

Government Communication as Future-Making: Constructing Sociotechnical Imaginaries of Precision Medicine in Indonesia

Febby R. Widjayanto^{1*}, Sidrotun Naim²

Universitas Airlangga, Indonesia¹

IPMI Institute, Indonesia²

Email: febby.risti.w@fisip.unair.ac.id*, sidrotun.naim@ipmi.ac.id

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Abstract

Governmental communication has become an increasingly important arena through which states shape public expectations and legitimize emerging technologies. However, existing studies on sociotechnical imaginaries have predominantly focused on policy documents and institutional strategies, with comparatively limited attention given to official governmental communication during the formative stages of technological initiatives. This study examined how the Indonesian Ministry of Health constructed sociotechnical imaginaries of precision medicine through official news releases introducing the Biomedical and Genome Science Initiative (BGSi). Employing qualitative content analysis, this study analyzed the complete corpus of seven official news releases published between 2022 and 2025 during the formative communication stage of BGSi. The findings revealed that governmental communication constructed and legitimized a future-oriented vision of healthcare through four interconnected narratives: technoscientific governance, genomic datafication, technological sovereignty, and the strategic omission of ethical and participatory concerns. These findings demonstrated that official news releases functioned not merely as channels for policy dissemination but also as performative instruments through which governments anticipated, legitimized, and stabilized technological futures. This study contributed to the sociotechnical imaginaries literature by conceptualizing governmental communication as a formative site of sociotechnical future-making and extended empirical understanding of anticipatory governance and precision medicine communication in the Global South.

INTRODUCTION

Healthcare systems worldwide are being reconfigured by breakthroughs in genomics, artificial intelligence, and biomedical data science, ushering in a broader paradigm shift from reactive treatment toward healthcare models that anticipate, prevent, and personalize care, with precision medicine representing the clearest embodiment of this trajectory (Ashley, 2016; Lamb, 2022). Precision medicine has emerged as a prominent narrative of this transformation, integrating genomic sequencing, machine learning, and large-scale health data infrastructures under a unified vision of future healthcare (Juengst et al., 2016). Its development is not merely a technical advancement; rather, it embodies broader claims about the future direction of healthcare systems (Verhulst & Benstock, 2023), which governments, research institutions, and industry actors have increasingly embraced as a strategic domain for investment.

Precision medicine represents a paradigm shift in healthcare by integrating genomic sequencing, machine learning, and large-scale health data infrastructures to tailor medical interventions to individual patients (Mayer et al., 2023). This approach is driven by advances in genomic medicine that enable the identification of genetic markers and the development of personalized treatment strategies across various medical fields, including oncology, cardiology, and neurology (O'Shea et al., 2023; Zhuang, 2025).

As governments increasingly invest in precision medicine programs (Garcia-Foncillas et al., 2021), public communication has become a central instrument through which emerging biomedical technologies are disseminated, legitimized, and framed. Through governmental communication, public expectations are mobilized, and desirable visions of future healthcare are communicated to society (Chude-Okonkwo et al., 2023; Kenney & Mamo, 2020). Within Science and Technology Studies (STS), technological futures are understood not as inevitable trajectories but as socially constructed sociotechnical imaginaries—collectively held visions that shape expectations regarding what science and technology should achieve (Jasanoff & Kim, 2015; Jasanoff, 2015).

Recent STS scholarship has extended this concept by suggesting that governmental communication constitutes a performative arena in which sociotechnical imaginaries are articulated, circulated, negotiated, and legitimized, thereby expanding the analysis of imaginaries beyond formal policy documents to include public communication practices. For instance, Katzenbach et al. (2025) proposed an analytical framework for Sociotechnical Imaginaries in Public Communication (SIPCs), using artificial intelligence (AI) as a case study to demonstrate how public communication constructs visions of sociotechnical futures that guide actions and mobilize resources.

Similarly, the performative politics of national AI strategies have been examined by Katzenbach and Bareis (2020), who identified these strategies as hybrids of policy and discourse that shape public imaginaries and create path dependencies through technological investments and political commitments. The concept has also been applied to nuclear power, where Ekström (2025) examined Sweden's renewed interest in nuclear energy and demonstrated how nostalgia and historical narratives are used to envision future energy solutions, thereby connecting past experiences with future imaginaries. Previous studies have also applied the concept of sociotechnical imaginaries to investigate how governments envision and govern emerging technologies, including artificial intelligence, digital health, genomics, renewable energy, and academic medicine, through national strategies, policy documents, and institutional planning texts (Mukherjee et al., 2023; Ølgaard & Hedling, 2026; Pickersgill, 2021; Rowland et al., 2023; Samimian-Darash et al., 2024) .

Although these studies have significantly advanced understanding of governmental future-making, they have predominantly focused on formal policy documents, strategic plans, and institutional visions, while paying comparatively limited attention to governmental digital communication as a distinct arena where sociotechnical futures are publicly constructed and legitimized (Rowland et al., 2023; Endlund, 2025). This gap is particularly evident during the formative stages of emerging technologies, when ministry-issued news releases remain largely overlooked despite functioning as institutional artifacts that frame societal problems, articulate desirable technological futures, and legitimize emerging policy agendas (Gardner, 2022; Gross & Geiger, 2023).

