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An Analysis of the Implementation of GRC in Optimizing Productive Waqf Management for Socio-Economic Development

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Abstract

Objective: This study aims to analyze the application of Governance, Risk, and Compliance (GRC) in optimizing the management of productive waqf (endowments) within the socio-economic sector, to enhance nazhir (waqf manager) professionalism, the sustainability of waqf assets, and community welfare. **Theoretical framework:** The study employs the OCEG GRC Capability Model (2021), which integrates governance, risk management, and compliance combined with the concept of productive waqf and the perspective of Maqashid Sharia (objectives of Sharia). **Literature review:** Previous studies indicate that research on waqf governance, risk management, and Sharia compliance remains fragmented, failing to present an integrated waqf management model. **Method:** This study utilizes a qualitative method with a descriptive approach based on library research. Secondary data were sourced from Law Number 41 of 2004 concerning Waqf, regulations from the Indonesian Waqf Board (BWI), the OCEG GRC Capability Model, academic books, and national and international articles, all analyzed using content analysis. **Results:** The application of GRC is proven to enhance transparency, accountability, risk mitigation, and compliance with regulations and Sharia principles. It also optimizes the utilization of productive waqf for real sector development, MSME empowerment, education, healthcare, and socio-economic resilience, although challenges regarding nazhir competence, digitalization, and oversight persist. **Implications:** This study contributes theoretically to the development of literature on GRC-based waqf governance and offers practical recommendations for the Indonesian Waqf Board, nazhirs, and regulators to establish a professional, transparent, accountable, and sustainable waqf management system. **Novelty:** This study proposes a GRC-based analysis model for productive waqf management that integrates governance, risk management, regulatory and Sharia compliance, and a Maqashid Sharia orientation into a comprehensive management framework.

Keywords: compliance, governance, risk management, socio-economic sector, productive waqf.

INTRODUCTION

Productive waqf is one of the Islamic social financial instruments that has unique characteristics because it combines the dimension of worship (tabarru') with productive economic activities (tijari) [1]. In contrast to consumptive waqf, which is generally used for the construction of mosques, cemeteries, or other means of worship, productive waqf is directed at the development of assets that can generate economic added value sustainably. The results of the asset management are then distributed to mauquf 'alaih as beneficiaries, so

that waqf not only functions as a philanthropic instrument, but also as a mechanism for economic empowerment of the community [2]. From the perspective of Islamic economic development, the existence of productive waqf has an increasingly strong relevance because it is able to support poverty alleviation, expand access to education and health, create jobs, and strengthen the economic resilience of the ummah [3]. With the largest Muslim population in the world and very abundant waqf assets, Indonesia has a great opportunity to make productive waqf one of the pillars of sustainable socio-economic development as well as an instrument for the implementation of sharia maqashid, especially in maintaining property (hifz al-mal) and realizing the benefits of society.

However, the magnitude of this potential has not been followed by the level of optimization of productive waqf management. Data from the Indonesian Waqf Agency shows that the area of national waqf assets reaches billions of square meters with a very large economic value, but its contribution to national economic growth and community empowerment is still relatively low [4]. This condition reflects the gap between the potential and realization of productive waqf utilization. Most of the waqf assets are still managed conventionally and consumer-oriented, while the development of assets towards productive sectors such as agribusiness, property, micro enterprises, education, health, and sharia investment is still not optimally developed. On the other hand, the low managerial capacity of nazhir, the limited competence of human resources, weak transparency, low accountability, the suboptimal supervision system, and the lack of public trust in the management of money waqf are the main factors that hinder the development of productive waqf in Indonesia [5]. As a result, waqf has not been able to make a maximum contribution as an instrument for equitable distribution of welfare and economic development based on social justice.

These problems show that the management of productive waqf is no longer enough to rely solely on administrative approaches or sharia compliance, but requires a more modern, integrated, and sustainability-oriented institutional governance system. In this context, the theory of Governance, Risk, and Compliance (GRC) offers a comprehensive conceptual framework to improve the quality of management of waqf institutions [6]. Governance emphasizes the importance of organizational governance that is transparent, accountable, responsive, independent, and with integrity so that the entire decision-making process runs professionally. Risk Management functions to identify, analyze, evaluate, and mitigate various risks that have the potential to interfere with the sustainability of waqf investment, including operational, financial, legal, market, reputation, and sharia non-compliance risks. Meanwhile, the Compliance aspect ensures that all waqf management activities are carried out in accordance with the provisions of laws and regulations, sharia principles, governance standards, and institutional ethics [7]. The integration of these three components is believed to be able to build a more professional waqf management system, increase public trust, minimize investment risks, and strengthen the sustainability of waqf benefits for the community.

