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The Governance of Top-Level Domain (TLD) to Support the Advancement of Internet Promotion and Innovation in Indonesia

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ABSTRACT

The internet is a widely accessible public resource that serves as a primary driver of the digital economy. In the realm of internet governance, Top Level Domains (TLDs) assume a significant function in facilitating the expansion of internet accessibility, hence enhancing its utilization and dissemination across society. This study aims to address three primary inquiries, namely the global trends in top level domain (TLD) governance, the current governance of TLD in Indonesia, and the potential to formulate better domain management policy in Indonesia to foster internet promotion and innovation. This study employed a qualitative methodology by conducting interviews and focus group discussions (FGDs) with the key stakeholders involved in domain governance in Indonesia. The results indicate that there is a global tendency for TLD management to become more independent. Currently, Indonesia is still considered lacking in capability to optimize the empowering role of TLDs in supporting internet promotion and innovation. This study proposes encouraging registry forum as a means to stimulate TLD development that promotes internet promotion and innovation for Indonesian society.

I. INTRODUCTION

The advancement of internet technology has experienced significant growth during the past few decades (Fortunati, 2017). These advancements prompt the government to recognize the potential and obstacles in leveraging the internet's capacity to support the economic and social progress. The discourse brought forward the matter of the extent to which governmental entities can partake in the regulation of the internet (Bygrave & Bing, 2009).

The question concerning the government's role has emerged as a significant concern in the delineation of 'internet governance'. The matter

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at hand has been in circulation ever since the World Summit on the Information Society tasked Secretary-General Kofi Annan with delineating and charting public policy concerns in the realm of internet governance (Mueller et al., 2004). Moreover, there has been a discernible trend towards a more stringent delineation of internet governance when administrative responsibilities are delegated to more encompassing institutions. This characterization pertains to the conceptualization and implementation of principles, conventions, legislation, decision-making processes, and initiatives that exert an impact on the evolution and utilization of the internet. Therefore, it is imperative that collaborative development of the internet involves three key actors: governments, the commercial sector, and civil society in diverse roles (Kurbalija, 2023; Mueller et al., 2004). According to Mueller et al. (2004), the concept 'internet governance' was originated from the apprehensions expressed by numerous internet enterprises regarding the regulation of internet management by a dominant entity, in this case refers to as the government.

In addition to those actors, the field of internet management encompasses various elements, including Transport Control Protocol/Internet Protocol (TCP/IP), Root Servers, Internet Service Providers (ISP), Cloud Computing, Cyber Security, and Domain Name System (DNS) (Kurbalija, 2023). The subject of DNS, which pertains to the allocation and management of domain names, remains a debatable matter that has sparked ongoing discussions regarding the exercise of governmental authority (Kurbalija, 2023). DNS management encompasses the administration and control of three distinct categories of top-level domains, namely generic top-level domain (gTLD), country code top-level domain (ccTLD), and sponsored top-level domain (sTLD). Throughout the history of the internet, the control on DNS management has shifted gradually from the government to an independent entity. Currently, a non-profit organization known as the Internet Corporation for Assigned Names and Numbers (ICANN) is responsible for DNS management.

Nowadays, there are various viewpoints across nations regarding the internet governance, encompassing various approaches concerning the governance of top-level domains (TLDs). The transformation of ICANN from a government entity to an independent agency varies among several countries, meaning they are responsible for managing ccTLDs by mobilizing different entities, such as government bodies, business organizations, non-profit organizations, and educational institutions (Geist, 2003). The extent of this function is contingent upon the government's overarching goal and its perspective on the internet.

The role of government entails achieving desired results by managing various sectors to satisfy the public needs. According to Aguerre (2019), the administration of ccTLDs should not solely focus on its technical aspects, but also give precedence to its sustainability within the digital economy. The implementation of managing ccTLDs can be considered a strategic investment in intelligent infrastructure, as stated by the Organization for Economic Cooperation and Development (OECD, 2014). This investment aims to i) facilitate the growth of the internet and promote innovation within the digital economy and ii) enhance the accessibility of internet usage to a wider range of individuals. The proliferation of internet accessibility is closely linked to the enhanced ability of those involved in the digital economy to create and distribute their digital innovations.

Internet management has been a longstanding practice in the Indonesian environment, as noted by Purbo (2008). Indeed, the existence of internet management predates the government's intentional involvement in domain management. The responsibility regarding the latter was initially undertaken in 1998 by Faculty of Computer Science, University of Indonesia, but this endeavour was declared unsuccessful. The registration of an Indonesian ccTLD domain was accomplished solely in 1993. The authority on domain management had shifted from Indonesia Network Information Center (IDNIC) in the period of 1998–2005 to government control in 2005. It is noteworthy that *Pengelola Nama Domain Internet Indonesia* (PANDI) was also established in 2005. A significant development in the management of TLDs in Indonesia occurred in

2013 through the enactment of the Regulation of the Minister of Communication and Informatics No. 23/2013, which pertains to the management of domain names. During that time, this matter has evolved into a model that is overseen by a non-profit organization.