Viewing official news releases as practice-oriented documents within the sociotechnical imaginaries framework provides an opportunity to extend existing scholarship by examining

how imaginaries are enacted through everyday communicative practices. Rather than treating government communication as a passive channel for disseminating policy decisions, this perspective recognizes official news releases as performative sites where future visions are actively produced through textual framing, narrative structures, metaphors, and institutional communication practices. This approach aligns with arguments that sociotechnical imaginaries acquire political force not only through formal policy instruments but also through the social practices and material artifacts that stabilize and circulate collective visions of desirable futures (Rowland et al., 2023; Gardner, 2022; Shaw & Donia, 2021).

This study addressed this gap by investigating how Indonesia's Ministry of Health employed official news releases to construct sociotechnical imaginaries during the formative stage of the Biomedical Genome Science Initiative (BGSi) and the introduction of precision medicine. Focusing on governmental public communication is theoretically significant (Ogami et al., (2025); Vaara et al., (2024); Hepp, (2025)) because it captures the early discursive processes through which technological futures are publicly articulated, normalized, and legitimized (Lim, 2024; Mandelbaum, 2025) before becoming fully institutionalized in policy and practice (Yoon, 2024). The purpose of this study was to examine how the Indonesian Ministry of Health constructed and communicated sociotechnical imaginaries of precision medicine through seven official news releases published during the formative stage of the Biomedical Genome Science Initiative (BGSi). Drawing on the concept of sociotechnical imaginaries (Jasanoff & Kim, (2015)) and employing qualitative content analysis, this study investigated how governmental communication envisioned desirable healthcare futures, framed science and technology as solutions to societal challenges, and articulated the respective roles of the state and citizens within Indonesia's emerging precision medicine agenda.

Indonesia has recently positioned precision medicine as a strategic pillar of national health transformation through the Biomedical Genome Science Initiative (hereafter BGSi), signaling its ambition to develop genomic capacity and data-driven healthcare systems (Ministry of Health of the Republic of Indonesia, 2024; Kamelia & Putri, 2023). Before the establishment of a dedicated BGSi institutional webpage, the Ministry of Health introduced BGSi exclusively through a series of official news releases that articulated its objectives, technological promises, and anticipated societal benefits (Ministry of Health of the Republic of Indonesia, 2022), creating a naturally bounded corpus of formative governmental communication.

Although governmental digital communication plays a decisive role in introducing emerging health technologies to society, limited research has examined how such communication constructs sociotechnical imaginaries specifically during the formative stage of national innovation programs (Endlund et al., 2025). This limitation is particularly evident in the Global South, where research on governmental communication surrounding genomics and precision medicine remains scarce despite increasing national investments in genomic medicine and health innovation. Consequently, important questions regarding how technological futures are publicly imagined outside Western contexts remain insufficiently explored (Meunier & Herzog, 2023).

This study contributed to the literature in three ways. First, it advanced sociotechnical imaginaries scholarship by demonstrating that the formative stage of governmental digital communication represents a distinct phase in the production of sociotechnical imaginaries, during which governments actively define societal problems, construct technological promises, mobilize public expectations, and establish normative foundations through which emerging

technologies gain public legitimacy. By shifting analytical attention from established policy documents and national strategies toward the earliest governmental narratives surrounding an emerging technological program, this study extended existing STS scholarship from examining what sociotechnical imaginaries represent to understanding how they are initially articulated and publicly performed through official communication (Jasanoff & Kim, 2015). Second, this study extended the empirical scope of sociotechnical imaginaries research by examining official ministry news releases as a form of governmental communication, addressing a literature that has predominantly focused on policy documents, strategic plans, and institutional visions. Third, this study contributed to the growing literature on precision medicine governance in the Global South by providing empirical evidence from Indonesia and demonstrating how official governmental communication functions as a performative mechanism for constructing and legitimizing future-oriented healthcare visions.

METHOD

This study adopted a qualitative research design using qualitative content analysis (QCA) to investigate how the Indonesian Ministry of Health publicly constructed the vision of precision medicine during the formative stage of the Biomedical and Genome Science Initiative (BGSi). Rather than measuring the frequency of specific concepts or evaluating communication effectiveness, the study focused on interpreting how governmental communication constructed meanings, legitimized policy agendas, and articulated desirable technological futures. This interpretive approach was consistent with the objectives of qualitative content analysis, which emphasizes the systematic and transparent examination of contextual meanings embedded in textual data (Kuckartz & Rädiker, 2023).

Qualitative content analysis was appropriate for this study because official governmental communication was examined not as a neutral source of information but as a socially situated discourse through which the state constructed public understandings of science, technology, and future societal development. This approach enabled the study to examine how meanings were produced, narratives were structured, and governmental priorities were discursively stabilized (Schreier, 2021).

Data collection involved systematically identifying, retrieving, documenting, and archiving eligible news releases from the official website of the Ministry of Health. Each document was archived with its publication date, title, URL, and full textual content. These archived news releases served as the primary units of analysis. Additional materials, including Ministry regulations, BGSi policy documents, roadmaps, and relevant academic publications, were collected as supplementary sources to support contextual interpretation.