Various previous studies have examined the management of productive waqf from various perspectives. Some of the research focuses on the governance of waqf institutions as an effort to increase accountability and transparency, while other research focuses more on the digitalization of waqf management, strategies for optimizing waqf assets, the implementation of sharia maqashid, and productive waqf-based economic empowerment models [8]. Other research has also discussed the importance of risk mitigation of waqf investment through increasing nazhir competence, diversifying investments, periodic monitoring, and applying the principle of prudence in asset management. However, most of the research still partially addresses these aspects, so it is not able to explain the complete relationship between organizational governance, risk management, regulatory compliance, and optimization of productive waqf management in one integrated management framework [9]. In fact, the complexity of modern waqf asset management requires the integration of all these aspects in order to be able to produce management that is adaptive to economic dynamics, regulatory

changes, technological developments, and increasing public expectations of the professionalism of waqf institutions.

Based on these conditions, there is a significant research gap in the literature on productive waqf management. Previous research has generally focused on the application of the principles of good governance and risk management separately, or the implementation of sharia maqashid without integrating all of these elements within the framework of Governance, Risk, and Compliance (GRC) [10]. In addition, studies on the implementation of GRC in waqf institutions in Indonesia are still relatively limited, especially in explaining how governance synergy, risk mitigation, and regulatory compliance can increase the effectiveness of productive waqf asset management and expand its impact on socio-economic development. Therefore, this research presents a novelty in the form of developing a GRC-based productive waqf management analysis model that integrates modern governance principles, investment risk management systems, compliance with national regulations and sharia principles, and the orientation of the achievement of sharia maqashid [11]. This approach is expected to be able to produce a more comprehensive, sustainable, and relevant waqf management model to the needs of waqf institutions in the era of digital economic transformation.

Based on this description, this study focuses its discussion on several main problems, namely how to implement Governance, Risk, and Compliance in the management of productive waqf, the role of GRC in mitigating various risks in managing waqf assets, and how the implementation of GRC can optimize the contribution of productive waqf to the development of the socio-economic sector [12]. Thus, the purpose of this study is to comprehensively analyze the application of the GRC framework in the management of productive waqf, identify various challenges in its implementation, evaluate its effectiveness in improving the professionalism of waqf institutions, and formulate a productive waqf management model that can create a balance between institutional accountability, risk management, compliance with sharia principles, and improving community welfare [13].

The results of this research are expected to make a theoretical and practical contribution to the development of Islamic economic science, especially in the field of governance of waqf-based Islamic social financial institutions. From the academic side, this study enriches the literature on the implementation of Governance, Risk, and Compliance in the management of productive waqf by offering a multidimensional approach that integrates governance theory, risk management, regulatory compliance, and sharia maqashid [14]. From a practical perspective, the results of this study are expected to be a reference for the Indonesian Waqf Agency, nazhir, waqf institutions, regulators, and policymakers in developing a waqf management system that is more professional, transparent, accountable, and adaptive to various investment risks. In the end, the optimal implementation of GRC is expected to be able to increase public trust in waqf institutions, expand the collection of productive waqf funds, optimize the use of waqf assets, and strengthen the role of waqf as a strategic instrument in encouraging inclusive, just, and sustainable socio-economic development [15].

LITERATURE REVIEW

Governance, Risk, and Compliance (GRC) Framework

Governance, Risk, and Compliance (GRC) is an integrated management framework designed to ensure that organizations are able to achieve objectives effectively, manage various uncertainties, and carry out all activities in accordance with legal provisions and ethical principles. According to OCEG (2021), through the GRC Capability Model, GRC is understood as an organization's ability to integrate three main elements, namely governance, risk management, and compliance, so that all business processes run in a directional,

efficient, and sustainable manner [16]. Governance is oriented towards a governance system that regulates the decision-making process, division of authority, supervisory mechanisms, transparency, and organizational accountability. Risk management serves as a systematic process to identify, analyze, evaluate, and control various risks that have the potential to hinder the achievement of organizational goals. Meanwhile, compliance emphasizes the importance of compliance with regulations, operational standards, internal policies, and ethical principles that are the foundation of organizational management [17]. The integration of these three components forms an organizational control system that is able to increase operational effectiveness while maintaining the sustainability of the organization in the long term.

In the context of productive waqf management, the implementation of GRC is increasingly relevant considering that waqf institutions manage public funds that must be accounted for professionally, transparently, and in accordance with sharia principles. Good governance will strengthen the accountability of the nazhir in managing waqf assets so as to increase public trust in waqf institutions [18]. On the other hand, the implementation of risk management allows waqf institutions to anticipate various investment risks, such as operational risks, market risks, legal risks, reputational risks, and the risk of sharia non-compliance that can reduce the benefits of waqf assets. The compliance aspect also has an important role in ensuring that all waqf management activities are in accordance with the provisions of laws and regulations, sharia fatwas, and institutional governance standards [19]. Therefore, the implementation of GRC not only functions as an instrument of organizational supervision, but also as a strategy to strengthen waqf institutions that can increase the effectiveness of asset management, minimize risks, strengthen public trust, and optimize the contribution of productive waqf to sustainable socio-economic development.

