



Research article

The development of national *waqf* index in Indonesia: A fuzzy AHP approachYuliani Dwi Lestari^{a,*}, Raditya Sukmana^b, Irfan Syauqi Beik^c, Mahfud Sholihin^d^a Institut Teknologi Bandung, Indonesia^b Universitas Airlangga, Indonesia^c Institut Pertanian Bogor, Indonesia^d Universitas Gajah Mada, Indonesia

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ABSTRACT

As one of the alternative forms of Islamic Social Finance, *Waqf* could be potentially developed to achieve the Sustainable Development Goals in Indonesia, particularly providing a major solution for socio-economic problems, such as poverty, improving education quality, and giving a lifelong learning opportunity, unemployment, and many more. But, unfortunately, due to the absence of a universal standard of *Waqf* evaluation, the implementation of *Waqf* in Indonesia has not been optimal. Therefore, this study proposes the National *Waqf* Index (*Indeks Wakaf Nasional* or IWN) for improving the governance system and measuring *waqf* performance at national and regional levels. Through literature review and focus group discussion (FGD), this study develops six factors, namely regulatory (with three sub-factors), institution (with two sub-factors), process (with four sub-factors), system (with three sub-factors), outcome (with two sub-factors), and impact (with four sub-factors). Using the Fuzzy Analytical Hierarchy Process (Fuzzy AHP) involving experts from government, academic, and industry, this study finds that the priority of IWN is a regulatory factor (0.282) followed by institution factor (0.251), process factor (0.190), system factor (0.156), outcome factor (0.069), and impact factor (0.050). The findings from this study will strengthen the existing literature in *Waqf* and be used to develop the governance system to improve performance.

1. Introduction

Islamic finance has the potential to be a financing solution for governments to advance their SDGs (Sustainable Development Goals) implementation since it can fill the SDGs funding gap, which cannot be closed by traditional development aid alone [1]. The current Islamic social finance, which is applied nowadays, can be divided into three main categories, namely (i) traditional Islamic instruments based on philanthropy (e.g., *zakat*, *sadaqah*, and *waqf*); (ii) cooperative-based foundations (e.g., *qard* and *kafalah*); and (iii) other modern forms of Islamic financial services (e.g., Islamic microfinance, *Sukuk*, and *takaful*) [2]. Additionally, *zakah*, *sadaqah*, *waqf*, and *qard al-hasan* are the redistributive instruments of Islamic finance that can enhance financial inclusion by poverty alleviation [3].

Waqf has been known in Indonesia since Islam entered Indonesia, from the sultanate era, colonial era, to the independence era [4]. The history records that *waqf* contributed to Muslim societies' educational and welfare development [5]. The *awqaf* (i.e., the plural

* Corresponding author.

E-mail address: yuliani.dwi@sbm-itb.ac.id (Y.D. Lestari).

form of *waqf*) also contributed to flora and fauna preservation and environmental protection [6]. Initially, *waqf* was mainly based on fixed assets (e.g., land and buildings) in Indonesia. Then in 2004, the first regulation of cash *waqf*, Act No.41/2004, emerged and justified the basis of cash *waqf* on current assets (e.g., money, jewelry), which was supported by government regulation No. 42/2006 [7]. Indonesia has 52,112.50 ha of land *Waqf*. Among them, 19,696.18 have certification. The other 32,416.31 do not have the certificate [8]. The other examples of practices and management of *waqf* in Indonesia are as follows: (i) In the city of Pekanbaru, the management and development of productive *waqf* are conducted by using traditional management system [9], (ii) in the city of Pekalongan, the Muslimin foundation are doing productive *waqf* model by renting out hotel rooms, shop houses, meeting rooms, shops, and using some of the rooms in the hotel as business premises, such as internet cafes and restaurants [10], (iii) in Nusa Tenggara Barat province, *waqf* association *Lembaga Amil Zakat Dompot Amal Sejahtera Ibnu Abbas* (DASI) manages the *waqf* land and building in the form of several programs, such as independent Islamic boarding house, *tahfidz* house, and benefit land *Shariah* [11].

Despite its diverse applications, *waqf*'s contributions are still not as massive as other types, such as *zakat*. It was recorded that in 2020, cash *waqf* only reached IDR 391 billion. In contrast, the nominal *zakat* collected in the same year was IDR 10.2 trillion [12]. When *waqf* management is conducted properly, it increases the income according to its potential. At the same time, it becomes a major solution for socio-economic problems. According to Nur Syam, Secretary-General of Indonesian Ministry of Religious Affairs, Indonesia has six challenges related to *waqf*: (1) data validation of *waqf* asset; (2) the increasing in *waqf* money collection; (3) *waqf* land certification; (4) *waqf* land disputes, which require mediation, advocacy, and *ruislag* of problematic *waqf* land; (5) the utilization *waqf* asset for economic activities that add value to the welfare of humanity; and (6) the capacity and the sense of responsibility of *nazhir* [13].

Moreover, the use of *waqf* as a supporting tool of implementation still faces several limitations. There are needs for standards and principles governing the management of *waqf* assets and new institutional arrangements that build on pre-existing initiatives to move from current models of parallel financing to actual 'Sustainable Development Fund' (SDF)-related financing [1]. This study proposes the National *Waqf* Index (*Indeks Wakaf Nasional or IWN*) to provide an overview of the model framework and its constituent factors, sub-factors, and weight values to describe the level of importance. It aims to a measurement framework to develop the governance system of *waqf* at the national or regional level by using Fuzzy AHP involving experts from government, academics, and industry sectors.

This study consists of five sections. The first section describes the background, phenomena in the context of *waqf*, and underlining the gap that will be filled through this study. The second section describes the literatures about *waqf* in Islamic finance and national *waqf* index framework. The third section describes the methodology encompasses of fuzzy analytical hierarchy process, descriptions of expert profile and FGD mechanism. The fourth section presents the finding from data analysis, as well as the validation from the experts through FGD. Suggestions on how to implement the IWN framework is also provided in this section. The final section is conclusion that describes the contributions of this study and future research.

2. Literature review

2.1. *Waqf* in islamic finance

Islamic finance began as a small cottage industry in some Arab countries in the late 1970s and distinguished itself from conventional finance because of absolute compliance with Islamic law principles. Islamic finance has become a solution for the contemporary financial system with its core risk-taking principle [14], which faces trust issues between stakeholders and financial institutions [15]. In February 2014, the term Islamic Social Finance (ISF) was introduced through the Annual Islamic Social Finance Reports by Islamic Research and Training Institute [16] with three categories, namely, traditional Islamic instruments based on philanthropy (e.g., *zakat*, *sadaqah*, and *waqf*), cooperative-based foundations (e.g., *qard* and *kafalah*), and other modern forms of Islamic financial services (e.g., Islamic microfinance, *Sukuk*, and *takaful*) [2].