Numerous studies have been conducted on the subject of domain management in Indonesia. Several scholars also have conducted the comparative analysis on domain management and its organizational forms across different countries (Geist, 2003; Jumhur, 2014; Simanungkalit, 2013), However, there is a notable absence of critical study that investigate the influence of domain management on internet promotion and innovation within Indonesian society. Therefore, this study aims to address the existing knowledge gap by providing answers to the following research inquiries:

1) What are the prevailing trends in global domain management?
2) What are the current appraisal and impact of domain management in Indonesia?
3) What are the strategies for formulating an effective domain management policy in Indonesia to foster internet promotion and innovation within the digital economy?

II. ANALYTICAL FRAMEWORK

A. Domain Name System (DNS) and Top-Level Domain (TLD)

Domain Name System (DNS) is a network infrastructure that associates domain names with corresponding IP addresses. Thus, DNS facilitates efficient communication inside the internet network using alphanumeric identifiers that are more user-friendly and memorable (Liu & Albitz, 2006). The DNS encompasses various elements, such as root servers, authoritative servers, and resolver servers, which interrelate to facilitate the course of requests and dissemination of information pertaining to domain names. The DNS resolution process, which involves the conversion of a domain name into an IP address, is initiated when a user inputs a URL into a web browser. The DNS plays a crucial role in enabling the effective communication between devices on the internet by facilitating the process of discovering and identifying IP addresses that correspond to given domain names.

The functioning of the DNS encompasses multiple stages. Initially, the user inputs the domain name into the web browser, subsequently triggering a request to the resolver server (Liska & Stowe, 2016). The resolver server has the capability to store cached data and forward requests to the root server. The root server answers by furnishing data that indicates the location of an authoritative server that possesses the necessary authorization towards a certain domain. Subsequently, the server with authoritative control furnishes a response encompassing the pertinent IP address, which is subsequently transmitted by the resolver server back to the user's web browser. This procedure allows users to conveniently access websites or online services by utilizing domain names that are more memorable compared to numerical IP addresses.

Typically, TLD occupies the highest position within the hierarchical structure of the domain naming system. It denotes the ultimate extension component of a domain name (Kruger, 2015; Sause & Edmar, 2021). The definition of TLDs entails the categorization of domains based on their extension, namely encompassing gTLDs such as .com, .org, and .net, as well ccTLDs such as .id, .uk, and .jp. gTLDs are utilized on a worldwide scale without being affiliated with any specific geographic location, while ccTLDs are more closely linked to specific regions or countries. Additionally, there are novel TLDs, including high-paying TLDs, which are tailored to particular sectors, such as .bank or .university. The categorization of TLDs serves as a representation of the wide range and distinctiveness of domain utilization across different regions globally. TLDs encompass extensions that are commonly recognized and extensively utilized across the internet. Conversely, ccTLDs offer a geographical indicator linked to a particular country or region.

The association between DNS and TLD is highly interconnected since both entities play a crucial role in the domain resolving procedure within the realm of the internet. The DNS plays

a role in the conversion of user-friendly domain names into numerical IP addresses, which are essential for identifying and locating certain destinations inside a network. Meanwhile, TLD occupies the highest position within the hierarchical structure of the domain naming system, and it serves to categorize the ultimate extension of any given domain name.

B. Top Level Domain Hierarchy

The Internet Corporation for Assigned Names and Numbers (ICANN) is a non-profit organization that assumes the responsibility of organizing the encoding system for internet addresses and overseeing the management of the domain naming system (ICANN, 2023). Since its establishment in 1998, the ICANN has been played a significant role for managing and supervising the allocation of IP address, as well as the regulation and registration of domain names on a worldwide scale. This organization aims to uphold the long-term viability and steadfastness of internet infrastructure, while also advocating for the inclusion and involvement of multiple stakeholders in the process of formulating internet policy. Thus, in this regard, ICANN proactively engages several stakeholders, encompassing governmental bodies, corporate entities, academic institutions, and civil society, in the decision-making procedures aiming to achieve these objectives.

