Deploying AI in taking down Indonesian regulatory problems: A study on early pandemic regulations

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Article Info

Abstract

Indonesia depends on national and governmental regulations to ensure legal certainty and provide guidelines on how existing subjects of law must act in accordance with the laws. As the House of Representatives of The Republic of Indonesia (DPR RI) recently adopted systems to provide transparency on the law legislation process, they probably encountered the constantly changing nature caused by economic factors, social factors, and technological context. However, the sophistication and interest in Artificial Intelligence (AI) has rapidly increased. Thus, AI has the potential to bring game-changing contextual changes in Administrative Agencies. The authors of this paper examined how the government should incorporate and regulate AI, and how it can guide Indonesia in modernizing the public sector and introduce safeguards to govern the use and adoption of AI. The authors intended to analyze the challenges and potential benefits of using AI in Administrative Agencies by examining the usage and development of AI in the U.S. Federal agencies. Currently, incorporating AI can address Indonesia's disruptive regulatory gaps and overlapping authorities; however, these obstacles also impede the successful incorporation of AI. Hence, the AI scheme in regulatory oversight will be able to reduce such problems only if the Indonesian government begins to adopt AI.

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Introduction

Modern businesses have incorporated algorithms and benefit from the various functions they provide, particularly in the areas of fraud detections, minimizing human errors, and even providing a personalized experience to their customers. Similarly, governmental institutions can improve their ability to effectively accommodate the public's needs by applying algorithms to solve regulatory issues. When governmental bodies responsible for resolving regulatory issues are introduced to AI and machine learning (ML) algorithms, they will be able to design comprehensive regulations and derivative regulations more effectively (Coglianese, 2019).

In facing the extraordinary global challenges posed by technologies and the increasingly complex regulations, the government needs to adopt precautions and effective measures in the development and implementation of regulatory oversight. Specifically, government officials must have the capacity to analyze large volumes of laws and regulations, which can be achieved through the use of ML algorithms. Accordingly, the government must move towards algorithmic regulatory governance. By analyzing cases of regulatory overlaps which also include several regulations issued during the pandemic, this article intends to unfold the potentials of AI in the regulatory oversight mechanisms in Indonesia despite the country's lack of regulatory oversight agency. Few regulations enacted during the early stages of the pandemic are relevant to illustrate the importance of incorporating AI in regulatory oversight.

What is an Algorithm in Regulatory Oversight?

Algorithms are a set of computational steps that have been used by numerous occupations requiring statistical analysis to make decisions (Coglianese, 2019). ML and AI carry out their tasks differently, where ML algorithms would use modern digital computing powers in analyzing massive amounts of data to produce predictions (Coglianese, 2019). ML algorithms can be used to establish regulations and provide legal certainty in the case of regulatory oversight, thereby avoiding overlapping regulations. Unlike the common regulatory oversight task performed manually by members of governmental institutions, ML algorithms work by learning the values and data that have been inserted into such machines (Coglianese, 2019). In general, ML is divided into two types: "learners" and "classifiers"; the former refers to ML algorithms that train on test data, while the latter refers to ML algorithms that take inputs known as features, and produce an output that is also known as category (Burrell, 2016). In conducting its tasks, ML can be supervised or even unsupervised in how it performs its tasks. As has been deployed in the U.S., ML algorithms are capable of easing the burden of federal agencies and provide accurate decision-making at a faster pace (Pencheva et al., 2020).

Algorithms work differently in comparison to a conventional theoretical approach in social sciences. The use of ML in establishing regulations is best contrasted with the standard conventional technique known as regression analysis; the manual selection of variables based on referral conducted by humans (Coglianese, 2019). Contrarily, ML algorithms determine variables

and functional forms on their own. Humans would only need to focus on defining the goal that an ML algorithm is supposed to achieve, which in the case of regulatory oversight involves a set of standards for what should be created and overseen (Lehr & Ohm, 2017).