Zakat, *sadaqah*, and *waqf* are categorised as philanthropy because they relate to social welfare, such as alleviating poverty. Poverty can be defined (in the standard materialistic terms) as 'a state of not having sufficient money to meet one's basic needs' [17]. The cause of poverty ranges from a shortcoming in the administration of income support to the social and economic system [18]. *Zakat*, *sadaqah*, and *waqf* are different in their meaning, structure, mode of collection, and distribution [19]. *Zakat* is obligatory with a fixed amount spent in one year; it needs to be discharged as soon as possible, either in cash or stock. The payment liability is under the *sharia* description. *Sadaqah* is nonetheless voluntary. It is not fixed or invested but is discharged according to need and mandate. *Sadaqah* can take the form of any asset and can be given by anybody without any restriction. Finally, *waqf* is generally capitalised, invested on social or economic assets, and informed of endowment and long term [19].

Waqf is an Arabic word meaning 'to hold' or 'stop', whose execution is voluntary to worship and get closer to The God and become part of Islamic social finance. The objective of *waqf* can be seen in spiritual terms (i.e., provides a vehicle for a *waqif*) and in socio-economic perspective (i.e., giving a lot of benefit toward an underprivileged section in society in particular and for the whole community in general) [20]. A *waqf* asset cannot be disposed of (i.e., its ownership cannot be transferred). Only its benefit is used for specific purposes, which are primarily charitable [21]. *Waqf* consists of four basic components – *waqif* (i.e., the person who donates the *waqf*), *mauqif* (the *waqf* item), *mauqif alaih* (i.e., the person who receives the benefit of *waqf*), and *sighah ailaihi* (i.e., the declaration of *waqf*). Based on its type, *waqf* is divided into two types: movable *waqf* properties (e.g., cash *waqf*, share *waqf*, and *sukuk waqaf*) and immovable *waqf* properties (e.g., land and building) [22].

Another component of *waqf* is *mutawalli* or *nazhir*. A *mutawalli* is appointed by the *waqif* (i.e., the founder of *waqf*) and is responsible for managing the *waqf* property for the benefit of recipients under the terms and conditions laid down by the *waqif* [23]. According to

article number 9, Act No. 41/2004, in the Republic of Indonesia, *waqf nazhir* is divided into three individual types organisations and legal entities. *Nazhir* has several duties (article 11, Act No.41/2004) such as (i) administering *waqf* property, (ii) managing and developing *waqf* property as per its purpose, function, and allotment, (iii) monitoring and protecting *waqf* property, and (iv) reporting the implementation of duties to the Indonesian *waqf* agency.

Furthermore, articles 42 and 43, Act No. 41/2004, also obligate *nazhir* to manage and develop *waqf* property in accordance with its purpose, function, and allotment, and it must be carried out productively without violating *shariah* principles. The Indonesian *Waqf* Agency or *Badan Wakaf Indonesia* (BWI) was established according to Act No. 41/2004 about *waqf* to develop and promote *waqf* in Indonesia. BWI exists to foster *nazir* so that *waqf* assets are managed better and more productively to benefit society, either in social service, economic empowerment, or public infrastructure development [24]. The management and development of *waqf* property can be done productively, for example, by fundraising, infestation, investment, production, partnerships, trade, agri-business, mining, industry, technology development, building construction, apartments, offices, education, health facilities, and businesses following *shariah* [11].

2.2. National waqf index framework

In practice, the potential of *waqf* has not reached its maximum productiveness. Issue such as the lack of competence and *nazhir* professionalism are the significant internal *waqf* management problems, which can be solved by guidance and mentoring [25]. Meanwhile, the major external problems are less supportive regulation and the lack of societal understanding about *waqf*, which can be solved by socializing and educating about *waqf* and optimizing the role of BWI through regulation improvement. According to Islamic Social Sector Development Initiatives [26], there are five major areas (dimension) of *Waqf* Core Principles (WCP), namely:

- Legal foundations: responsibilities, objectives, powers, independence, accountability, and collaboration; *waqf* asset classes; permissible activities; licensing criteria; transfer of *waqf* management; and takeover of *waqf* institution and assets.
- *Waqf* supervision: *waqf* supervisory approach; *waqf* supervisory techniques and tools; *waqf* supervisory reporting; corrective and sanctioning powers of *waqf* supervisor; consolidated supervision; and home-host relationships.
- Good *nazhir* governance.
- Risk management: risk management; collection management; counterparty risk; disbursement management; problem *waqf* assets, provisions, and reserves; transactions with related parties other than the beneficiaries; country and transfer risks; market risk; reputation and *waqf* asset loss risks; revenue/profit-loss sharing risk; and disbursement risk.
- *Shariah* governance: operational and *Shariah*-compliance risk; *shariah* compliance and internal audit; financial reporting and external audit; disclosure and transparency; and abuse of *waqf* services.

Although the above guideline is relevant as a reference in *waqf* management, particularly in reconstructing the accountability of *waqf* institutions in Indonesia, it does not cover the aspect of impact measurement. Study from Refs. [27,28] underlined that all types of *waqf*, including cash *waqf*, could be an effective tool for social welfare if utilised synthesising models to address the current contexts. It indicates *waqf* can improve well-being, religious aspect, health, and education [19] and enhance societal development [29].

Further, a study from Ref. [30] underlined the potential impact of *waqf* on the microfinance sector, the development of small and medium-sized enterprises, education, and poverty alleviation through a literature review. In this regard, optimal *waqf* management needs to be accompanied by impact measurement. Knowing the impact aspects/factors and how to measure them will make it easier for stakeholders to make strategic and tactical decisions related to *waqf* management. For that reason, this study develops National *Waqf* Index or *Indeks Wakaf Nasional* (IWN) framework that encompasses six factors: regulatory factor, institution factor, process factor, system factor, outcome factor, and impact factor.

2.2.1. Regulatory factor

The first factor is the regulatory factor, which refers to the government's strategy support for developing *waqf* membership in Indonesia (or in the regions). Three sub-factors reflect the regulatory factor: (1) regulatory support, (2) government budget support, and (3) coaching support by the authorities. The regulatory support is critical since it can help develop and grow *waqf* in Indonesia by fostering public confidence in *waqf*, encouraging donors and volunteers, and promoting ethical and proactive behaviour *mutawallis* [6]. The existence of Act No.41/2004 and Government Regulation No.42/2006 reflects how Indonesia's government supports the implementation of *waqf*, which involves many stakeholders. For example, article 49, clause 2, Act No.41/2004, states that the Indonesian *Waqf* Board (BWI) may cooperate with central and regional government agencies, community organisations, experts, international agencies, *Majelis Ulama Indonesia* (MUI), and other parties as deemed necessary.