The analysis proceeded through the following stages:

1. Corpus familiarisation: Each news release was read repeatedly before coding began. Analytical memos were prepared during this stage.
2. Open coding: Relevant textual segments were identified and assigned descriptive codes.
3. Theme development: Related codes were grouped into subthemes and subsequently synthesized into overarching themes.
4. Theme interpretation: Interpretive narratives were developed for each overarching theme, supported by representative excerpts from the news releases.

5. Analysis of discursive absences: The analysis also examined topics that were absent or only minimally represented in the corpus.

To enhance trustworthiness, the study analyzed the complete corpus of official BGSi news releases published during the study period. Supplementary documents were used for interpretive triangulation. Coding was conducted iteratively across the corpus, with themes continuously refined throughout the analytical process. Analytical memos documenting coding decisions and theme development were maintained as part of the audit trail.

RESULTS AND DISCUSSION

Government Communication as the Formative Articulation of Sociotechnical Imaginaries

The analysis of the seven official news releases published by the Indonesian Ministry of Health demonstrates that governmental communication surrounding the Biomedical and Genome Science Initiative (BGSi) functions far beyond the dissemination of policy information. Rather than merely announcing the implementation of a biomedical programme, these communications constitute a discursive arena in which the government actively constructs and legitimises a particular vision of Indonesia's future healthcare system. Across the corpus, the dominant narrative does not begin with technical explanations of genomic technologies; instead, it begins with the articulation of a desirable future in which healthcare becomes increasingly predictive, personalised, and data-driven. Genomic science is therefore presented not as an end in itself but as the technological pathway through which this imagined future can be realised.

The first news release illustrates this discursive strategy by positioning BGSi as a central component of Indonesia's broader health transformation agenda. Rather than emphasising existing healthcare challenges, the communication directs public attention towards an anticipated future where genome sequencing enables early disease prediction, personalised diagnosis, and preventive interventions. Expressions such as "future diagnoses will utilise genome sequencing" and "identifying diseases that may emerge in the future" portray the future as an object that can be scientifically anticipated and technologically governed. Consequently, healthcare is no longer framed as a reactive system responding to illness but as a predictive system capable of intervening before disease manifests.

This future-oriented narrative becomes more explicit in the second news release, where the Ministry frames the establishment of a national genomic ecosystem as a strategic investment in Indonesia's long-term health security and scientific capacity. Here, genomics is represented not merely as laboratory technology but as a national infrastructure capable of strengthening healthcare resilience, improving diagnostic precision, and enhancing preparedness for future health challenges. In this narrative, the future is imagined as something that can be designed, anticipated, and engineered through scientific expertise, technological innovation, and state-led investment.

These findings suggest that governmental communication performs a constitutive rather than merely informative function. From the perspective of sociotechnical imaginaries, communication becomes a performative practice through which particular visions of desirable futures are publicly articulated and normalised. As Jasanoff and Kim (2015) argue, sociotechnical imaginaries are collectively held and institutionally stabilised visions of desirable futures animated by advances in science and technology. The empirical evidence presented here demonstrates that such imaginaries are not produced exclusively through formal

policy documents or strategic plans but are also actively constructed through governmental digital communication directed towards wider public audiences.

This finding extends existing scholarship on sociotechnical imaginaries in important ways. Previous studies have primarily examined how imaginaries are embedded within strategic planning documents, national innovation policies, and institutional visions (Rowland et al., 2023). These studies convincingly demonstrate that policy documents provide important sites for envisioning technological futures. However, they pay comparatively limited attention to governmental communication as an independent arena in which these futures are publicly narrated, legitimised, and socially circulated. The BGSi case suggests that official news releases are not simply derivative representations of existing policy but constitute an integral component of future-making itself.

The analysis further indicates that governmental communication serves to generate political legitimacy for technological transformation. Across the seven news releases, recurring references to health transformation, precision medicine, genomic sequencing, and biomedical innovation repeatedly associate technological advancement with national progress. Through this repetitive framing, the Ministry constructs genomic medicine as the natural and inevitable trajectory of healthcare development. Such repetition contributes to what Jasanoff and Kim (2015) describe as the stabilisation of sociotechnical imaginaries, whereby particular technological futures gradually become accepted as rational, desirable, and politically legitimate.

These findings also resonate with recent scholarship highlighting the increasingly performative role of governmental communication in governing emerging technologies. Studies of digital governance suggest that governments increasingly employ communication not merely to explain policy decisions but to shape public expectations regarding technological innovation and societal transformation. Similarly, research on anticipatory governance argues that envisioning future technological trajectories constitutes a central mechanism through which governments coordinate present-day political action (Lösch et al., 2019). Rather than waiting for technologies to become fully operational, states actively cultivate societal expectations that render technological investments both politically acceptable and institutionally necessary.

The BGSi case illustrates this anticipatory function particularly clearly. Before genome sequencing becomes routinely integrated into clinical practice, before national genomic databases reach maturity, and before precision medicine becomes fully institutionalised, governmental communication has already established a coherent narrative explaining why such developments are necessary for Indonesia's future. In other words, symbolic construction precedes material implementation. The future must first be imagined, narrated, and legitimised before it can be institutionally realised.