On the other hand, regulatory oversight can be defined as a method to evaluate the effectiveness and efficiency of regulations to ameliorate the quality of regulations. The possibility of inefficient regulatory making by the government may result in a variety of issues, including increased costs, risks, and the reduction in innovations. As regulators are prone to making mistakes as a result of poor decision-making processes, this may hamper important interests and issues from being addressed in regulations. In short, similar to market failures, governmental failures can also happen in the public sector (Wolf, 1993).

Flawed governmental regulations would entail unsatisfactory results. In some cases, people view that the existence of flawed regulations is better than no regulations, also commonly known as the "third best" outcome (Yew-Kwang, 1983). As regulators accomplish objectives enshrined under regulations by reducing risks and allocating them to other sectors, it is imperative to have legitimate regulatory oversight mechanisms to compensate for possible trade-offs. Moreover, regulatory oversight may amplify regulatory quality as it provides regulators an overview of existing data and past practices, which may help them perform better decision-making. Thus, regulatory oversight can be an instrument to obtain a more satisfying regulatory-making process to maximize the effectiveness of regulations.

The action of conducting regulatory oversight is normally done by regulatory oversight bodies (ROBs), which refer to hierarchical supervision of regulations conducted by executive and legislative actors (Bermann et al., 2008). From multiple perspectives, ROB essentially can be located in various branches of government such as courts or independent bodies (Wolf, 1993). ROB can consist of government officials that are experts in social sciences, law and policy, life sciences, and physical sciences. These experts' function to prevent the establishment of politically distorted regulations, provide transparency of regulatory choices, and inform decision-makers and the public about regulations.

ROBs are obligated to provide political accountability. With the accountability reports given to the President and the public, ROBs must ensure that regulations are capable of implementing programs initiated by their superiors who are also accountable to the public. Accountability is crucial to ensure that ROBs are independent from

interventions of the regulators. Likewise, ROBs must also provide accountability as demonstrated by the fact that ROBs are subjects of oversight from both the President and the public.

Governments can utilize ML in numerous ways. For instance, ML can conduct trial and errors on all possible combinations from datasets until it finds the most accurate and acceptable match (Breiman, 2001). If deployed in regulatory oversight, the aforementioned ability would benefit the government particularly in the fields of time efficiency. Despite ML's ability to provide infinite benefits, its development is faced with key issues in Indonesia. A number of problems in Indonesia include the proper design and development of algorithms, the integration of data between agencies (Yusrizal, 2020), and the provision of adequate user interfaces for the public (Masyhur, 2014). Regardless of the aforementioned issues, Indonesia's regulatory system crucially needs the assistance of ML through AI to ease and manage existing agencies. Such urgency is reflected by the numerous regulatory overlap cases provided below.

Searching for New Approach

Indonesia currently faces "overflowing" regulations. From 2017 to March 2021, Indonesia released 8,038 new regulations at the national level (The Ministry of Law and Human Rights Republic of Indonesia, 2017, 2018, 2019, 2020, 2021). Given that governmental bodies have no obligation to evaluate existing laws when issuing new regulations voluntarily, such circumstances would most likely create overlapping regulations. Accordingly, new regulations may contradict existing and higher regulations.

Indonesia's regulatory chaos is caused by the disordered regulatory system. The first issue comes from the inconsistency between legislative and development planning. Since each administration adopts different guidelines, this results in cost-ineffectivity and dualism in law creation (Bappenas, 2017; Presidential Regulation of The Republic of Indonesia, 2019). Second, as regulations are created at different governmental levels, the duty to monitor and evaluate laws become difficult to be conducted. Thus far, only one mechanism has been initiated by the House of Representatives through the Post Legislative Scrutiny organ, but the organ only focuses on national law; there are no clear procedures on the evaluation of regional, presidential, and other governmental regulations (Implementation of the Law Monitoring Center of the House of Representatives of the Republic of Indonesia, 2020).