Furthermore, a study from Ref. [31] underlined the priority problems related to the management of *waqf*. The regulators' lack of state budget for *waqf* certification has become the cause of *waqf* property legalisation failure. In Indonesia, the rules regarding budget support are reflected in article 58, Act No.41/2004, which states that the government should assist BWI with operational costs to carry out duties. A study from Ref. [31] also pointed out the lack of coordination among the stakeholders. Thus, improving *waqf* management from the regulators' side (top-down) and the budget support is important to ensure the engagement of all stakeholders. Meanwhile, the lack of *nazhir* competence has become another critical problem in *waqf* management. These findings show the urgency of coaching support from the authority.

2.2.2. Institution factor

The second factor is the institution factor, which relates to the *nazhir* entities, the individual and institutional levels involved in *waqf* management. In this study, the institution factor is represented by *nazhir*'s management quality and *nazhir* status. For example, in Asia, *Majlis Ugama Islam Singapore* (MUIS) has already achieved ISO 9001 for its management and administration *waqf*, which helps them constantly strive towards an excellent management system [32]. Therefore, it reflects that *nazhir*'s management quality has become critical. Further [31], underlined that *nazhir* status is also important. The status of *nazhir* has been recommended to be full-time, and the number/proportion in each area must be ensured to be adequate to achieve optimal *waqf* management. For instance, article 4, clause 5, Act No. 42/2006, states the provision of individual *nazhir* status. It must be a group consisting of at least three people, and one of them should be the leader. This effort is a mechanism of efficiency, accountability, transparency, monitoring, and control, which can help support the industry's consistent and sustainable development and help create effective *waqf* management [20].

2.2.3. Process factor

The third factor is the process factor, which relates to the business processes of *waqf* practices. This study considers four sub-factors to reflect process factors for IWN calculations: collection, management, distribution, and reporting. Regarding the collection, according to article 11, Act No. 41/2004, *nazhir* has four tasks related to *waqf*: (1) administering *waqf* property, (2) managing and developing the price of *waqf* objects according to their purpose, function, and allotment, (3) supervise and protect *waqf* property, and (4) report the execution of duties to the *Badan Wakaf Indonesia* (BWI). Additionally, article 42, Act No. 41/2004 also stated that *nazhir* should manage and develop *Waqf* assets according to its purposes, function, and designation that can be measured from the accumulation of *waqf* assets, growth, and surplus.

The next sub-factor is reporting. According to articles 7 and 11 (clause 3, point c, sub-point 6) Act No. 42/2006, the organisation (i.e., operates in social, education, and/or Islamic religious sector) and legal entity (i.e., the legal entity of *nazhir* that already is registered on Ministry and BWI through local Religious Affairs Office) must have the declaration letter stating their willingness to be audited. Thus, the accountability of *mutawalli* can be seen on two sides. First, human beings are accountable to Allah (God), and second, *mutawalli* is accountable to *waqif* as there is a contract between them [33,34]. Moreover, *waqf* accounting may also enhance *waqf* institutions' transparency and accountability by disclosing their *sharia*-based finance and their investment of *Waqf* funds [35,36]. Overall [20], pointed out that the honesty, transparency, and management skill of *mutawallis*, which supported the accountability element, will enhance the attractiveness and trustworthiness of *Waqf* institutional administration.

2.2.4. System factor

The fourth is the system factor (i.e., indicator that relates to matters that support the management of *waqf* by *nazhir*), which covers three sub-factors, including *waqf* land legality, *Sharia* compliance, and the management of public information. Article 39, Act No.42/2006 explains the procedure to register a *waqf* land certificate based on *Waqf* Pledge Deed '*Akta Ikrar Wakaf (AIW)*' or Deed in Lieu of Deed of Pledge of *Waqf 'Akta Pengganti Akta Ikrar Wakaf (APAIW)*'. The validity of the *waqf* certificate becomes important because it can provide the legality and legal force ownership to the parties whose identities are mentioned in the *waqf* land certificate, prevent disputes, and become strong evidence [37].

Article 2, Act No. 41/2004 emphasizes that *waqf* is legitimate if only its implementation is as per *sharia*. This regulation is supported by article 43, clause 1, Act No. 42/2004 that regulates the obligation of *nazhir* to manage and develop *waqf* property, which must follow *sharia* principles. Consistently, the Malaysia-based Accounting and Auditing Organization for Islamic Financial Institutions' (AAOIFI) *sharia* Standard No. 33 (SS 33) on *waqf* has become a guide for identifying whether the financial reporting practices of organisations managing *waqf* are based on *sharia* or not [35]. Technically, this *sharia* compliance is related to the *Sharia* Supervisory Board (DPS) in *nazhir* institutions.

The last sub-factor is public information management, which relates to the investigation of public information by BWI. According to article 38, Act No. 41/2004, the minister and BWI announced the registered *waqf* property to society. This regulation is supported by article 61, clause 2, Act No. 41/2004, which obligates BWI to announce its annual report to society. The annual report contains BWI's duties, accountability information, audited by an independent audit agency and submitted to the minister.

2.2.5. Outcome factor

The fifth factor is the outcome factor, relating to outputs from *waqf* management by *nazhir*. It is represented by two sub-factors, namely productive *waqf* ratio and *Mauquf Alaih* scope. In recent decades, the productive *waqf* is usually linked to religion and the socio-economic system of Muslim communities, Islamic business, and social purposes [38]. Consistently, article 43, clause 2, Act No. 41/2004 emphasizes *waqf* property's product management and development. Therefore, this article supports article 43, clause 1, Act No. 41/2004, about the management and development of *waqf* assets by *nazhir* according to *sharia* principles.

For the *Mauquf Alaih* scope, article 5, Act No. 41/2004 stated the function of *Waqf* as creating potency and economic benefit from *waqf* property for the interest of worship and promoting the general welfare. This regulation is supported by article 22, Act No. 41/2004. It lists the scope of *waqf* usages, such as facilities and activities of worship, education, health, assistance to the poor, abandoned children, orphans, for the scholarship, people's economic progress and improvement, and the other public welfare advancements that do not conflict with *sharia* and regulator's legislations. For example, *Dompot Duafa*, as one of the Indonesian *waqf* institutions, has an integrative process of accountability practices, which encompasses fulfilling upward and downward accountabilities and involves the commitment to preserve organisational values [34].

