the Metaverse by MFAs are scarce, highlighting the need for further exploration.

t) Summary:

The integration of social media influencers within this new construct represents an untapped opportunity for Multi-Factor Authentication is to reimagine their diplomatic strategies. By leveraging their influence, embassies and consulates can enhance their public diplomacy efforts, extend their reach, and create innovative forms of engagement. Nevertheless, the challenges of credibility, coordination, and security must be addressed to ensure successful implementation. Future research should focus on evaluating the effectiveness of Metaverse applied diplomacy and its long-term implications for international relations.

APPENDIX 1

'Second Life' Virtual Embassy and Missions Vs Physical Embassies.

Table 2. The Difference of Services Achievable by Virtual and Physical Diplomatic Comparison

VIRTUAL EMBASSY SERVICES	PHYSICAL EMBASSY SERVICES
<p>Providing information: Virtual embassies offer comprehensive information about the host country, including its culture, history, government, and policies. This can help users understand the country better and prepare for travel or business opportunities.</p>	<p>Consular services: Some virtual embassies offer limited consular services such as visa information, passport renewals, and emergency assistance to citizens abroad. However, for most legal documentation or in-person appointments, individuals would still need to visit a physical</p>
<p>Business and investment opportunities: Virtual embassies can promote trade and investment by providing information on the economic climate, market opportunities, and how to do business in the country.</p>	<p>NOTATION:</p> <p>Virtual embassies are online representations of a country's diplomatic mission that provide various services and information similar to what a traditional, physical embassy would offer. While they cannot fully replicate the experience or all the functions of a physical embassy, they can perform a range of tasks that is included in this Table 2., (left column).</p>
<p>Educational and cultural exchange: They may offer details about scholarships, student exchange programs, and cultural events to foster connections between the countries.</p>	
<p>Online appointments and forms: Some services can be accessed or initiated online, reducing the need for in-person visits to a physical embassy.</p>	
<p>E-mail and telephone communication: Users can often communicate with embassy staff via email or telephone for inquiries and assistance.</p>	
<p>Online visa applications: In some cases, virtual embassies allow citizens of the host country to apply for visas and track the status of their applications.</p>	
<p>Online passport and ID services: Some virtual embassies offer the option to apply for or renew passports and other identity documents online.</p>	
<p>Emergency assistance: Virtual embassies can provide information and assistance to citizens in distress abroad, such as in case of natural disasters, arrests, or medical emergencies, and help connect them with the appropriate physical embassy or consulate for further support.</p>	
<p>Virtual events and webinars: They may host online events, webinars, or live chats to engage with the local community and provide updates or information on topics of interest.</p>	
<p>Social media presence: Many virtual embassies maintain active social media accounts to communicate with the public and share information quickly and efficiently.</p>	
<p>Travel advisories: They provide real-time updates on travel warnings, safety information, and entry requirements for citizens planning to visit the country.</p>	

9. Conclusion

9.1 This study illustrated both the positive aspects of the potentiality of introducing the Metaverse or (MFA) Multi-Factor Authentication into Mongolia's Ministry of Foreign Affairs operations and its limitations:

Virtual Diplomacy and the Environmental Metaverse

9.2 The environmental metaverse extends this concept by creating a dedicated virtual space for environmental policy discussions, negotiations, and knowledge sharing. This section will review literature on the effectiveness of virtual diplomacy in addressing environmental issues, the role of technology in diplomacy, and the theoretical frameworks that underpin the idea of the environmental metaverse.

Case Studies of Virtual Embassies

9.3 This body of research has visited the practical applications of the environmental metaverse, from other nations which currently implement this technology thus, the thesis has both been explored in detail enough so to suggest that this would be a good fit for Mongolia's technological progression. Notable case studies included the virtual Swedish Embassy in Second Life, which serves as a platform for public diplomacy and cultural outreach, and the Maldives' virtual embassy, which addresses the urgent issue of climate change. These case studies have shown the potential benefits and the limitations of virtual embassies in terms of cost savings, environmental footprint reduction, and diplomatic engagement.

Strategic Benefits

9.4 The strategic advantages of an environmental metaverse include the ability to reach a broader audience, foster collaboration between governments, NGOs, and the private sector, and enhance Mongolia's visibility in international environmental discussions while applying this metaverse technology to serve as a tool for public diplomacy, enhancing the country's soft power and advocating for its environmental policies within its Global Sustainability Goals via the UN and European Union.

Economic Considerations

9.5 Transitioning from physical to virtual embassies could be of financial benefit and potential savings for Mongolia, a nation with limited financial resources especially within a year of unfortunate tariff disputes - especially with neighbouring China actioned by the United States. Cost-effectiveness studies were conducted pertaining to virtual embassies, and determined that the potential for cost reduction without compromising diplomatic efficacy was a sound hypothesis. Moreover, this paper and review considered the economic implications of reducing the carbon footprint of diplomatic missions and how virtual platforms will and have supported sustainable business practices and scope for investment opportunities in the green sector.

Environmental Implications

9.6 The environmental benefits of a virtual embassy for Mongolia have been central to the thesis. The results discerned from global reporting suggests that further Studies on the ecological footprint of traditional diplomatic missions, such as those conducted by the European Union (EU) and the United States, that had

revealed the high carbon emissions and resource consumption associated with maintaining a physical presence - warrant further consideration. Conversely, the environmental metaverse could indeed mitigate these impacts by the reduction of travel, energy consumption, and physical waste, therefore, be of cost benefit once more to Mongolian diplomacy and its foreign affairs and relations.