Comprehensive oversight is essential for Indonesia's legal reform. Due to the absence of comprehensive oversight, plenty of regulations are still valid despite undergoing amendments; other regulations are no longer used despite not being revoked. For instance, Law No. 32 the Year 1948 on Money Circulation stipulates that transactions exceeding IDR 25.000 must be conducted through banks (Argama, 2019). Despite the fact that this provision is no longer used, it has not been revoked to adapt with the change in currency since 1948. Yet, since there is no obligation to evaluate regulations, the provision is technically valid (Argama, 2019).

With President Joko Widodo's recent instruction to cut off several regulations to support Indonesia's investment activities, it is hard to imagine how Indonesian regulatory makers will cope with the President's instruction. Accordingly, Indonesia's issuance of more than 8,038 regulations since 2017 would take years to review with the present oversight mechanism. Such a problem has been reflected by the Indonesian Omnibus Law, which possesses numerous flaws. Acknowledging the current problems in Indonesia, the incorporation of ML in governmental agencies would enable such agencies to detect existing inconsistencies and legal loopholes in numerous legislations. Consequently, the Indonesian government could expedite its overseeing activities, which would contribute to the consistency between regulations.

Methodology

In conducting this research, the complex and dynamic nature of literary works involved in understanding the incorporation of ML into regulatory oversight required the authors to evaluate the performance of the U.S. as the country has implemented such systems into its federal agencies. By adopting a holistic approach to assess several overlaps of regulations and effectivity of laws created by ML, this approach involved a combination of the following steps:

1. Identifying critical challenges on the legitimacy of integrating ML process; and

2. Reflecting the value or benefits of integrating ML into Indonesian regulatory oversight.

This research employed current Indonesian regulations, such as COVID-19 regulations and ship crew permit regulations, to illustrate the importance of incorporating AI into regulatory oversight. The authors used conflicting regulations regarding Indonesia's large-scale movement restrictions during COVID-19 to reflect

the lack of coordination and disharmony amongst ministries, while conflicting regulations regarding the confusing business technicalities during COVID-19 depict the overlap of derivative regulations. On the other hand, the authors considered the conflicting ship crew permit regulations to comprehend the inefficiency of overlapping authorities in overseeing permits issued in a particular sector.

Results and Discussion

This section discusses existing regulatory problems in Indonesia that could have been tackled by using ML, existing challenges that exists in implementing ML, and how ML can be utilized to solve Indonesian regulatory problems. The authors divided this section into the following sub-sections: Examples of Conflicting Regulations; Key Challenges Required to Legitimize ML; and ML Applications in Regulatory Oversight.

Examples of Conflicting Regulations

The Indonesian government needs to recognize the importance of ML algorithms (Athey, 2017). When conducting regulatory oversight, the government must make decisions based on accurate predictions and oversight results. In conducting their oversight function, they could benefit from ML's superior predictive power and speed. Some of Indonesia's fragmented regulations that could be improved by implementing algorithms are listed below:

Conflicting regulation concerning Indonesia's large-scale movement restrictions during COVID-19

There are two different regulations on how online ride haul (known as *ojek* or *ojol*) should operate during the COVID-19 pandemic based on the Ministry of Health (MoH) and the Ministry of Transportation (MoT) regulations. The MoH Regulation No. 9 the Year 2020 prohibits online transportations to operate, while the MoT Regulation No. 18 the Year 2020 allows online transportations to operate. According to the former, online ride hauls can only be used to deliver goods during the pandemic and not as a mode of transportation for citizens to move from one place to another (The Ministry of Health, 2020). However, the latter stipulates that in the event where motorcycles are to be utilized for public service or personal use, citizens may use online ride haul as a mode of transportation under certain circumstances laid out in the regulation (The Ministry of Transportation,

2020). The different stipulations create ambiguity caused by the lack of coordination amongst the two ministries.

Conflicting regulation concerning confusion on the technicalities of businesses during COVID-19

A similar problem causing legal uncertainty is generated under the Indonesian Ministry of Industrial Circular Letter No. 7 the Year 2020 on Business Sectors Operation Permit during Large-Scale Movement Restrictions and the DKI Jakarta Governor Decree No. 33 the Year 2020 on technical implementation during large-scale movement restrictions. The former upholds that all business sectors are allowed to operate during large-scale movement restrictions, yet the latter only allows 11 business sectors to "operate temporarily".