2.2.6. Impact factor

The last factor is the impact factor, which relates to the impact of *waqf* on community welfare and the provision of *waqf*-based public services. This study selects the Center of Islamic Business and Economic Studies (CIBEST) index, Human Development Index, *Indeks Pembangunan Manusia* or Human Development Index (IPM), independence index, and infrastructure as the sub-factor of impact factor. CIBEST model was designed and developed by Ref. [39] with the base concept that poverty should be measured holistically and comprehensively (i.e., material and spiritual aspects should be considered). Therefore, the ability to fulfil basic spiritual and material needs is divided into four quadrants in the CIBEST model (see Fig. 1). The figure shows four quadrants: (i) Quadrant 1: A household can fulfil both needs, this is called a welfare household, (ii) Quadrant 2: A household can only fulfil spiritual needs, this is called material poverty, (iii) Quadrant 3: A household can only fulfil material needs, this is called spiritual poverty, (iv) Quadrant 4: A household can fulfil neither material nor spiritual needs, this is called absolute poverty.

The IPM explains how the population can access development outcomes in terms of income, health, education, etc. The IPM was introduced by the United Nations Development Program (UNDP) in 1990 and is published regularly in the Annual Human Development Report (HDR). It is formed by 3 (three) basic dimensions of a long and healthy life, knowledge, and a decent standard of living. Therefore, the IPM is an important indicator to measure success in improving the quality of human life (community/population). In addition, it can determine the ranking or level of development of a region/country. For the Indonesian context, IPM is strategic data because apart from being a measure of the government’s performances, HDI is also used as one of the allocators in General Allocation [40].

Furthermore, one of the functions of *waqf* is to help alleviate poverty. According to Ref. [21], poverty covers four problems: low income, poor health, poor education, and lack of infrastructure. Here, *waqf* has a function to help the poor by giving aid for their expense at least on one problem. Hopefully, if one problem of poverty is already solved, it will later solve the other problem. So, in this case, we chose the independence index (i.e., the measurement of the independence of the *Mauquif’ Alaih* household is carried out by looking at whether the *Mauquif’ Alaih* household has a permanent job, business/business, and savings) as a sub-factor of *waqf* impact.

Infrastructure was chosen as one sub-factor of impact to monitor *Waqf* usage and see the portion of *waqf* infrastructure to the overall infrastructure in a region. According to article 22, Act No. 41/2004, *waqf* property is only designated for: (1) worship facilities and activities, (2) education and health facilities and activities, (3) assistance to the poor, abandoned children, orphans, scholarship, (4) progress and improvement of people’s economy; and (5) other public welfare advancements that do not conflict with *sharia* and regulator’s legislations.

Overall, the proposed framework of the National Waqf Index or *Indeks Wakaf Nasional* (IWN) in this study covers six factors that consist of 18 sub-factors. Each factor and sub-factor are arranged based on the literature and mainly on the existing constitution in Indonesia and validated through FGD with experts from the government, academics, and industry sector. The IWN factor and sub-factor summary is presented in Table 1, along with their definitions and references. At the same time, the IWN framework is described in Fig. 2.

3. Methodology

3.1. Fuzzy analytic hierarchy process

The analytic hierarchy process (AHP) is a robust and flexible multi-criteria decision-making tool for dealing with complex decision problems. This method divides a complicated system into a hierarchical system of elements, including objectives, evaluation criteria, and alternatives [46]. In this case, AHP models a problem with a hierarchy structure to represent that problem and makes pairwise comparisons to establish relations within the structure. Although the AHP method provides a systematic way to compare importance levels, the use of crisp value in AHP can confuse decision-makers since, in many practical cases, the human preference model is uncertain. As a result, the decision-makers might be reluctant to assign crisp values to the comparison judgments [47]. In reality, while

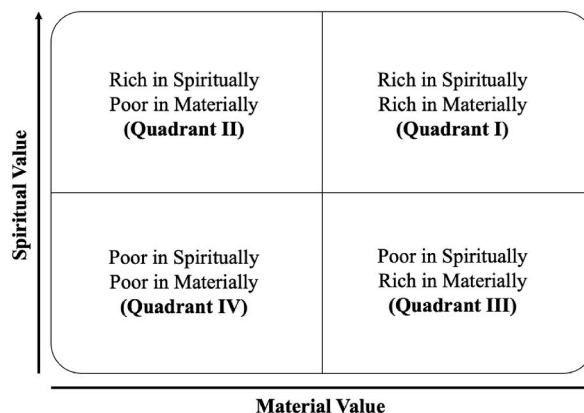


Fig. 1. Cibest quadrant [39].

Table 1
IWN factor and sub-factor.

Primary Factor	Sub-factor	Definition	Article References	Regulation References
Regulatory Factor	Regulatory support	Availability of regulations in <i>waqf</i> management	[6,7]	Law 41/2004 Article 49 Section 2
	Government budget support	Regional expenditure budget support for regional BWI operational costs	[31,41]	Law 41/2004 Article 49 Section 2 & Article 59
	Coaching support by the authorities	Guidance regarding <i>waqf</i> by local authorities	[22,31]	Law 41/2004 Article 13, 63, and 64
Institution Factor	Nazhir management quality	The quality of <i>nazhir</i> 's management as measured by ISO certification	[31,32]	Waqf Core Principle (WCP) 1 and 29
	Nazhir status	Percentage of <i>nazhir</i> institutions from all <i>nazhir</i> in the region	[20,31]	Government Ordinance/Regulation 42/2006 Article 4 Section 5
Process Factor	Collection	Indicators relating to the accumulation of <i>waqf</i> assets collected by <i>nazhir</i>	[21,42]	Law 41/2004 Article 11 and 42
	Management	Indicators related to the growth of <i>waqf</i> asset accumulation	[21,42]	Law 41/2004 Article 12
	Distribution (net assets)	Relating to the level of profit or surplus of <i>waqf</i> management by <i>nazhir</i>	[21,42]	Law 41/2004 Article 12
	Reporting	Relating to the quality of reporting by <i>nazhir</i> institution <i>waqf</i> , with proxies in the form of <i>nazhir</i> reports audited by the Public Accounting Office (<i>KAP</i>)	[20,33–36]	Government Ordinance/Regulation 42/2006 Article 7 Section 3 point 3 sub-poin 6; Article 11 Section 3 poin 3 sub-poin 6; PSAK 112
System Factor	The legality of <i>waqf</i> land	Relating to the level of certification of <i>waqf</i> land	[31,37]	Government Ordinance/Regulation 42/2006 Article 39
	Sharia compliance	Relating to the presence of the <i>Sharia</i> Supervisory Board (<i>DPS</i>) in <i>nazhir</i> institutions	[35]	Government Ordinance/Regulation 41/2004 Article 2 & Article 43 Section 1
	Public information management	Relating to the investigation of public information by BWI as mandated by Article 61 of the <i>Waqf</i> Law No. 41/2004	[31,43]	Government Ordinance/Regulation 41/2004 Article 38 & Article 61 Section 2
Outcome Factor	Productive <i>waqf</i> ratio	Relating to the relative comparison of productive <i>waqf</i> towards all <i>waqf</i>	[21,38,42]	Government Ordinance/Regulation 41/2004 Article 43 Section 2
	<i>Mauquif' Alaih</i> scope	Relating to the range of benefits of <i>waqf</i> to the community	[32,34]	Government Ordinance/Regulation 41/2004 Article 5 & Article 22
Impact Factor	CIBEST index	An index that measures the level of community welfare at the household level by grouping poverty into two types, namely material and spiritual poverty	[39]	National Zakat Index (IZN)
	Modification of IPM index	The indicator that measures the health and education index	[44]	National Zakat Index (IZN)
	Independence index	The measurement of the independence of the <i>Mauquif' Alaih</i> household is carried out by looking at whether the <i>Mauquif' Alaih</i> household has a permanent job, business/business, and savings	[21]	National Zakat Index (IZN)
	Infrastructure	Relating to the portion of <i>waqf</i> infrastructure to the overall infrastructure in a region	[41,45]	Government Ordinance/Regulation 41/2004 Article 22