Challenges and Limitations

9.7 Referring to the challenges involved, it can be clearly seen that while a virtual diplomacy technological apparatus offers numerous advantages, challenges such as security, digital divides, and the potential for misinformation must be accepted. The study additionally explored these issues through the lenses, for example on the risks and opportunities of digital diplomacy. Moreover, this research considered unique challenges faced by Mongolia in terms of digital infrastructure, internet penetration, and workforce digital literacy.

Mongolia's Education Potential

9.8 This academic treatise has delved into a multitude of dimensions within the educational sphere, with a predominant emphasis on the realms of Cultural and Linguistic Adaptation, positing that the material disseminated within the metaverse must be meticulously attuned to cultural nuances and translated into the Mongolian tongue to genuinely encapsulate inclusivity and efficacy. Furthermore, it is noteworthy that the educational arena constitutes a substantial 30.3% of the entirety of green occupations.

9.8.1. With respect to Cultural Exchange and Global Awareness, the paper underscores the significance of interlinking Mongolian educational institutions with their international counterparts, thereby facilitating cultural interchange and enabling students to acquire a profound comprehension of transnational concerns. This synergy is instrumental in cultivating a society characterized by interdependence and cosmopolitan perspectives.

9.8.2 In considering the interplay between Technology and Traditional Learning, it is advocated that a judicious equilibrium be struck to preserve the crucial social dynamics and human bonds that underpin a holistic educational experience. The digital realm, while innovative, must not supersede the irreplaceable value of traditional classroom settings.

9.8.3 Moreover, the study has illuminated the imperative for the expansion of 5G technology across Mongolia's far-flung regions, particularly for the nomadic herding communities. This endeavour, endorsed by the Economic Policy & Competitiveness Research Centre in the metropolis of Ulaanbaatar, is of paramount importance to ensure equitable and unimpeded access to advanced educational resources. This technological advancement also aligns with the broader objective of public diplomacy, wherein the metaverse can function as a conduit for the dissemination of Mongolian historical, political, and social narratives to international spectators, thereby bolstering its soft power and fostering a favourable global perception. This strategic approach falls under the purview of countries aiming to shape international public opinion and construct a positive national image, which is central to the concept of public diplomacy.

9.9 As the results indicate, the emergence of virtual embassies in the Metaverse exemplifies the evolution of diplomatic communication strategies, transitioning from a traditional one-way model to a participatory paradigm that leverages social media's immediacy and interactivity. It is considered that Mongolia be a part of this revolution which can assist its overall domestic communication's architecture. These digital representations of national entities are adept at disseminating information and engaging in dialogues, thereby reshaping public perceptions through shared experiences. Concurrently, the Metaverse empowers a direct, real-time exchange of policy-related discourse among governments and their constituents globally. Despite these advancements, the integration of influencers in Metaverse diplomacy introduces challenges in managing their narratives and activities due to the decentralized nature of the platform. Moreover, while the Metaverse enhances cultural exchange by facilitating virtual cultural events and interactions, technological disparities may impede its effectiveness in bridging the digital divide, thereby potentially limiting its reach to less connected or tech-savvy populations. Furthermore, maintaining security and privacy remains paramount as sensitive diplomatic information must be safeguarded in this digital realm, necessitating robust cybersecurity measures and stringent protocol adherence.

Metaverse Projections Globally in Market

9.10 The findings presented in the discussion section, as depicted in Figure 1 (p20), suggest that the Metaverse market is poised for substantial growth, with a projected value of US\$103.6 billion by 2025. It is anticipated to experience an impressive compound annual growth rate of 37.43% from 2025 to 2030, culminating in a market volume of approximately US\$507.8 billion by the end of the forecast period. Notably, the United States is expected to contribute significantly to this growth, generating an estimated market volume of US\$32.1 billion in 2025. Furthermore, the user base within the Metaverse market is projected to expand at a remarkable rate, from 2.6 billion users in 2025 to a substantially higher number by 2030. This growth trajectory implies a rise in user penetration from 17.4% in 2025 to 39.7% in 2030, reflecting an increase of 22.3%. Additionally, the average Value per User (ARPU) is forecasted to be US\$92.0 in 2025. These insights collectively underscore the immense global potential of the Metaverse market, which is currently being driven by the technological strides and user engagement in countries such as the United States, China, and Japan. These leading nations are at the forefront of Metaverse technological advancements and adoption, setting the stage for a burgeoning industry with far-reaching implications.

10. Delimitations

The parameters within this research were to merely use the data, which has already been defined, in the public scientific sphere, and still within the framework of international debate, however:

a) Data which has not been included, are citations pertaining to in rhetorical nature that is still been litigated within both national and international jurisprudence guidelines. Thus, this aforementioned literature will not be included in any statistical nature of this draft. Empirical Data only recognised and therefore cited.

b) The procedures and methods that have not been undertaken are elements such as and direct journalistic inquiry via face-to-face interviews (Direct Engagement). This is attributed to both the political and legal sensitivities of the issues portrayed in this study inclusive of the author's geographical location.

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