This sequential process represents an important theoretical contribution to the literature on sociotechnical imaginaries. Existing scholarship has predominantly focused on how imaginaries become embedded within policies, governance frameworks, or technological systems after they have already been formulated (Jasanoff & Kim, 2015; Rowland et al., 2023). The BGSi case suggests an earlier stage that has received comparatively little attention: the formative articulation of sociotechnical imaginaries through governmental communication. Official digital communication emerges as one of the first institutional spaces where future technological visions are publicly introduced, socially normalised, and politically legitimised. Rather than functioning merely as a channel for disseminating policy, governmental

communication actively participates in producing the sociotechnical futures that subsequent policies, infrastructures, and governance arrangements seek to materialise.

Accordingly, this study proposes that governmental digital communication constitutes a formative stage in the production of sociotechnical imaginaries. This proposition expands existing STS scholarship by identifying governmental communication not simply as a medium of policy dissemination but as an active site of future-making through which states construct collective expectations, mobilise political legitimacy, and prepare the discursive conditions necessary for the institutionalisation of emerging technologies. In the Indonesian BGSi case, communication itself becomes an anticipatory governance practice, shaping how genomic medicine is imagined long before it becomes an established component of everyday healthcare.

Constructing State Authority through Technoscientific Governance

The preceding analysis demonstrates that governmental communication first establishes an aspirational vision of Indonesia's future healthcare system before introducing the technological means through which that future will be achieved. The subsequent news releases reveal a complementary discursive strategy: once the future has been imagined, the Ministry of Health systematically constructs the state's authority to realise that vision. Across the corpus, governmental legitimacy is not derived primarily from political mandate or administrative authority, but from the state's ability to mobilise scientific expertise, biomedical infrastructures, research institutions, and genomic technologies. The implementation of BGSi is therefore presented as evidence of the state's capacity to govern through technoscience rather than through conventional bureaucratic instruments.

This pattern becomes particularly visible in the fourth and fifth news releases, where genomic medicine is increasingly represented through descriptions of scientific infrastructures rather than abstract policy objectives. Instead of merely emphasising the importance of precision medicine, the Ministry explains how this future will be materialised through national genomic databases, Whole Genome Sequencing (WGS), biological data infrastructures, sequencing technologies, and hospital-based genomic services. These technological artefacts are consistently presented not as isolated innovations but as components of an integrated governance system designed to improve healthcare efficiency, reduce public health risks, and enhance the state's capacity to intervene earlier in disease management. In this narrative, technological infrastructures themselves become instruments of governance.

The fifth news release further reinforces this governance logic by detailing how genomic information will be generated, stored, managed, and utilised within a nationally coordinated biological data system. Rather than focusing solely on the scientific characteristics of genomic technologies, the communication repeatedly emphasises the Ministry's role in establishing institutional control over biological information, sequencing facilities, and genomic databases. The recurring references to WGS, national biological data systems, genomic information, and integrated sequencing facilities portray the state as the central coordinator of biomedical knowledge production. Consequently, governance is no longer represented merely as the regulation of healthcare institutions but increasingly as the management of biological information infrastructures that underpin future healthcare delivery (Bossen et al., 2020; Heshajin et al., 2024; Vicente, 2021).

A similar narrative appears in the sixth news release, where technoscientific authority is further legitimised through the construction of national scientific capacity. Here, governmental communication highlights collaborations between the Ministry of Health, universities, research institutions, and national laboratories to develop domestic expertise in genomic technologies.

Scientific capacity-building is framed not only as a strategy for improving healthcare services but also as an expression of technological sovereignty. Statements emphasising the development of Indonesian genomic expertise, research laboratories, university partnerships, and domestic innovation collectively construct an image of the state as both a scientific coordinator and a national innovation leader. Scientific institutions are therefore incorporated into the state's governance architecture rather than positioned as independent knowledge producers.

These empirical findings indicate that governmental communication systematically links scientific infrastructures with political authority. Laboratories, sequencing facilities, genomic databases, research collaborations, and university partnerships function not merely as technical resources but as symbolic representations of state capability. Rather than claiming legitimacy through political rhetoric alone, the Ministry demonstrates legitimacy by displaying the material infrastructures through which genomic futures can supposedly be realised. Scientific capacity thus becomes political capacity.

From the perspective of Science and Technology Studies (STS), this finding reflects a broader transformation in contemporary governance in which political authority increasingly depends upon the mobilisation of scientific knowledge and technological systems. Jasanoff (2015) argues that modern states derive legitimacy not only from legal institutions but also from their ability to organise scientific expertise in ways that make particular futures appear both credible and desirable. Similarly, Bossen et al (2020) suggest that governance in contemporary health systems increasingly relies upon scientific infrastructures that simultaneously generate biomedical knowledge and reinforce state authority. The Indonesian BGSi illustrates this process by demonstrating how genomic technologies become intertwined with governmental legitimacy.

Importantly, the empirical material suggests that authority is constructed not through scientific expertise alone but through the integration of heterogeneous sociotechnical elements. The repeated references to hospitals, sequencing laboratories, biological databases, universities, researchers, and digital infrastructures reveal what STS scholars describe as sociotechnical assemblages—networks in which human actors, institutions, technologies, and material infrastructures collectively stabilise governance arrangements (Jasanoff, 2015). Governmental authority therefore emerges not simply because the Ministry possesses political power, but because it successfully positions itself as the coordinator of an expanding network of scientific institutions and technological infrastructures capable of materialising the envisioned future.