comparing, people are concerned about the linguistic scales of 'between', 'around', 'close to', or 'approximately'. Therefore, they feel more confident giving interval judgments than expressing their judgments in single numeric values [48]. Thus, the application of fuzzy AHP can overcome this issue by setting the AHP scale into the fuzzy triangle scale to accessed priority. Referring to study from Ref. [49], the following part describes the steps of Fuzzy AHP.

Step 1. Develop the structure of the AHP model, which consists of criteria and sub-criteria as provided in Fig. 2.

Step 2. Conduct a pairwise comparison. Here, each pairwise response is transformed into a fuzzy number through the formal scale system, which converts linguistic terms into fuzzy numbers following the study of [50], as shown in Table 2. For instance, in basic AHP, if A is 'strongly more important' compared to B, with the fuzzy set, we define the value of 'strongly more important' as (3/2, 2, 5/2), and the reciprocal value is equal to (2/5, 1/2, 2/3). This logic will appear on the matrix for weight calculation. We take the fuzzy set's arithmetic average as we have more than one expert (multi-data).

The following part describes the definition of the triangular fuzzy number and the operational laws of the triangular fuzzy number. The membership function as illustrated in Fig. 3, $\tilde{M}(x) : R \rightarrow [0, 1]$ of the triangular fuzzy number $\tilde{M} = (l, m, u)$ defined on R is equal to:

$$\tilde{M}(x) = \begin{cases} \frac{x}{m-l} - \frac{l}{m-l}, & x \in [l, m], \\ \frac{x}{m-u} - \frac{u}{m-u}, & x \in [m, u], \\ 0, & \text{otherwise,} \end{cases} \tag{1}$$

where $l \leq m \leq u$, and m is the possible value of the fuzzy number \tilde{M} , and l and u are the lower and upper bounds, respectively. According to Zadeh's extension principle [51] given two fuzzy triangular numbers $\tilde{M}_1 = (l_1, m_1, u_1)$ and $\tilde{M}_2 = (l_2, m_2, u_2)$, (l_1 and $l_2 \geq 0$).

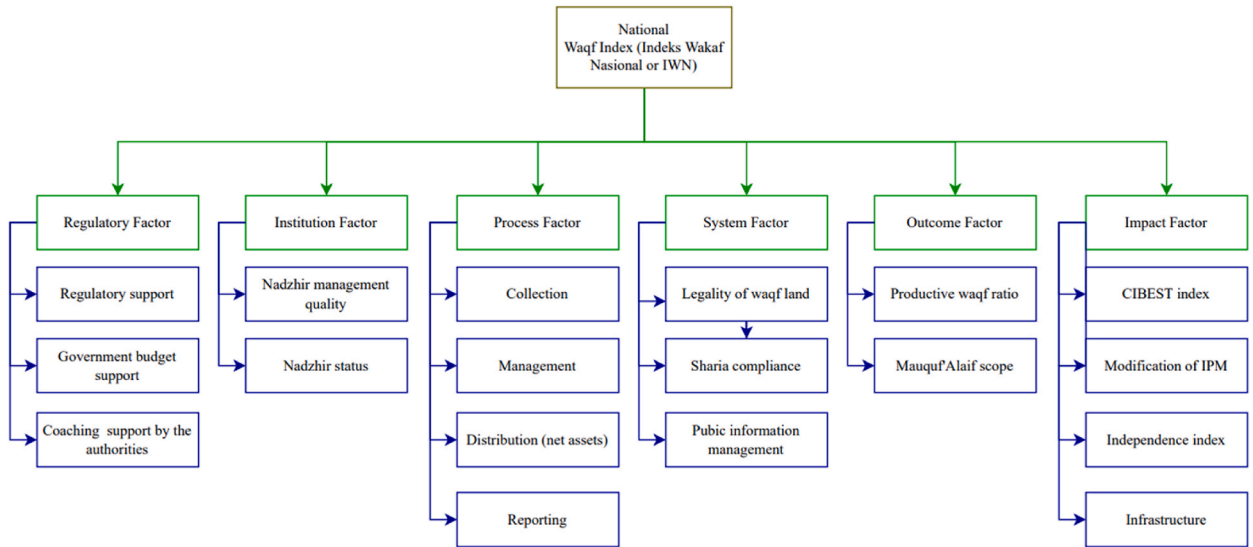


Fig. 2. IWN Hierarchical Framework
Source: Authors' analysis.

Table 2

Linguistic scales.

Linguistic scale	Triangular fuzzy scale	Triangular fuzzy reciprocal scale
Just equal	(1,1,1)	(1,1,1)
Equally important (EI)	(1/2,1,3/2)	(2/3,1,2)
Weakly more important (WMI)	(1,3/2,2)	(1/2,2/3,1)
Strongly more important (SMI)	(3/2,2,5/2)	(2/5,1/2,2/3)
Very strongly more important (VSMI)	(2,5/2,3)	(1/3,2/5,1/2)
Absolutely more important (AMI)	(5/2,3,7/2)	(2/7,1/3,2/5)

Source [50].