Conflicting regulation concerning ship crew permit

Under the Indonesian laws, the usage of ship crew requires the issuance of one of the following permits, i.e., SIP3MI (Indonesian migrant worker placement company permit) (Ministry of State Apparatus Utilization and Bureaucratic Reform, 2021), SIUPPAK (manning agency business permit) (Kementerian Perhubungan, 2014), or SIUP (business permit) (Ministry of Fisheries, 2016). The SIP3MI is issued by the Ministry of Labour focusing on the issuance of permits to Indonesian migrant workers. Conversely, the SIUPPAK issued by the MoT focuses on the recruitment and placement of a ship's crew (manning agency) (The Ministry of State Secretary, 2000). Other than that, the SIUP issued by the MoT concerning ship crew placement by manning agencies further complicates the current situation. Due to the three different permits issued by three various ministries, the oversight of the legality of ship crew recruitment becomes challenging.

Key Challenges Required to Legitimize ML

Harmonizing laws is crucial, and the vast development of technology would aid in achieving this. The continuous development of technology will empower us to improve our economic sector and harmonize the currently scattered and unstructured Indonesian regulations. Additionally, Indonesian agencies can utilize technology to harmonize policies between executive bodies. However, the goal of harmonizing Indonesian regulations certainly entail numerous challenges, *inter alia* overlapping regulations and authorities which may affect the development of ML, the need to have synchronized databases, the lack of human resources capable of operating ML, and concerns arising from the absence of human participation.

The overlap of regulations and authorities

The growing demand for legislations to govern modern problems in the midst of ineffective regulatory-making entails regulations being tedious, overlapping, and unclear. To exemplify such, Law No. 12 the Year 2011 on the Establishment of Legislations specifically regulates that "Legislations are written rules consisting of legal norms that are binding and created or established by competent authorities through the procedures that have been regulated under legislations" (The Ministry of Law and Human Rights Republic of Indonesia, 2011). The provision may be seen as ineffective as it repetitively used the term "legislation" in defining what legislations are, which contradicts its objective to define legislations. The aforementioned example of an inefficient definition in regulations may hamper the implementation and development of ML as algorithms would only operate well if regulations are conducive to algorithmic application (Hildebrandt, 2018). If the same problem occurs in other regulations, it is highly likely that ML cannot perform maximally in analyzing existing regulations.

Aside from the previously elaborated example of an ineffective regulation, numerous regulations are also overlapping as exemplified in the section above, therefore contributing to the disharmony and ineffectiveness in the Indonesian laws. If such overlap persists, the government would also face problems when governing the usage of ML.

The overlap of regulations also entails the overlap of authority in overseeing permits and documents subject to regulatory oversight. To understand how regulatory oversight may be better conducted when authorities do not overlap, it is important to observe the U.S. In the U.S., there are specific documents subject to being overseen specifically by the Securities and Exchange Commission (SEC), which are the 10-K and 10-Q documents filed by publicly traded companies (Engstrom et al., 2020). In overseeing the aforesaid documents, the SEC initiates the Electronic Data Gathering Analysis and Retrieval system (EDGAR) (Sakarwala & Tanaydin, 2019) and the Corporate Issuer Risk Assessment (CIRA) (Engstrom et al., 2020). Essentially, the EDGAR provides access to corporate filings by allowing corporate documents to be accessible to the public (Sakarwala & Tanaydin, 2019). Presently, there are more than 20 million corporate documents in the SEC's database (Sakarwala & Tanaydin, 2019), consequently proving how the SEC is able to independently allow corporate documents to be accessible to both the federal agency and the public; the public may then contribute in checking the transparency of systems.

Comparing the SEC's ability to synchronize its documents independently with the Indonesian problem on the ship crew manning agency overlapping authority, we may predict that the oversight of permits by different authorities may entail a longer process of data integration and more complex research to be conducted.