ICANN serves as the preeminent regulatory authority in the realm of domain management. The distribution of TLDs involves a sequential connection between each TLD and multiple stakeholders (Easton, 2012; Weinberg, 2001; Weitzenboeck, 2014). The distribution involves the following entities:

1) Registry. In the realm of internet domain, the term "registry" refers to an entity entrusted with the management and administration of the central database that houses comprehensive details pertinent to TLDs, such as .com, .org, or .net. Registry carries out complete authority over the process of domain names registration within TLDs under its management, as well as establishes the regulations governing the utilization and allocation of these domain names.
2) Registrar. It refers to a firm or an entity who possesses the necessary licencing to facilitate the registration of domain names on behalf of end users or registrants. It serves as mediators between individuals or organizations seeking to register certain domain names. Registrar is responsible for managing and maintaining the DNS so that it offers various services, such as domain name registration, DNS management, and other associated services.
3) Registrant. It refers to an entity, either an individual or an organization, that undergoes the process of registering a domain name and subsequently possesses the legal entitlement to utilize this domain name. Registrant possesses exclusive ownership of the domain name and carries out complete authority over the configuration and data associated with its domain.
4) Reseller. It refers to a business entity or individual that purchases a domain name from a registrar or registry and subsequently resells this domain name to the original registrant. Reseller serves as supplementary intermediary that enables transactions between registrar and end-user, frequently by providing additional services or customized packages to meet the specific requirements of the registrant.

While ccTLDs are limited to certain regions and gTLDs are not, both types of domain names can be applied to the distribution model, as depicted in Figure 1. Registrars have the capability to allocate domain names from both ccTLD and gTLD.

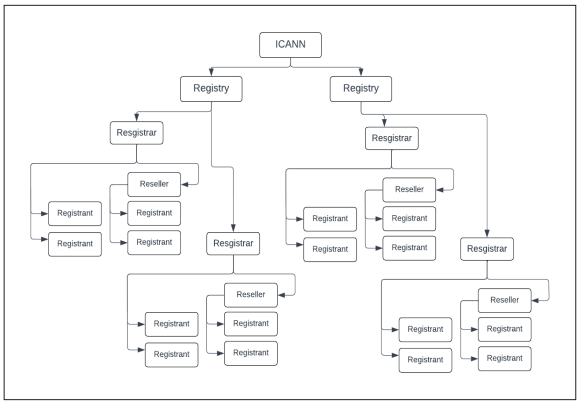

Figure 1. TLD distribution

C. Organization Form

A prevailing viewpoint asserts that the internet is a communal asset, hence necessitating governmental oversight and regulation of this resource (Foster et al., 1997). One of the primary justifications for the government assuming complete accountability is the pivotal role of the internet in safeguarding domestic cyber security (Eriksson & Giacomello, 2009). According to Geist (2003), within the framework of the registry, the government assumes a role akin to that of a company's director, namely responsible for establishing strategies to advance, employ, and exploit the internet in alignment with the state's objectives.

A Self-Regulatory Organization (SRO) refers to an entity or establishment entrusted with the responsibility of overseeing and governing its own operations within a specific industry or sector (Caral, 2004). The primary role of a SRO is to uphold the integrity and ensure the high quality of services within a certain industry (de Vey Mestdagh & Rijgersberg, 2010). This is achieved through the establishment of standards, as well as the monitoring and enforcement of rules that are binding upon its members. SROs often comprise individuals from the sector who collaborate to establish an environment that promotes well-being and equity, while safeguarding the interests of relevant parties. The implementation of their self-regulation is anticipated to facilitate the establishment of effective governance mechanisms, hence mitigating the occurrence of detrimental practices.

Typically, SROs are mostly deployed in areas of critical importance where government intervention is limited, such as financial services authorities and stock market institutions. Certain theories argue that independent organizations are still considered the most optimal to function as SRO, even though external entities, such as the government or government-established authorities, continue to exert regulatory control (Barcys & Kalinauskas, 2013). This statement underscores the significant role of the registry in carrying out ICANN's mandate. However, it acknowledges that the government continues to play a role, particularly in shaping the organization's values and vision.

According to Aguerre (2019) and Geist (2003), certain registry principles continue to uphold the notion that universities are the most esteemed institutions. The prevalence of projects in domain name administration can be attributed to the prioritization of this issue by institutions. However, the optimization of internet promotion and innovation development can be achieved through the involvement of higher education institutions.

Table 1 provides a description of various organizations that serve as reference points in this research mapping. As previously mentioned, based on their basic organizational functions, there are two types of organizations, namely NGO and GRO. The registry form in each type is determined based on the organization's regulatory authority.