This interpretation also resonates with recent scholarship on technoscientific governance, which argues that emerging technologies increasingly become mechanisms through which governments anticipate, manage, and regulate societal risks (Lösch et al., 2019). Rather than governing populations exclusively through legislation or administrative regulation, states increasingly govern by constructing infrastructures capable of producing continuous scientific knowledge about society. In the case of BGSi, genomic sequencing, biological databases, and integrated laboratory networks are represented as technologies that enable earlier diagnosis, more precise interventions, and more efficient healthcare planning. Consequently, governance becomes increasingly dependent upon the continuous production and circulation of biomedical data.

The Indonesian case nevertheless extends this literature in an important way. Existing studies of technoscientific governance often concentrate on the institutional implementation of

scientific infrastructures after governance arrangements have already been established. By contrast, the present findings demonstrate that governmental communication itself actively contributes to constructing the legitimacy of those infrastructures before they become fully operational. Through repeated references to laboratories, sequencing facilities, university partnerships, and national genomic systems, official communication cultivates public confidence in the state's scientific capacity while simultaneously normalising the expansion of technoscientific governance.

Accordingly, this study argues that the legitimacy of BGSi does not rest solely upon the promise of precision medicine. Rather, legitimacy is progressively constructed through the public representation of scientific infrastructures that embody state competence. Governmental communication transforms laboratories into symbols of national capability, genomic databases into infrastructures of governance, and scientific collaboration into evidence of institutional readiness. In doing so, the Ministry of Health does more than explain a policy initiative; it performs the state as a scientifically competent actor capable of governing future health through technoscience.

Rendering the Population into Genomic Data: Datafication and Biopolitical Governance

The Ministry of Health's communication extends beyond promoting genomic technologies as innovative healthcare tools; it also redefines how the population itself is understood and governed. Across the analysed news releases, citizens are increasingly represented not merely as recipients of healthcare services but as sources of biological information that can be collected, stored, analysed, and mobilised to optimise population health. The envisioned transformation of Indonesian healthcare therefore depends not only on technological innovation but also on the systematic production of genomic data as a new foundation for governing health. In this sense, the governmental narrative shifts attention from treating illness to managing biological futures through continuous data production.

This transformation becomes evident in the second news release, where the Ministry explains that BGSi seeks to generate 10,000 human genome sequences through Whole Genome Sequencing (WGS) involving multiple referral hospitals. Rather than presenting genomic sequencing solely as a scientific research activity, the communication frames the collection of biological samples as an essential national undertaking aimed at mapping genetic variation across the Indonesian population. The production of genomic data is therefore represented as a prerequisite for precision medicine and future disease prediction, positioning biological information as a strategic national resource.

The fifth and seventh news releases further deepen this narrative by explaining how a national biological data system will operate. The Ministry introduces genomic technologies through descriptions of sequencing facilities, biological sample repositories, biobanks, server rooms, and integrated genomic databases that collectively constitute the backbone of Indonesia's genomic ecosystem. These infrastructures are presented as enabling earlier disease detection, faster diagnosis, more accurate treatment, and more efficient public health interventions. Rather than emphasising individual patients, governmental communication repeatedly foregrounds the circulation of biological information across interconnected technological systems. Consequently, healthcare increasingly appears as a process of organising, managing, and analysing biological data rather than responding to clinical symptoms alone.

The empirical findings suggest that the envisioned transformation of healthcare is inseparable from what can be described as the datafication of the body. Biological materials—

including blood, urine, and other clinical samples—are translated into digital genomic information that can subsequently be stored, linked, analysed, and reused within national information infrastructures. In this process, the human body becomes simultaneously a biological entity and a digital object of governance. Genomic data are portrayed not simply as scientific evidence but as infrastructures through which future health risks can be anticipated, monitored, and managed.

From an STS perspective, this transformation reflects broader processes of datafication, whereby social and biological realities are rendered measurable, computable, and governable through digital infrastructures (Ferrer-Conill et al., 2023). In the health sector, datafication does not merely improve medical knowledge; it fundamentally changes the relationship between citizens and the state by transforming biological life into continuously analysable information (Sharon & Lucivero, 2019). The Indonesian BGSi illustrates this process through its emphasis on national genomic databases, integrated sequencing systems, and biological data repositories that collectively redefine health governance as a data-intensive enterprise (Begkos et al., 2023).

The findings also resonate strongly with Foucauldian analyses of biopolitics, which describe modern governance as increasingly concerned with managing the biological characteristics of populations rather than merely regulating individual behaviour. However, the BGSi case demonstrates that contemporary biopolitics is increasingly mediated through digital infrastructures capable of producing continuous streams of genomic information. Rather than relying solely on demographic statistics or epidemiological surveillance, governmental communication promotes a model of governance grounded in molecular knowledge, where health risks are anticipated through genomic prediction before disease becomes clinically visible.