Furthermore, the CIRA in the SEC acts as an algorithmic assessor, which conducts assessments on corporate filings such as 10-K and 10-Q by detecting anomalous patterns in financial reporting (Engstrom et al., 2020). Without the intervention of other agencies, the SEC can utilize and develop the CIRA to expedite its oversight activities, providing independent, certain, and easily trackable assessments. It is important to note that as the SEC oversees 10-K and 10-Q documents independently, the agency is not burdened with the task to constantly cooperate with other agencies to ensure companies' compliance to existing regulations.

Contrarily in Indonesia, observing the problem on ships crew manning agency permits issued by different ministries, Indonesian agencies would be hampered from conducting effective ML-based regulatory oversight due to the issuance of different types of permits and the different authorities available to conduct oversight. Thus, there may be uncertainties on which authority is responsible to oversee which compliance, and uncertainties if one company possesses different permits that are not similar in nature. In maximizing the efficacy of ML-based regulatory oversight, the certainty of documents to be submitted and the authority responsible for conducting oversight are critical to be settled.

The necessity of a synchronized database

Another key element to legitimize ML is to create, utilize, and maintain a database consisting of documents subject to regulatory oversight. The requirement of a synchronized and well-maintained database can be seen from not only the previous example elaborated on the usage of EDGAR by the SEC but also the U.S. Internal Revenue Service's (IRS) practice under the Treasury Department. The U.S. IRS utilizes the Compliance Data Warehouse in analyzing several databases to spot tax fraud possibilities and this integration has been proven to be effective (National Tax Association, 2017; Slemrod, 2016), Indonesia is moving towards the path of establishing an integrated database, marked by the issuance of Presidential Regulation No. 39 the Year 2019 on *Satu Data* Indonesia which regulates *Satu Data* as an integrated data-management service to ease the coordination between central and regional governmental bodies (Presidential Regulation No. 39 Year 2019 on Satu Data

Indonesia, 2019). Despite the initiative to establish an integrated system, the existing Indonesian database in regional and governmental bodies has not been sufficiently maintained. The recent social assistance distribution case reflects a discrepancy in the citizens' database to accept social assistance (Rand et al., 2006). Other than the aforesaid case, a similar case may be seen in the deployment of EvaData; an application used to evaluate legislation by the Indonesian National Law Development Agency. EvaData analyzes only 475 legislations out of the thousands of existing legislations (BPH Nasional, 2021). Hence, the Indonesian government has been proven to not be able to maximize the usage of databases as reflected by the social assistance distribution case and EvaData.

Indonesian agencies have faced extensive problems in synchronizing data between ministries. The Indonesian government has recently merged the Ministry of Research and Technology and the Ministry of Education into the Ministry of Research, Technology, and Education (Newsdesk, 2021). With the merge of the two ministries, the President hopes that there will be major improvements through the utilization of research and technologies. However, the plan may backfire as the merger entails a long period of adaptation. Furthermore, the merger may be ineffective in achieving the previous goals of respective ministries. In the context of the deployment of AI in the public sector, such a merger would create challenges in the incorporation of technological innovations in the fields of regulatory making and oversight.

The lack of human resources capable of operating systems

Aside from the challenges due to the regulatory overlap along with the insufficient and unsynchronized database, Indonesia also faces a lack of human resources. To realize the goal of implementing ML in Indonesian agencies, the quality, quantity, and equal distribution of human resources in each agency must be taken into account (Haryono, 2018). Globally, there is a disparity in humans proficient in utilizing technological innovations and humans that are not well trained in this sector (The Ministry of Law and Human Rights Republic of Indonesia, 2011). Particularly in Indonesia, the 2020 Global Talent Competitiveness Index (GTCI) reflects the scarcity of technicians, associate professionals, and professionals, including professional engineers (Insead, 2018). Indeed, the technical knowledge on technological innovations such as ML is crucial in its incorporation into governmental agencies. Furthermore, the GTCI of government effectiveness in Indonesia ranks 69 worldwide,

which indicates that the quality of public services is still not at its best state (Insead, 2018). Given the scarcity of human resources and the quality of public services, the GTCI reflects that much remains to be done by the Indonesian government; the urgency to train humans to adapt with technological innovations.