D. TLD to Support the Advancement of Internet Promotion and Innovation

The internet serves as a catalyst for innovation within the realm of the digital economy (Paunov & Rollo, 2016; Prescott, 1997). According to Xu et al. (2019), the expansion of internet access among individuals correlates with an increased potential for fostering creativity. The evidence suggests that there has been a notable rise in digital economic growth globally. According to Statista (2023), numerous businesses that utilize digital technologies have made significant inroads into the world's top sectors. According to Kominfo (2021), the Indonesian government is currently seeing that the expansion of the digital economy is being facilitated by the implementation of governmental measures aiming to convert diverse business models into the new ones that adopt digital technologies.

Conversely, the facilitation of convenient internet connectivity can contribute to the advancement of the internet in supporting communal well-being (Nyirenda-Jere & Biru, 2015). The internet facilitates enhanced accessibility to educational opportunities and limited fiscal resources. According to Kominfo (2023), the convenience offered by the internet can potentially serve as a viable solution for addressing

Table 1. Types of Organization Based on the Function

Function	Registry Form	Description
Non-Government Organization (NGO)	Self-Regulatory Organization (SRO)	Domain management in accordance with company's objectives is the key principle. Limited government intervention. Typically, in the context of business operations, the organizational structure similarly functions like a firm.
	Externally regulatory organization	Domain management should be conducted by an autonomous agency. Typically, this type of organization is characterized by its non-profit or profit-for-good nature. It has closer proximity to the governing body.
	Academic	Conduct domain management in combination with academic and research endeavours. It may take the form as an agency or an organizational entity that is affiliated with a college or established by a college.
Government Regulatory Organization (GRO)	Government Agency	One aspect of governmental organization
	Quasi-Governmental	Established by the governing body, while lacking a formal corporate organizational framework. This type of organization may take the form of an ad- hoc body or a specialized institution established by the government.

social and economic challenges within any given country.

The ccTLDs have had a significant impact on the advancement of the digital economy. OECD (2014) considered the increase in ccTLDs as one of the criteria for assessing investment in smart infrastructure. This growth of ccTLDs has a significantly positive impact on digital economies, particularly in developing nations (Lazović, 2014; Sepulveda & Strickling, 2022). The reason for this is that TLD is connected to the expansion of products and digital applications that are distributed via the website.

The utilization of ccTLD in Indonesia has resulted in favorable outcomes in terms of digitalization. As of 2022, the number of ccTLDs registered in Indonesia stands at 726,000 domains, representing a growth of over 250% compared to those of 2018 (PANDI, 2022). This aligns with 2020–2024 strategic plan established by the Ministry of Communication and Informatics, namely implementing a comprehensive internet acceleration program throughout Indonesia by focusing on infrastructure development and nurturing digital talent (Kemenkominfo, 2021). Currently, this plan focuses on improving the necessary infrastructure and capital to enhance accessibility and capability of ccTLD in Indonesia so as to increase its domestic value.

III.METHODOLOGY

This study collected field data through in-depth interviews and focus group discussions (FGDs). These methods aimed to obtain comprehensive information from the representatives and key entities involved in TLDs governance in Indonesia (Berg, 2001; Creswell, 2009). Besides, a historical analysis was conducted on the organizational structures and goals of different registers worldwide.

In accordance with the analysis process (Figure 2), the initial step conducted was the cartography of worldwide patterns in the domain of human resource management. Two data points were selected, one from the year of 2000 and another from the year of 2023. The year 2000 was chosen because the early 2000s has been widely recognized as the beginning of the rapid expansion period of the internet (Giovannetti et al., 2003). Subsequently, a series of interviews were held with representatives from the registry, registrar, and government entities in order to ascertain the present status of strategic issues. The process of data collection was scheduled to be conducted in 2023. The primary criteria for the selected respondents were they must be the parties that best represent the organization. This includes individuals in the registry, the registrar, and the government, such as the director or the person appointed by the director, who advocate for their respective perspectives.

To obtain more comprehensive data, two FGDs were performed with representatives from various sectors. The objective of these FGDs was to explore potential enhancements in the management of TLDs in Indonesia in achieving its goals, namely fostering the internet promotion and innovation in Indonesia.

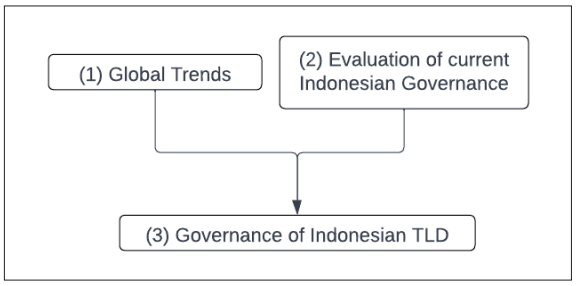

Figure 2. Analysis process (source: Author)