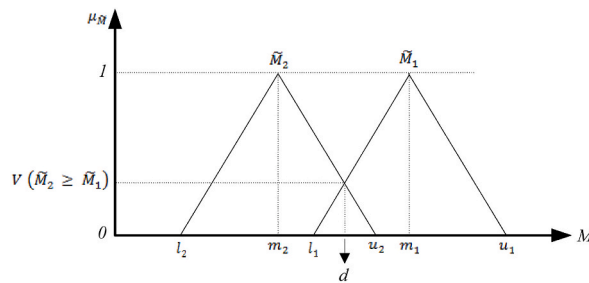


Fig. 3. Illustration of membership function [52].

1. The extended addition is defined as

$$\tilde{M}_1 \oplus \tilde{M}_2 = (l_1 + l_2, m_1 + m_2, u_1 + u_2) \tag{2}$$

2. Extended multiplication is defined as

$$\tilde{M}_1 \otimes \tilde{M}_2 = (l_1 l_2, m_1 m_2, u_1 u_2) \tag{3}$$

3. The inverse of triangular fuzzy number $\tilde{M}_1 = (l_1, m_1, u_1)$ is defined as

$$\tilde{M}_1^{-1} \approx \left(\frac{1}{u_1}, \frac{1}{m_1}, \frac{1}{l_1} \right) \tag{4}$$

Step 3. Apply the extent analysis method of the fuzzy AHP to calculate the local weights of each criterion and sub-criteria.

Let $X = \{o_1, o_2, \dots, o_n\}$ be an object set and $U = \{g_1, g_2, \dots, g_m\}$ be a goal set. According to Chang’s extent analysis [52], each subject is considered one by one, and for each object, the analysis is carried out for each of the possible goals, g_i . Therefore, m extent analysis values for each object are obtained and shown as follows:

$$\tilde{M}_{g_i}^1, \tilde{M}_{g_i}^2, \dots, \tilde{M}_{g_i}^m, i = 1, 2, \dots, n \tag{5}$$

where all the $\tilde{M}_{g_i}^j$ ($j = 1, 2, \dots, m$) are all triangular fuzzy numbers. The membership function of the triangular fuzzy number is denoted by $\tilde{M}(x)$. The steps of Chang’s extent analysis [52] can be given as follows:

Step 3.1. The value of fuzzy synthetic extent with respect to the i th object is defined as,

$$S_i \approx \sum_{j=1}^m \tilde{M}_{g_i}^j \otimes \left[\sum_{i=1}^n \sum_{j=1}^m \tilde{M}_{g_i}^j \right]^{-1} \tag{6}$$

Where \otimes denotes the extended multiplication of two fuzzy numbers. To obtain $\sum_{j=1}^m \tilde{M}_{g_i}^j$, perform the fuzzy addition operation of m extent analysis values for a particular matrix such that:

$$\sum_{j=1}^m \tilde{M}_{g_i}^j = \left(\sum_{i=1}^m l_j, \sum_{i=1}^m m_j, \sum_{i=1}^m u_j \right) \tag{7}$$

and to obtain $\left[\sum_{i=1}^n \sum_{j=1}^m \tilde{M}_{g_i}^j \right]^{-1}$, perform the fuzzy addition operation of $\tilde{M}_{g_i}^j$ ($j = 1, 2, \dots, m$) values such that,

$$\sum_{i=1}^n \sum_{j=1}^m \tilde{M}_{g_i}^j = \left(\sum_{i=1}^n l_i, \sum_{i=1}^n m_i, \sum_{i=1}^n u_i \right) \tag{8}$$

and then compute the inverse of the vector such that,

$$\left[\sum_{i=1}^n \sum_{j=1}^m \tilde{M}_{g_i}^j \right]^{-1} = \left(\frac{1}{\sum_{i=1}^n u_i}, \frac{1}{\sum_{i=1}^n m_i}, \frac{1}{\sum_{i=1}^n l_i} \right) \tag{9}$$

Step 3.2. The degree of possibility of $\tilde{M}_2 = (l_2, m_2, u_2) \geq \tilde{M}_1 = (l_1, m_1, u_1)$ is defined as,

$$V(\tilde{M}_2 \geq \tilde{M}_1) = \sup[\min(\tilde{M}_1(x), \tilde{M}_2(y))]$$

and can be equivalently expressed as follows:

$$V(\tilde{M}_2 \geq \tilde{M}_1) = \text{hgt}(\tilde{M}_1 \cap \tilde{M}_2) = \tilde{M}_2(d) = \begin{cases} 1, & \text{if } m_2 \geq m_1, \\ 0, & \text{if } l_1 \geq u_2, \\ \frac{l_1 - u_2}{(m_2 - u_2) - (m_1 - l_1)}, & \text{otherwise} \end{cases} \tag{10}$$

Fig. 3 illustrates $V(\tilde{M}_2 \geq \tilde{M}_1)$ for the case $m_2 < l_1 < u_2 < m_1$, where d is the abscissa value corresponding to the highest crossover point D between \tilde{M}_1 and \tilde{M}_2 . To compare \tilde{M}_1 and \tilde{M}_2 , we need both of the values,

$$V(\tilde{M}_1 \geq \tilde{M}_2) \text{ and } V(\tilde{M}_2 \geq \tilde{M}_1) \tag{11}$$

Step 3.3. The degree possibility for a convex fuzzy number to be greater than k convex fuzzy numbers \tilde{M}_i ($i = 1, 2, \dots, k$) can be defined by:

$$V(\tilde{M} \geq \tilde{M}_1, \tilde{M}_2, \dots, \tilde{M}_k) = \min V(\tilde{M} \geq \tilde{M}_i), i = 1, 2, \dots, k \tag{12}$$

Step 3.4. Finally, $W = (\min V(S_1 \geq S_k), \min V(S_2 \geq S_k), \dots, \min V(S_n \geq S_k))^T$ is the weight vector for $k = 1, 2, \dots, n$.

3.2. Data collection

This study applies a qualitative approach to developing the IWN framework involving government, academic, and industry experts. In [step 1](#), the literature is reviewed to figure out the complex problem in *waqf* management and existing factors determinants and regulation references. [Step 2](#) combines secondary data from existing literature and expresses the factors in structured and hierarchical forms. In [step 3](#), the author conducts FGD with experts to validate the model. [Step 4](#) uses the FAHP method to identify the importance level of each factor by involving the experts. [Step 5](#) is based on the FAHP results, the experts conducted a second focus group discussion (FGD) to discuss the model logic.