Absence of human participation resulting in possibilities of opacity, discrimination, and inaccurate decisions

Another key challenge to consider is the lack of human participation in the decision-making process of systems, which can lead to opacity, discrimination, and the possibility of inaccurate decisions. First, opacity, also known as the lack of transparency, can occur as a result of intentional concealment to maintain state secrecy or even technical illiteracy (Burrell, 2016). Opacity that occurs as a result of intentional concealment of information to ensure state secrecy causes citizens to distrust ML, as they would question how ML can come to a particular decision. To address this, scholars have proposed disclosing ML codes, which can be obtained through regulatory means (Burrell, 2016; Pasquale, 2015). However, governments are unlikely to be willing to disclose ML codes as doing so would allow citizens to understand how to circumvent the system (Yeung & Lodge, 2019). On the other hand, opacity caused by technical illiteracy is very likely to occur as Indonesia lacks technical specialists to operate these systems.

Second, discrimination must be assessed, particularly in the context of administrative law, as systems implementing ML can easily become discriminatory since they rely on data trends and variables (Fitsilis, 2019). According to Fitsilis, the process of selecting variables incorporated into systems is not an objective task. Similarly, despite existing research and data collection standards, data trends may be biased to a certain extent (Olteanu, 2019). Therefore, governments must ensure that variables are chosen objectively and data trends originate from objective data collection. Where is it not possible that variables were chosen objectively, governments must ensure that outcomes are not problematic and are justifiable (Fitsilis, 2019).

Third, decisions produced by these systems may be inaccurate (Yeung & Lodge, 2019), especially if biased variables and data sets arise. In the case of the incorporation of algorithms in agencies, such inaccuracy may have serious effects, leading to citizens' distrust towards the government. More importantly, humans cannot even understand how algorithms arrived at certain decisions, making it difficult to determine whether decisions are biased or not (Fitsilis, 2019). Numerous

scholars have referred to the aforementioned issue as the black box problem (Fitsilis, 2019; Pasquale, 2015; Yeung, 2018). Scholars have argued that there are several ways to address the possibility of inaccurate decision, such as granting citizens the right to explanation, but its feasibility has been widely questioned (Fitsilis, 2019). Perhaps one of the ways to mitigate this problem from arising in regulatory oversight is to involve humans in decision making, whereas ML will only be used to identify potential regulatory problems.

Risks and uncertainties stemming from concerns about the lack of human involvement in ML necessitates the establishment of regulations to govern systems and governments that operate them. Inevitably, regulatory gaps, also known as regulatory disconnection, will emerge as a result of the immense growth of technology (Brownsword, 2008). This inevitability of regulatory gaps should not be seen as an impossibility to regulate algorithms (Murray, 2008). Governments must regulate these systems and ensure adherence to applicable administrative laws to manifest the principle of legal certainty as one of the principles of good governance of state administration. Hence, governments may provide the baseline to address issues of opacity and potential discrimination via regulating the fulfillment of citizens' rights to appeal and the obligation of state agencies to adhere to principles of good governance of state administration, such as openness and impartiality. In regulating technologies, the government must resort to existing frameworks that govern the usage of AI, such as the OECD Recommendation of the Council on AI (OECD, 2020), which requires AI actors to ensure the fairness, transparency, responsible disclosure, security, safety, and accountability of systems.

ML Applications in Regulatory Oversight

The incorporation of ML will undoubtedly increase the effectiveness of agencies, especially given that ML covers a wide range of subjects, starting from general to specific, as evidenced by their usage in math and even disease diagnosis (Girasa, 2020). In the current developing era of laws, humans may use ML to untangle complex problems such as creating legal opinions (Hukum Online, 2018) and matching clients with potential lawyers (Toews, 2019). In this section, the authors discuss ways in which ML may help the Indonesian regulatory process and pinpoint how ML classifiers and algorithmic formula may be deployed.