Importantly, the Ministry consistently frames this expansion of biological data infrastructures as an unquestionably positive development. National genomic databases are associated with faster diagnosis, improved treatment accuracy, healthcare efficiency, and disease prevention. Scientific infrastructures therefore appear primarily as instruments of public benefit rather than mechanisms of surveillance or population management. Such framing reflects what STS scholars have described as technological solutionism, whereby complex societal challenges are presented as problems that can be solved primarily through technological innovation (Have & Gordijn, 2022). Within the governmental narrative, precision medicine becomes the self-evident solution to future healthcare challenges, while the extensive collection and management of biological data are portrayed as necessary and largely uncontested components of this transformation (Assidi et al., 2022; Joyner & Paneth, 2019).

The analysis nevertheless reveals that governmental communication simultaneously constructs new forms of biosurveillance. Although the term "surveillance" is never explicitly employed, repeated references to disease prediction, biological monitoring, genomic databases, and integrated health information systems indicate the emergence of infrastructures capable of continuously observing population health at the molecular level. As the seventh news release explains, biological data systems are intended to support disease monitoring, population management, and the long-term governance of public health through nationally coordinated genomic information infrastructures. Biological monitoring is therefore normalised as an indispensable component of modern healthcare governance rather than presented as an exceptional intervention.

This finding extends recent scholarship on precision medicine, which has increasingly recognised genomic databases as sociotechnical infrastructures that simultaneously enable

scientific discovery and reshape governmental authority (Meunier & Herzog, 2023; Roberts et al., 2024). While existing research has largely focused on the governance of genomic data after databases have been established, the BGSi case demonstrates that governmental communication performs an earlier legitimising function. Official communication normalises the large-scale collection of biological information before these infrastructures become fully operational, encouraging citizens to perceive genomic data production as an essential prerequisite for national health transformation.

Accordingly, this study argues that governmental communication does more than introduce precision medicine as a medical innovation. It actively reconfigures the relationship between the state and the population by transforming citizens into sources of strategic biological information. Through repeated references to genome sequencing, biological sampling, biobanks, national genomic databases, and integrated digital infrastructures, the Ministry constructs a new sociotechnical imaginary in which governing health increasingly depends upon governing biological data. The population is therefore imagined not only as a community requiring healthcare services but also as a continuously evolving genomic resource through which healthier national futures can be anticipated and managed.

This constitutes an important theoretical contribution to STS scholarship. Whereas existing studies have predominantly analysed genomic governance after biological data infrastructures have been institutionalised, the Indonesian case demonstrates that the discursive normalisation of biological datafication precedes institutional implementation. Governmental communication thus serves as an anticipatory governance mechanism that legitimises new forms of molecular governance by presenting them as natural, necessary, and beneficial components of healthcare modernisation.

Techno-nationalism and the Political Economy of Genomic Futures

Beyond presenting genomic medicine as a mechanism for improving healthcare delivery, the Ministry of Health consistently frames the Biomedical and Genome Science Initiative (BGSi) as a strategic project for strengthening Indonesia's position within the global knowledge economy. Across the analysed news releases, genomics is not portrayed solely as a medical innovation but as an instrument of national development, technological sovereignty, and international competitiveness. The envisioned future of healthcare is therefore inseparable from a broader political vision in which scientific capability becomes an essential component of national power.

This framing becomes particularly evident in the fourth news release, where Indonesia's health transformation is explicitly connected to its aspiration to participate more actively in global biomedical innovation. The Ministry presents precision medicine as an opportunity not only to improve domestic healthcare services but also to position Indonesia as an important actor within international scientific networks. References to Indonesia's "first national initiative," the mobilisation of international support, and the adoption of globally recognised genomic technologies collectively portray the programme as a strategic effort to elevate Indonesia's scientific standing beyond the national healthcare sector. Rather than depicting genomic medicine as a purely domestic reform, governmental communication embeds it within broader narratives of global scientific competition and technological advancement.

The sixth news release reinforces this narrative by placing particular emphasis on technological independence and national scientific capacity. The Ministry repeatedly argues that Indonesia must develop its own genomic technologies, strengthen domestic research capabilities, prepare highly skilled human resources, and expand collaborations between

government agencies, universities, and research institutions. Statements emphasising that Indonesia must possess its own capabilities, develop domestic genomic research, and become a player in health biotechnology illustrate that genomic innovation is framed as a matter of national sovereignty rather than simply scientific progress. Technological capability is presented as a strategic national asset through which Indonesia can reduce dependence on foreign expertise while simultaneously increasing its influence within global biomedical research.

Importantly, governmental communication consistently associates scientific self-reliance with broader narratives of economic and developmental progress (Judianto, 2024; Yusuf & Setiawan, 2022). Investments in laboratories, research infrastructure, university partnerships, and innovation ecosystems are represented as contributing not only to better healthcare outcomes but also to Indonesia's long-term economic competitiveness. Scientific research is therefore positioned as productive capital capable of generating innovation, strengthening domestic industries, and enhancing the country's international competitiveness within the emerging bioeconomy. Genomic science consequently becomes integrated into a broader developmental agenda in which technological advancement serves simultaneously as a public health strategy and an economic growth strategy.