The profile of the six experts involved in this study are:

1. The Director of *Zakah* and *Waqf* Empowerment from the Indonesian Ministry of Religious Affairs (*Kemenag*).
2. The member of *Badan Wakaf Indonesia* (BWI) with academic and regulator background.
3. Treasurer of the National Sharia Council from Majelis Ulama Indonesia (MUI) or Indonesian Ulema Council.
4. The Director of Financial Inclusion, Socio-religious Funds, and *Sharia* Microfinance from *Komite Nasional Keuangan Syariah* (KNEKS).
5. General Manager Wakaf Mobilisation from *Yayasan Dompot Dhuafa Republika*.
6. President Director from Global Waqf Corporation.

In FGD, the first important consideration is the number of respondents/experts to be invited for discussion. It is generally accepted that between six and eight participants are sufficient [53,54]. With too many members, the group becomes difficult to manage and may disintegrate into two or even three small groups, each having their own independent discussion [54]. The second consideration, FGD discussion requires expert or skilled respondents based on the aim of the research. In the context of *waqf*, authorities or actors related to *waqf* in Indonesia, consisting of Ministry of Religion, which in this case represented by the first expert. Second is the BWI that has significant role in the development of *waqf* in Indonesia, particularly (i) provide guidance to *nazhir* in managing and developing *waqf* assets, (ii) manage and develop *waqf* assets on a national and international scale. In this case represented by the second expert. Third, MUI as institution that issues fatwas on the halalness of a food, process, *syari'a* compliance, determining the truth of a sect in Islam, and matters relating to the relationship of a Muslim with his environment. In this case represented by the third expert. Fourth expert from KNEKS, that has a role to develops the task of accelerating, expanding and advancing Islamic economic and financial development in order to support national economic resilience. Fifth, is a *waqf* management institution, that responsible for collecting, distributing, and providing reports on asset management or *waqf* funds. In this represented by fifth and sixth experts. Thus, this study involves experts who are high profile, reliable, and highly relevant to research needs.

The FGD process to develop the IWN framework begins with presentation from the research team to introduce the preliminary proposed IWN framework developed based on literatures, aiming to focus the discussion on model development. Nevertheless, in the FGD process, experts have the freedom to provide suggestions beyond what has been compiled from the literature. Then all experts are having discussions to provide justifications, adjustment to factor and sub-factors which might not be relevant from expert's point of view. During the FGD, differences of opinion between experts occurred and this is resolved by allowing time for the expert group to discuss until a final consensus is reached. The next step, all experts fills out the pairwise comparison through questionnaire. Based on the questionnaire, we analyse the model until the weighted value is obtained. The last step, second discussion is carried out with the aim of obtaining verification and explanation of the relevance of the weights in the context of *waqf* in Indonesia.

Table 3
Weight and Rank of Criteria for IWN index.

Primary Factor	Weight	Rank	Sub-factor	Weight	Rank
Regulatory Factor	0.282	1	Regulatory support	0.527	1
			Government budget support	0.213	3
			Coaching support by the authorities	0.259	2
Institution Factor	0.251	2	<i>Nahzir</i> management quality	0.811	1
			<i>Nahzir</i> status	0.177	2
Process Factor	0.190	3	Collection	0.237	2
			Management	0.448	1
			Distribution (net assets)	0.157	3
			Reporting	0.156	4
System Factor	0.156	4	Legality of <i>waqf</i> land	0.473	1
			<i>Sharia</i> compliance	0.369	2
			Public information management	0.157	3
Outcome Factor	0.069	5	Productive <i>waqf</i> ratio	0.586	1
			<i>Mauquf' Alaih</i> scope	0.413	2
Impact Factor	0.050	6	CIBEST index	0.235	3
			Modification of IPM	0.195	4
			Independence index	0.324	1
			Infrastructure	0.245	2

4. Result and discussions

The result of the fuzzy AHP calculation of IWN criteria and sub-criteria are presented in Table 3. The result shows that the priority of IWN is a regulatory factor (0.282) followed by institution factor (0.251), process factor (0.190), system factor (0.156), outcome factor (0.069), and impact factor (0.050). This outcome indicates that the role of regulation with a top-down approach is critical. Consistent with existing studies by Refs. [6,7,31], and [41], the existence of regulation at the national and regional level (yields weight of 0.527) will accelerate the improvement of governance system and *waqf* management. Further, the regulation should be equipped with budget support (0.213) and coaching (0.259) as two primary resources in managing *waqf*. Furthermore, through the FGD, the experts justified that in the Indonesian context, the regulatory at the national level is actually sufficient, only the translation at the regional level to the technical management mechanism is still weak. Not all regions have the appropriate set of rules and technical guidelines, as well as budget support to run the operational activities. So that the regulatory factor comes with the highest weight is logical. This regulation will be the foundation/prerequisite in *waqf* management.

The institution factor reflects on how well the operator manages the *waqf*. This study finds that the *nahzir* management quality holds a critical role as it yields a high weight of 0.811. This outcome is consistent with the existing study of [31,32]. Developing a solid quality management system mainly through ISO (International Organization for Standardisation) can effectively keep the system in place and fulfil the international standards. Moreover, it will lead to stakeholders' trust and compliance with the governance system. However, an interesting finding about *nahzir* status only yields 0.177 of weight. Through FGD, the experts argued that what is more priority is the existence of credible quality management system, since it will improve the effectiveness, process efficiency, quality of services, which in turn will increase engagement and public trust in *waqf* management. However, the existence of *nahzir* institutions who work full time is still relevant to ensure the availability of adequate and qualified human resources.

The process factor reflects the tactical, operational activities of *waqf* management, starting from collection to reporting. The analysis shows that 'management' yields the highest weight of 0.448. It implies that ensuring the growth of *waqf* asset accumulation is critical [20,21]. Consistently, experts through FGDs stated that the ability to build processes that ensure the accumulation of assets reflects the internalization of a growth mind-set. To ensure sustainable growth, the process needs to be supported by a good collection strategy (0.237), along with the performance to improve the surplus of *Waqf* (0.157). In addition, the quality of reporting is audited by the KAP (0.156).

System factor in this study consists of three sub-factor, including the legality of *waqf* land (0.437), *sharia* compliance (0.369), and public information management (0.157). It implies that the legal aspect holds a critical role in ensuring the effectiveness of the *waqf* process. Legal issues will hinder the process of handing over and managing *waqf* [31,37]. Through FGD, the experts underlined when the *waqf*, land is not legally clear, it will potentially posed to false claim or other various cases of *waqf* land. Furthermore, a Sharia Supervisory Board (DPS) in *nahzir* institutions is also important (0.369) to prevent this. Finally, public information management (0.157) will enhance openness to stakeholders, develop trust and compliance with regulations.