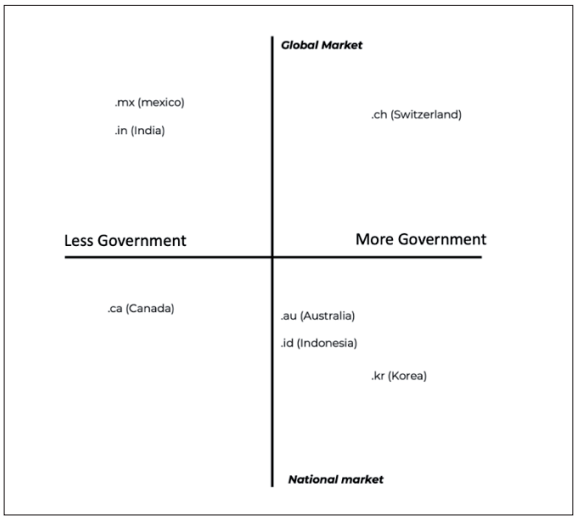

Figure 3. Market and government control (Simanungkalit, 2013)

IV. RESULTS

A. Global Trends of TLDs Governance

According to Simanungkalit (2013), various nations face distinct opportunities and problems in domain management, regardless of government involvement. Figure 3 depicts the interplay between government control and market direction. Simanungkalit (2013) asserted that Indonesia exhibits a higher degree of government control, despite its participation in the domestic market. Besides, the domain management in Indonesia shows similarities to that in Australia and Korea.

In contrast, the market management in Mexico and India falls within the domain of market management characterized by reduced government control and a global market orientation. Cross-border domain sales can be conducted with few limitations across various nations.

During the course of domain management development, certain countries underwent functional modifications. The accompanying image illustrates the typical transitions observed from non-governmental organizations (NGOs) to private entities. Several countries, primarily located in Europe, hold the perspective that the management of domains is not a role that should be carried out by the public sector.

Concurrently, a notable phenomenon pertains to the transformation of educational institutions into alternative structures, including private, governmental, and non-profit entities. The management practice within educational institutions has been discontinued due to the limited use of commercial and market forces in fulfilling the educational function. Domain-specific institutions within universities are not the primary focus of academic institutions. Despite being situated inside the academic sphere, universities often find themselves necessary to establish commercial entities specifically focused on performing domain management activities.

Figure 4 depicts the alterations occurred during a span of 23 years (2000–2023). In certain nations, the predominant sectors in 2000 were non-profit organizations and government, accounting for 37% and 28% of the total proportion, respectively. By 2023, it is anticipated that there will be an increase in the number of country domains, leading to the expansion of numerous new ccTLDs. Consequently, it is expected that non-profit corporations would emerge as the prevailing type, constituting approximately 43% of the total proportion.

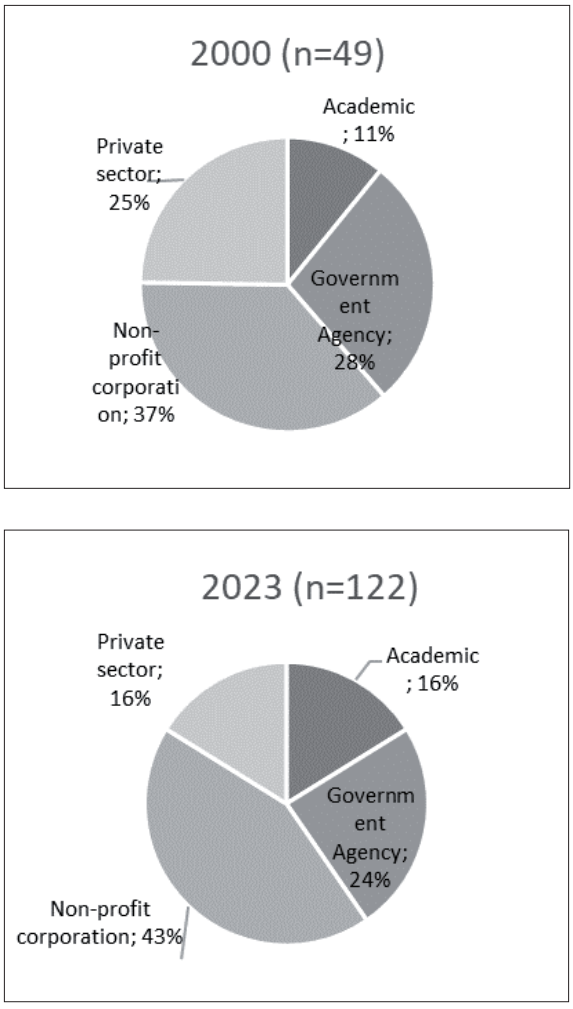

Figure 4. Trends of ccTLD organizational form in 2000 and 2023 (source: Authors)

In addition to this, Figure 4 illustrates a discernible alteration in the configuration of 11% of ccTLDs globally, commencing from the year 2000. The majority of these transitions include a shift from non-profit to private entities. The reason behind this shift is rooted in the economic prospects associated with the sale of domains to the public. Particularly, individuals or entities engaged in cross-border commercial domain sales, such as the Tuvalu domain through .tv, have been able to generate substantial profits by catering to broadcasting firms.