The utilization of ML will certainly help in lowering budgets required to oversee the effectivity of regulations subject to amendments. The budgetary process absorbs massive national budgets. Annually, the House of Representatives of the Republic of Indonesia allocates IDR 323,40 Billion to conduct the national legislative program; the discussion of bills to be prioritized (Indonesian Corruption Watch, 2019). Considering the outcome of the current national legislative program, it would be cost-effective to invest in the deployment of AI, as it would indeed save the budgets required to conduct conventional oversight. Additionally, the adoption of AI would aid in achieving the yearly target of legislative products bearing in mind that the DPR RI is relatively slow and not transparent during the discussion process (Abdiansyah et al., 2019).

Nowadays, ML is being used on a large scale to create regulations. To illustrate, U.S. federal agencies constantly use ML to analyze the weaknesses of agencies and their implications and program them to provide recommendations to enhance the quality of regulations issued. Seeing such a model from the U.S., if Indonesia wants to adopt ML to fix the current scatter of regulations, Indonesia must propose legal products that are urgently needed by the society using algorithm analysis. Thus, Indonesia will be able to expedite the establishment of laws, as ML may be utilized to oversee the effectiveness of existing legislations and determine which issue is crucial to be addressed first.

A concrete example that can be taken from the U.S. that can be used to help identify overlapping Indonesian regulations would be the U.S. Department of Health and Human Services' (HHS) use of ML classifiers (Engstrom et. al., 2020). The HHS has utilized ML classifiers for internal management to evaluate reports and determine whether grant applications are likely to be accepted or rejected. Similarly, Indonesian agencies may implement ML classifiers to evaluate and determine whether regulations overlap with other Indonesian regulations, or whether there exist any legal loopholes.

The usage of ML classifiers may also address the lack of certainty about which law still applies and which no longer applies, as well as the overlapping regulatory provisions. The deployment of ML in regulatory oversight would insulate citizens from any confusion regarding the applicable laws, as these algorithms ideally would enhance the quality of regulations. In achieving this goal, ML may be used before the drafting of newer regulations by identifying relevant and applicable laws. Regulators may then easily identify the validity of certain laws and the existing legal loopholes that must be covered by the newer legislations. Moreover, this function may as well help regulators to determine whether amendments are

urgent. Certainly, this particular capability of ML algorithms may prevent regulations from further overlapping one another, which would contribute to the decrease of legal uncertainty.

Supplementally, another problem that Indonesia faces is the discrepancy of laws. In tackling this issue, ML can assist regulators in identifying faults in regulations. Thus, when one regulation is deemed to conflict with the other regulation and potentially create a discrepancy of laws, ML may be deployed to not only identify but provide solutions to these problems.

Another issue that can be solved by AI would be the simplification of authority. The delegation of authority amongst agencies to create implementing regulations raises ambiguity as implementing regulations may contradict its main regulation. Since there might be unclear boundaries on the authority responsible for certain sectors, this may confuse the public as users of law (National Tax Association, 2017). Moreover, this condition is worsened by the existing egocentrism amongst agencies which contributes to the ambiguous authority (Hukum Online, 2018).

The overpopulation of regulatory agencies in a regulatory environment would cause a detrimental effect on the coherence of regulatory goals set up by the central government. To tackle this, a centralized regulation system through ML may allow the government to receive a comparison of performances between agencies, thus enabling the most efficient agency to be the responsible party in governing a particular sector. Alternatively, another solution would be to combine all just and valid provisions from each regulation and compile it using an easy-to-understand language. Presently, reference to the If This Then That (IFTTT) formula may be made (Hildebrandt, 2018). The IFTTT will depend on values, standards, and rules.
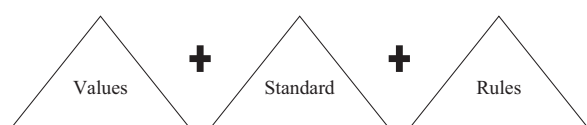