The seventh news release extends this vision by highlighting internationally standardised infrastructures—including sequencing laboratories, biobanks, secure genomic servers, and nationally coordinated biological data systems—as evidence that Indonesia is approaching the scientific standards of advanced economies. References to internationally accredited facilities, globally competitive research, and cross-sectoral collaboration indicate that international benchmarking constitutes an important source of legitimacy for the programme. Rather than measuring success exclusively through domestic health outcomes, governmental communication repeatedly evaluates BGSi through its capacity to position Indonesia within global scientific hierarchies.

These findings demonstrate that governmental communication constructs genomics as a national strategic resource whose significance extends well beyond healthcare policy. From an STS perspective, this reflects the dynamics of techno-nationalism, whereby states increasingly regard technological innovation as a critical source of geopolitical influence, economic competitiveness, and national sovereignty. In this framework, scientific knowledge is no longer treated as a neutral public good but as a strategic capability through which nations compete within global political and economic systems.

The Indonesian case illustrates that techno-nationalism operates through a distinctive discursive mechanism. Rather than employing overt nationalist rhetoric, the Ministry links genomic innovation with narratives of scientific excellence, technological independence, capacity building, and international recognition. National identity is therefore constructed through competence rather than confrontation. Indonesia is imagined not as resisting globalisation but as strengthening its position within global scientific networks by developing domestic expertise capable of meeting international standards. This represents a form of developmental techno-nationalism in which integration into global science becomes the pathway towards national autonomy rather than its opposite.

These findings also resonate with recent scholarship examining the relationship between biotechnology and national competitiveness (Knight & Sureka, 2023). Studies of genomic innovation increasingly argue that countries invest in precision medicine not only to improve public health but also to secure strategic advantages within the global bioeconomy (Jimenez-

Sanchez & Philp, 2015), where genomic databases, biomedical infrastructures, and scientific expertise constitute valuable national assets. The Ministry's communication closely reflects this logic by repeatedly linking genomic capability with innovation, industrial development, scientific leadership, and future economic resilience (Bollyky, 2023).

At the same time, the empirical material reveals that the programme is embedded within broader political-economic processes that receive relatively little explicit attention in official communication. While governmental narratives celebrate scientific collaboration and technological progress, they rarely discuss how genomic innovation also depends upon international flows of funding, proprietary technologies, commercial partnerships, and global data infrastructures. Instead, the programme is presented as a largely self-contained national achievement. This selective framing contributes to what STS scholars describe as the stabilisation of sociotechnical imaginaries, whereby particular futures are rendered politically attractive by emphasising opportunities while backgrounding structural dependencies and potential asymmetries of power.

Consequently, BGSi is communicated not simply as a healthcare programme but as a nation-building project in which genomic science symbolises Indonesia's transition towards a knowledge-based economy. Scientific infrastructures become symbols of modern statehood, technological capability becomes synonymous with sovereignty, and precision medicine becomes evidence of national progress. Through these narratives, the Ministry constructs a sociotechnical imaginary in which Indonesia's future is inseparable from its capacity to generate, control, and apply genomic knowledge.

This analysis contributes to the literature on sociotechnical imaginaries by demonstrating that governmental communication performs an important geopolitical function. Existing studies have largely examined how states employ technological imaginaries to organise domestic governance or public policy. The BGSi case suggests a complementary process in which governmental communication simultaneously projects an image of the nation as an emerging scientific power within the global bioeconomy. Official communication therefore serves not only to legitimate technological transformation domestically but also to symbolically position Indonesia within evolving international hierarchies of science, innovation, and biotechnology.

The Politics of Silence: What Government Communication Leaves Unsaid

While the previous sections have demonstrated how governmental communication constructs a future-oriented vision of genomic medicine through technoscientific authority, datafication, and techno-nationalist aspirations, an equally important finding emerges from what is absent from the official narrative. Across the seven news releases, the Ministry of Health consistently emphasises scientific progress, healthcare modernisation, national innovation, and international competitiveness. Yet several issues that have become central to global debates on genomic governance receive little or no substantive attention. These omissions are not merely informational gaps; they constitute an important dimension of the sociotechnical imaginary by defining which concerns are rendered visible and which remain outside the boundaries of public discussion.

The most notable absence concerns the ethical and social implications of genomic data governance. Although several news releases briefly mention cybersecurity, data protection, and technological investment, they provide almost no discussion of informed consent, individual autonomy, secondary use of genomic information, long-term data stewardship, or citizens' rights over their biological data. Genomic data are predominantly represented as a valuable

national resource for scientific research and healthcare improvement rather than as highly sensitive personal information requiring continuous ethical oversight. Consequently, the official narrative foregrounds technological capability while backgrounding the normative questions that increasingly dominate international discussions on precision medicine and genomic governance.

A second omission concerns the representation of risk. Throughout the governmental communication, BGSi is consistently portrayed as an unequivocally beneficial programme capable of improving diagnosis, preventing disease, accelerating scientific innovation, and strengthening Indonesia's healthcare system. Potential risks—including data breaches, algorithmic bias, unequal access to precision medicine, commercial exploitation of genomic information, or unintended consequences of large-scale biological surveillance—are almost entirely absent from the narrative. Instead, technological development is presented as a linear process of progress in which scientific advancement naturally produces societal benefit.