Moreover, the transition from an academic setting to a private one is a prevalent trend. Nowadays, numerous nations hold the perspective that the internet lacks relevance within educational establishments. Given the current circumstances (Figure 5), it is evident that higher education institutions often face limitations in terms of funding to take advantage of the domain sales. Certain educational institutions have established their own business entities or fully delegated their responsibilities to private entities.

Furthermore, there is a transition observed from both academic and non-profit sectors towards government entities in the overall structure. The aforementioned events occurred with regards to the Centre National de l'Informatique (CNI) to the Burundi National Center of Information Technology (BNCIT) in Burundi, as well as the Korea Network Information Center (KRNIC) and the Korea Internet and Security Agency (KISA) in South Korea. In the context of South Korea, KISA operates as a subsidiary entity under the jurisdiction of the Ministry of Science and ICT. It encompasses various responsibilities, such as promoting cyber security, safeguarding personal data, ensuring digital security, and facilitating the management of the digital economy. Similarly, within the realm of industrial management, KRNIC is a subsidiary organization responsible for the management of internet resources.

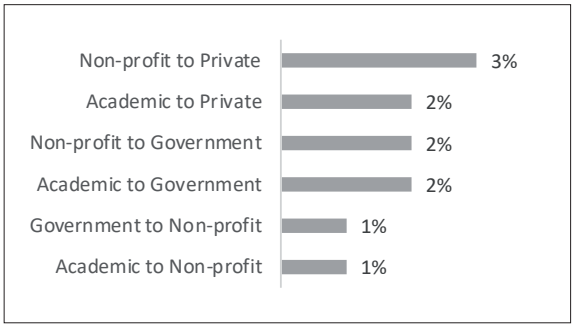

Figure 5. The evolution of ccTLDs organizational form (source: Authors)

A non-profit corporation can adopt either self-regulation or external regulation as its governing framework. According to Davidson (2002), there are many countries that assert themselves as self-regulatory organizations, such as .au Domain Administration Limited (AuDA) in Australia. Indonesia, represented by PANDI, also asserts its aspiration to establish itself as a self-regulatory organization. Nevertheless, a notable concern arises from the terminology "non-profit self-regulatory," as it exhibits a certain degree of prejudice. This is due to the fact that in certain instances, domain sales are only utilized for

commercial purposes, such as the development of additional digital items that are specifically designed for digital platforms.

B. Evaluation of TLDs Governance in Indonesia

The roles and responsibilities of the parties engaged in the management of Indonesian domain names was stipulated in the Regulation of the Minister of Communication and Informatics No. 23/2013. Chapter 1 in Article 1 of the regulation delineates the general provisions and explicitly identifies the entities responsible for the administration of the domain name. Three entities encompassed within this category: domain name registries, domain name registrars, and domain name users. They are responsible for the organization and administration of domain names, besides are also directly engaged in the management and implementation of domain name systems.

The utilization of a domain, which involves multiple actors rather than a single actor, should be examined from a broader perspective. This is not solely confined to practical applications within the realms of business or industry. However, it is vital to consider the perspective of each participant's engagement in the advancement of the field. In relation to the augmentation of Indonesian domains, the provision of supportive facilities for domain development, and the imperative adherence to governance and regulatory matters, several considerations arise, particularly when considering that the domain is not under private ownership. However, it is imperative that the community assumes ownership of the domain, while simultaneously ensuring that it is subjected to appropriate oversight and regulation by the state.

Based on the Regulation of the Minister of Communication and Informatics No. 23/2013, the registry carries out the following functions:

1) The task at hand involves the administration and oversight of both gTLDs and ccTLDs.
2) The responsibility of granting authorization for the registration of gTLDs and ccTLDs lies with the Domain Name Registrar.
3) The task at hand involves establishing, managing, and sustaining the necessary infrastructure and electronic systems for the administration of TLD Names.
4) The registration of TLD is conducted in compliance with the regulations set forth by International Domain Name management and relevant regulatory legislation.
5) The provision of services does not include any legal liabilities concerning Domain Names, except for those arising from acts of carelessness.

Regrettably, this legislation does not enforce the obligation of ccTLDs to assume responsibilities in fostering internet promotion and innovation among digital sector participants.