Figure 1 Explains code-driven regulation providing decisional logic as values, where the entry would be predicted and filtered using standards. The output will be safeguarded using rules

As seen above, engineering concepts can help to explain how using a simple algorithmic formula would reduce the risk of fragmented regulations. In our case, assuming that the previously mentioned Indonesian ministries and the Regional Government apply this

scenario, there should be no future regulatory clashes similar to issues related to ship crew permit and online transportation services problem during COVID-19. Thus, the burdens of agencies will be lifted as instead of issuing decisions individually, they can simply collaborate through an integrated AI-system to maximize their performance with minimal costs (Lee et al., 2019). In incorporating the IFTTT formula, agencies must also provide sufficient regulations to address several concerns raised above, i.e., opacity, discrimination, and inaccurate decisions. If the government can successfully incorporate the IFTTT formula while ensuring legal certainty, ML will optimize agencies' unsatisfactory performance of agencies at lower budgets.

Conclusion and Recommendation

Indonesian agencies must first be equipped with the technical capacity to incorporate AI. Though in practice most agencies rely on private contractors in creating an integrated system, the internal organs of such agencies need to have the expertise in building these systems. As Indonesia is the 4th biggest Internet user globally, governmental agencies must adapt to these circumstances by adopting AI in these agencies. Thus, in incorporating AI into governmental agencies, these agencies must create impenetrable systems, designed in compliance with the Indonesian regulatory system in an accountable manner.

This conversation on utilizing ML to address Indonesia's fragmented regulatory issues is essential. The Omnibus Law was recently enacted to simplify existing regulatory structures; however, a similar result can be achieved more effectively by utilizing ML algorithms that select applicable regulations and simplify existing regulations before establishing new legislations. Indonesian agencies can produce derivative regulations automatically from the Omnibus law through ML using the formula IFTTT. Nonetheless, major improvements must be conducted in developing ML, including funding, agency's technical capacities, IT systems, and technical guidance. With the aforesaid enhancements, the successful development of ML can be ensured, paving the way for a more promising future for the establishment of new legislation. Aside from that, if the government implements AI-based regulatory oversight, it must also ensure that the government can determine the right type of AI to be implemented, i.e., natural language processors, ML, or other types of AI, and in the case of ML, whether it must be supervised or

unsupervised, and whether they are classifiers or learners. In any case, the government may begin by deploying ML classifiers to help oversee regulatory overlaps, as this is less risky than directly deploying ML learners to issue decisions. Gradually, the government can incorporate ML learners to benefit from a more advanced feature of AI.

Apart from ameliorations that must be done to develop AI, the central government is also at a crossroads with technology. If ML is properly managed, the government can improve its regulatory quality. Contrarily, the poor management of these systems in the public sector will entail future consequences from the outputs of a mismanaged ML, which tends to be non-intuitive. These consequences include a lack of transparency, confidential information leakage, and the rise of biases and arbitrariness, which would contradict the goal of regulatory oversight.

Conclusively, there is plenty of work to be done, including resolving regulatory overlap, the absence of a well-maintained database, the lack of human resources skilled in using technological innovations, and issues arising from the lack of human intervention. The Indonesian government should punctiliously consider whether they can unfold the potential of ML, which remains a mystery, since the answer depends on a case per case basis. Given the prevailing challenges, the Indonesian government must decide whether to begin integrating technologies into the law and policy-making processes at the individual level or augmenting the capacity of its governmental institutions at the institutional level. The incorporation of technologies into law and policy-making processes would entail expenditures in the fields of research and development due to the recruitment of experts in the area, the development of such technologies, and the training of individuals who will operate these technologies; all aspects require a well-regulated framework, which may also necessitate the establishment of oversight bodies. As it appears, the debate on addressing regulatory issues by applying AI will never end; AI developments require well-established regulatory frameworks, yet one of the goals of deploying AI is to address regulatory frameworks that are not well-established.

Conflict of Interest

The authors declare that there is no conflict of interest.

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