As the fifth rank of priority of IWN, the outcome factor consists of two sub-factors: productive *waqf* ratio (0.586) and *Mauquf Alaih* scope (0.413). This is consistent with a current study from Refs. [21,38,42] that productive *waqf* holds a critical role. Further, [55] underlined that when the development of *waqf* is invested honestly and productively, it will generate returns that can help improve the *ummah*'s economic status. Meanwhile, as stated by the experts during the FGD, when the *waqf* assets are abandoned, undeveloped and unproductive, it will create loss and no impact. In line with this, the hi-range of benefits of *waqf* to the community will lead to *waqf* effectiveness, meaning that the *waqf* beneficiaries might receive their rights.

The last priority is the impact factor, which is represented by four sub-factors, which are the independence index (0.324), infrastructure (0.245), CIBEST index (0.235), and modification of IPM (0.195). As stated by the experts through FGD, it implies that *waqf* should mainly create a positive impact on the measurement of the independence of the *Mauquf Alaih* household. It is carried out by looking at whether the *Mauquf Alaih* household has a permanent job, business/business, and savings [21]. Furthermore, a higher portion of *waqf* infrastructure to the overall infrastructure in a region [41,45] will improve the level of community welfare at the household level by grouping poverty into two types, namely material and spiritual poverty [39]. In addition, it will improve the health and education index [44].

In general, the impact factor is having the lowest weight illustrates the perspective of the experts who think that the availability of regulations, processes, systems and output programs is more critical in *waqf* management. Without the above, the impact of *waqf* will not be felt by the beneficiaries. This finding is logical, especially in developing countries that still require efforts to improve the system to make it more solid and reliable in *waqf* management. From a practical perspective, the IWN framework can be implemented at the national and regional levels. Therefore, data can be collected using a bottom-up approach to derive the score/index. The *waqf* authority at the regional level can collect the data periodically that can be aggregated at the national level. This process bears at least four expected benefits from IWN as follows: (i) *waqf* management conditions at the regional level can be mapped and monitored reliably, (ii) performance between regions can be compared to trigger fair and healthy competition, (iii) regulators and *waqf* institutions can be encouraged to reach certain standards in *waqf* management as measured in IWN; and (iv) the management of *waqf* can be directed toward results or impact. Further, although the IWN framework is developed based on the Indonesian regulatory references and current literature on *waqf*, other countries can adopt its structure/hierarchical framework while ensuring the relevance of the weights according to country conditions. Specifically, countries with conditions or characteristics similar to Indonesia can apply this model by building regulatory instruments, *nahzir* readiness, quality management systems, processes or technical governance as the three dominant factors. The success of building this aspect will become the basis for *waqf* institutions to be able to develop a more mature system so that they can grow public trust, and get significant output and impact. Meanwhile, countries with different characteristics can apply the IWN model, but need to determine the weights according to the context of each country.

5. Conclusions

This study aims to develop *Indeks Wakaf Nasional* (IWN), which can later be used at the regional and national level. The analysis using fuzzy AHP showed that among six primary factors proposed as the factor in IWN, the regulatory factor gets the highest weight compared to the other primary factors. The second position goes to the institution factor, followed by the process factor, system factor, outcome factor, and the last is the impact factor. These results indicate that Indonesia needs to prioritise the foundations and system in place in this current stage, specifically on regulations, institutions, processes, and system of *waqf* implementation. It is expected that after stable and matured implementation, the factor priority might be adjusted, with greater weight on outcome and impact factor. These two factors need more time to nurture because they relate to the long-term effect of *waqf* management.

This study has provided both theoretical and managerial contributions. From the theoretical perspective, the IWN framework has strengthened the underlying theory in *waqf* management. It promotes comprehensive factors from regulation to impact, accompanied by an appropriate level of importance in the Indonesian context. Meanwhile, from the managerial perspective, the IWN framework can be used to reference *waqf* management. IWN, as a reference, not only includes what factors must be developed but also indicates a priority reference. Further studies will be carried out to technically translate factors and sub-factors into indicators equipped with measuring methods to provide a complete technical guide for IWN management in Indonesia.

Author contribution statement

Yuliani Dwi Lestari: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Raditya Sukmana; Irfan Syauqi Beik; Mahfud Sholihin: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.

Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix 1. Glossary

AHP: Analytical Hierarchy Process

BWI: Badan Wakaf Indonesia (Indonesia Waqf Agency)

CIBEST: Center of Islamic Business and Economic Studies

DPS: Dewan Pengawas Syariah (Sharia Supervisory Board)

FAHP: Fuzzy Analytical Hierarchy Process

FGD: Focus Group Discussions

IPM: Indeks Pembangunan Manusia or Human Development Index

ISF: Islamic Social Finance

ISO: International Organization for Standardisation

IWN: Indeks Wakaf Nasional (National Waqf Index)

Nazhir: The party who receives the waqf to be managed and developed according to its designation

KNEKS: Komite Nasional Ekonomi dan Keuangan Syariah (National Committee for Sharia Economics and Finance)

Kafalah: Is a guarantee, burden, or dependent given by the insurer to a third party to fulfil the obligations of the second party or that is borne

Mauquf' Alaih: The party appointed to benefit from the designation of waqf property in accordance with the statement of the will as outlined in the Waqf Pledge Deed

MUI: Majelis Ulama Indonesia (Indonesian Ulema Council)

PSAK 112: Waqf Accounting and SAWUT Application (Indonesian, *PSAK 112: Akuntansi Wakaf dan Aplikasi SAWUT*)

Sadaqah: Donations of a Muslim to others voluntarily and sincerely without being limited by a certain time and amount

SDG: Sustainable Development Goals

Sukuk: Commercial securities in the form of a certificate of ownership which proves that an asset is the ownership of a certain party

Takaful: Sharia Insurance is an effort to protect and help each other between a number of people/parties through investment in the form of assets which provides a

pattern of returns to face certain risks through sharia-compliant contracts

Qard: A loan agreement that must be returned in the same amount at the agreed time.

Waqf: Is a legal act to separate and/or surrender part of his property to be used forever or for a certain period of time in accordance with his interests for the purposes of worship and/or general welfare in accordance with sharia

WCP: Waqf Core Principles

Zakat: Zakat is certain assets that must be issued by Muslim and given to groups who are entitled to receive it