The assessment of the existing policy framework represents the ultimate phase of this study. Initially, researchers conducted field data collection by interviewing stakeholders to investigate the primary issues. Subsequently, during the first FGD, researchers engaged in discussions with each participant regarding the issues at hand and the optimal approach for managing ccTLD in Indonesia. In the second FGD, researchers conducted additional discussions to verify the validity of the management model that had been developed.

Table 2 presents the challenges that are associated with each stakeholder. This issue presents a critical analysis of the existing domain governance practices in Indonesia. Presently, a state of conflict exists regarding this issue, as not all stakeholders perceive it as a public resource.

In addition to this, the government perceives the potential for increased intervention in the registration, while the registry itself contends that further intervention is unnecessary. Various more stakeholders assert that a moderate level of involvement against the government is necessary.

In relation to the aspect of transparency, it is presently seen that the registration process in Indonesia exhibits a higher degree of transparency compared to other countries. However, there are alternative perspectives among stakeholders who argue that the existing state of domain administration lacks transparency. In this regard, the

Table 2. The topic of concern pertains to the current governance of the Top-Level Domain (TLD) in Indonesia (source: Authors).

Issues	Government	Registry	Registrar	Other Stakeholders
Domain name position	Public	Private	Private	Private
Government intervention	High	Low	Middle	Middle
Transparency	Limited	Transparent	Limited	Limited
Representativeness	Exclusive	Inclusive	Exclusive	Exclusive
Profit	Profit for good	Profit	Profit	Profit
Internet promotion & innovation	Collaborate with university and research center	Commercialization of digital product	Internet promotion for digitalization	Internet promotion for digitalization

management practices on registration process in Indonesia shows similarities to those in Australia since both countries adhere to the principles of self-regulation. The current perception is that the representation of each stakeholder is highly exclusive, with only the registry being considered sufficiently inclusive. The representation is situated inside the hierarchical framework of the steering council, which holds the authority to establish the overarching vision and objective of the organization.

In addition to this, there are various perspectives regarding internet promotion and innovation for the broader community. The registry recognizes that the commercialization of digital products is a viable approach to enhance the efficiency within the business practices of Indonesian registry. Conversely, registrars and other relevant parties contend that the implementation of internet promotion and digitalization initiatives is vital, particularly for supporting the sustainability of micro, small, and medium enterprises (MSMEs), as well as for advancing the nascent start-ups.

This study found that there are currently deficiencies in domain management in Indonesia. In particular, the organizational structure, the focus on generating profit, and the current policy perspectives are seen as the crucial elements in advancing the domestic internet agenda, specifically in terms of fostering the internet promotion and innovation.

C. The Governance of TLDs Plays a Crucial Role in Fostering the Internet Promotion and Innovation in Indonesia

This study asserts for the necessity of revising the Regulation of the Minister of Communication and Informatics No. 23/2013. In this regard, it becomes imperative for the government to establish collaborative partnerships with universities and research institutions to facilitate the initiatives for implementing internet innovation and promotion in Indonesia. For that reason, the following aspects should be considered:

1) An essential key performance indicator (KPI) for registries in Indonesia pertains to the level of country domains sold, since no other strategy has demonstrated a greater influence.
2) One of the actions that has a significant influence is the promotion of extensive internet usage across the broader community. This can be achieved through several means, such as subsidy programs, training initiatives, and the establishment of MSME learning centers dedicated to promote digital literacy within the community.
3) Moreover, the internet, as a channel for innovation, cannot be effectively promoted to its fullest potential without sustained efforts from key entities. Therefore, it is necessary for all related parties to engage in collaborative research and developmental efforts as an essential undertaking. An example of this can be observed in the context of emerging technological programs, such as Artificial

Intelligence (AI), Cloud Computing, and Big Data.

4) The registry plays a significant role in digital transformation, serving not only as a valuable resource, but also as an influential force beyond the realm of government.

This study regards non-profit organization as one of the most favorable organizational types in terms of organizational structure. The government facilitates the autonomy ccTLDs in the allocation of domain names. Nevertheless, it is imperative that the government assumes responsibility for participating in the deliberation of the medium and long-term vision within a representative registry forum. As seen in Figure 6, the registry forum serves as a platform where delegates from the corporate sector, government entities, and civil society can reach the mutual agreement to ascertain and assess the goals of the registry, encompassing ccTLD and gTLD.

In the registry forum, the business orientation is focused on gTLD, which enables the implementation of business development aligned with the company's objectives. The level of government intervention in this forum is maintained at minimal. If an activity or action poses a threat or hinders the interests and operations related to the security of a nation, it becomes imperative to take necessary measures.