This highly optimistic framing reflects what STS scholars have described as technological solutionism, where complex societal challenges are primarily understood as problems that can be addressed through technological innovation rather than through broader political, ethical, or institutional deliberation (Boerwinkel et al., 2014; Marris & Calvert, 2020). Within the BGSi narrative, genomics appears as a self-evident solution to future healthcare challenges, while the political choices embedded in the design, ownership, governance, and regulation of genomic infrastructures remain largely invisible. The absence of uncertainty reinforces the perception that technological modernisation is both inevitable and unquestionably desirable.

Equally significant is the limited visibility of public participation. The analysed news releases consistently highlight collaborations among government ministries, public hospitals, research institutes, universities, international organisations, biotechnology companies, and philanthropic partners. These institutional actors collectively construct an image of a broad national innovation ecosystem capable of implementing genomic medicine. However, citizens themselves rarely appear as active participants in shaping this transformation. Instead, they are primarily represented as future beneficiaries of improved healthcare or as providers of biological samples that support scientific research.

This asymmetrical representation suggests that the public occupies a predominantly passive position within the governmental imaginary. Patients, civil society organisations, advocacy groups, Indigenous communities, and other social actors who may possess legitimate concerns regarding genomic technologies are largely absent from the narrative. Similarly, there is little discussion of mechanisms for public consultation, democratic deliberation, community engagement, or participatory governance. Public acceptance appears to be assumed rather than negotiated.

From the perspective of Science and Technology Studies, these omissions are analytically significant because sociotechnical imaginaries are constituted not only through the futures they promote but also through the alternative futures they exclude. Jasanoff and Kim (2015) argue that imaginaries simultaneously organise aspirations and delimit the range of futures considered politically legitimate. By privileging narratives of scientific progress, technological sovereignty, and healthcare modernisation, governmental communication narrows the public conversation surrounding genomic medicine to questions of implementation rather than questions of governance, accountability, or democratic legitimacy.

The Indonesian case therefore illustrates a broader dynamic identified in recent scholarship on anticipatory governance. Emerging technologies are frequently communicated through narratives of innovation and competitiveness that encourage political consensus while postponing discussions regarding uncertainty, ethical contestation, and distributive consequences (Lösch et al., 2019). In the context of BGSi, governmental communication establishes broad societal support for genomic medicine before substantial public debate concerning its ethical and political implications becomes institutionalised. Communication thus functions not only as an instrument of policy dissemination but also as a mechanism through which potential controversies are strategically displaced from public attention.

The findings also resonate with contemporary debates on responsible innovation and genomic governance. International scholarship increasingly argues that the long-term legitimacy of precision medicine depends not solely upon technological excellence but upon meaningful public engagement, transparent governance, equitable benefit-sharing, and robust mechanisms for protecting genomic privacy (Meunier & Herzog, 2023; Roberts et al., 2024). These dimensions receive comparatively limited attention within the Ministry's communication, suggesting that the envisioned genomic future prioritises technological capability over participatory governance.

Rather than interpreting these absences simply as communication deficiencies, this study argues that they perform an important political function. By foregrounding opportunity while backgrounding uncertainty, governmental communication stabilises a particular sociotechnical imaginary in which genomic medicine appears as an uncontested pathway towards national progress. The omission of ethical conflict, public disagreement, and institutional complexity contributes to the production of a coherent and persuasive narrative capable of mobilising political legitimacy for large-scale technological transformation.

Accordingly, this study proposes that silence should be understood as a constitutive component of governmental sociotechnical imaginaries rather than merely an absence of information. Official communication constructs future technological visions not only by emphasising particular aspirations but also by selectively excluding issues that might complicate or challenge those visions. In the Indonesian BGSi case, the future of genomic medicine is imagined through narratives of innovation, scientific authority, and national development, while questions concerning consent, privacy, public participation, accountability, and distributive justice remain largely peripheral. These exclusions reveal that sociotechnical imaginaries are inherently political projects, organised as much by what they leave unsaid as by what they explicitly.

CONCLUSION

This study demonstrated that official governmental communication played a constitutive role in shaping sociotechnical imaginaries of precision medicine during the formative stage of technological governance. Through the analysis of seven official news releases introducing the Biomedical and Genome Science Initiative (BGSi), the findings showed that the Indonesian Ministry of Health not only disseminated information about precision medicine but also actively constructed desirable healthcare futures by mobilizing narratives of technoscientific governance, genomic datafication, and technological sovereignty while marginalizing ethical, participatory, and governance concerns. These findings extended

sociotechnical imaginaries scholarship by conceptualizing official governmental communication as a formative site of future-making, highlighting how states publicly articulated and legitimized emerging technological agendas before they became fully institutionalized. However, this study was limited to the Ministry's official news releases during the initial phase of BGSi. Future research could examine how these governmental imaginaries evolve throughout later stages of policy implementation and how they are negotiated through other communicative arenas, such as dedicated program websites, social media platforms, parliamentary debates, mainstream media, or public responses. Comparative studies across different countries or emerging health technologies could further contribute to a broader understanding of how sociotechnical imaginaries are constructed, contested, and transformed within diverse political and institutional contexts.

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