Conversely, it might be argued that a ccTLD is designed with the primary objective of generating profit for societal benefit. The operational revenues derived from the Indonesian domain business process can provide financial support for the digitalization program targeting micro, small, and medium enterprises (MSMEs) and contribute to the growth of the digital economy through innovative programs. In addition, governmental initiatives aimed to enhance digital literacy and foster the implementation of extensive research and innovation. The successful enhancement of this perspective necessitates collaborative efforts. The primary function of the registry forum encompasses not only the formulation of objectives, but also the assessment and supervision of the registry's performance in fulfilling this function.

Figure 6 illustrates the significance of the registry forum in influencing the trajectory and trolling output of ccTLDs in their role for supporting internet promotion and innovation. The forum is established through the involvement of government, society, and business representation. All these stakeholders compile short-term and long-term outputs in matters that need to be achieved by the registry. Furthermore, the registry forum also governs the suitability of the registry's progress and activities.

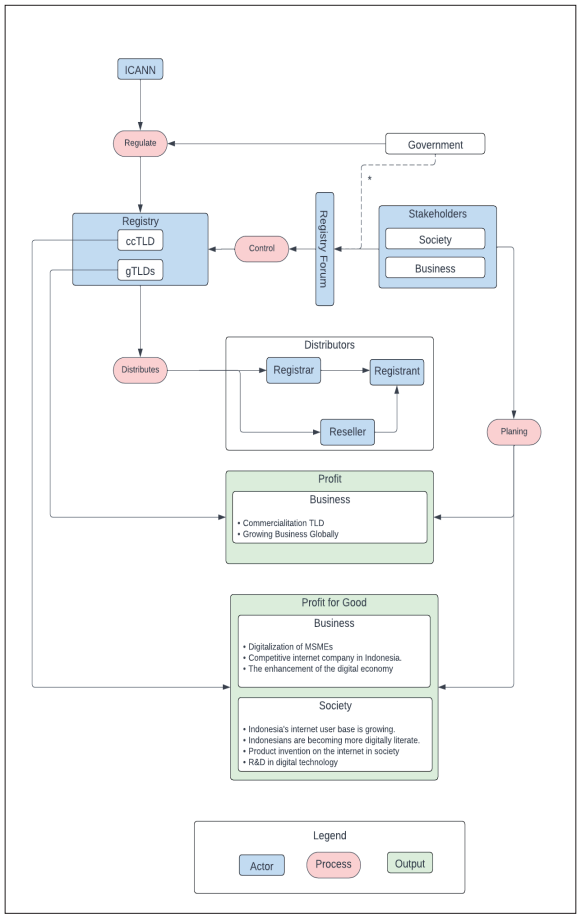

Figure 6. Registry forum function: Indonesian context (source: Authors)

Therefore, it is evident that there is a pressing need to implement fundamental modifications. Firstly, there should be a greater emphasis on promotion and innovation in the management output of ccTLDs. Secondly, it is crucial to ensure that the organization maintains its autonomy so that is not subjected to government intervention. This function is executed in the presence of the Top-Level Domain Forum in the form of policies implementation aiming to satisfy the aspiration and interest of all stakeholders. This

chart serves as a tool to assess output and track the performance of the TLD, which can take the form of a ccTLD or a gTLD.

V. CONCLUSION

This study observes a pattern in the changing methods of ccTLDs management worldwide. The extent to which a country considers the internet as a public resource determines its management practices. Currently, the domain management in Indonesia is making satisfactory advancements, although it has not yet reached its maximum potential. This is because domain management in Indonesia is still seen as lacking transparency and has not yet significantly influenced the advancement and promotion of the internet. This study suggests encouraging registry forum as a means to stimulate TLD development that promotes internet promotion and innovation for society. The optimization of the registry forum, which serves as a platform for multiple stakeholders, is an effective strategy for utilizing profits to promote innovation while preserving independence.

This study also observes that domain administration in Indonesia primarily focuses on the quantitative expansion of ccTLD domains, without adequately considering the implications on the domestic internet promotion and innovation. This study argues for the necessity of revising the regulation in Indonesia that pertains to domain administration, namely the Regulation of the Minister of Communication and Informatics No. 23/2013. Specifically, the focus is on the obligation of senior domain managers to priorities the implementation of profit for the greater good. The resulting program aims to incentivize government intervention in domain management through enhanced monitoring. The provision of funds, programs, and catalysts for online research has facilitated the advancement of research and technology in the realm of the internet, particularly to improve technological advances, such as the progress made in the field of artificial intelligence (AI).

Nevertheless, the study examines the necessity for careful implementation of policy changes, as radical alterations have the potential to disrupt the ongoing positive progress in terms of the number of registered domains.

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