Productive Waqf and Its Impact on the Socio-Economic Sector

Productive waqf is the development of the concept of waqf that focuses on managing assets productively so that they can produce sustainable economic value without eliminating the principal of waqf assets. According to Kasdi (2014), productive waqf is the management of waqf assets through investment activities or business activities that generate profits (surplus), where the proceeds are then distributed to mauquf 'alaih in accordance with the purpose of waqf [20]. This concept shows that waqf is not only positioned as an instrument of consumptive worship, but also as an instrument of economic empowerment that is able to create long-term benefits. Productive management of waqf assets allows the formation of sustainable sources of financing for various social programs, such as education, health, micro business development, community economic empowerment, and poverty alleviation [21]. Thus, productive waqf has a strategic position in supporting the implementation of sharia maqashid, especially in maintaining property (hifz al-mal), improving welfare (maslahah), and creating economic justice in the community.

The contribution of productive waqf to socio-economic development will be more optimal if it is managed professionally by paying attention to the principles of governance, risk management, and institutional compliance. Achyar and Srisusilawati (2021) explained that the surplus from productive waqf management can be used to finance various strategic sectors, such as sharia-based MSME financing without usury, the construction of education and health service facilities through cross-subsidy mechanisms, and the creation of jobs that can improve the welfare of low-income communities [22]. However, the optimization of these benefits still faces various challenges, including the limited managerial capacity of nazhir, a weak supervisory system, low transparency, and high investment risks that have the potential to reduce the productivity of waqf assets. Therefore, strengthening the management system through the implementation of the Governance, Risk, and Compliance (GRC) framework is an urgent need so that productive waqf management is able to produce

sustainable economic benefits, increase public trust, and strengthen the role of waqf as an instrument of inclusive and equitable socio-economic development.

METHODOLOGY

This study uses a type of qualitative research with a descriptive approach through the library research method, because the research is focused on conceptual analysis of the application of Governance, Risk, and Compliance (GRC) in optimizing the management of productive waqf in the socio-economic sector. This approach was chosen because it is able to provide a comprehensive understanding of the phenomenon of productive waqf management based on various theories, regulations, and previous research results without collecting direct field data. The data sources used are all in the form of secondary data, including laws and regulations, especially Law Number 41 of 2004 concerning Waqf, Regulations of the Indonesian Waqf Board, reports on the development of national waqf published by the Indonesian Waqf Agency (BWI), GRC Capability Model standards developed by OCEG, fatwas related to waqf management, scientific books, and reputable national and international articles discussing governance. Risk management, compliance, and productive waqf management. The data collection technique is carried out through documentation of various relevant literature, while the data analysis technique uses an interactive analysis model which includes data reduction, systematic data presentation, interpretation, and conclusion drawing through content analysis to identify the relationship between GRC principles and the effectiveness of productive waqf management. The selection of this method aims to produce an in-depth conceptual synthesis of the GRC implementation model as a modern governance framework in increasing accountability, transparency, risk mitigation, compliance with sharia regulations and principles, as well as optimizing the use of waqf assets for community socio-economic empowerment. The urgency of this research lies in the large gap between the potential of productive waqf and the realization of its management due to weak governance, low professionalism of nazhir, and lack of optimal risk management system, so that this study is expected to provide theoretical implications in the form of enrichment of literature on the integration of GRC in productive waqf governance, as well as practical implications as a recommendation for the Indonesian Waqf Board, the nazhir institution, regulators, and stakeholders in building a waqf management system that is more professional, sustainable, accountable, and able to increase the contribution of waqf to socio-economic development and community welfare.

RESULTS AND DISCUSSION

Implementation of Governance, Risk, and Compliance (GRC) in Productive Waqf Management

The development of productive waqf management in Indonesia shows a paradigm shift from traditional management to a more professional, transparent, and sustainability-oriented management system. The change emerged in response to the increasingly complex challenge of managing waqf assets, which is no longer limited to the construction of worship facilities, but has developed into a social investment instrument that is able to generate sustainable economic benefits [23]. In such conditions, the waqf management institution (nazhir) is not enough to only understand the aspects of waqf fiqh, but is also required to have modern institutional governance capabilities so that waqf assets can develop without reducing their basic value (habs al-ashl). The Governance, Risk, and Compliance (GRC) framework is one of the relevant approaches because it is able to integrate organizational governance, risk control, and compliance with sharia regulations and principles into a complete management system. This approach is in line with the GRC Capability Model developed by OCEG (2021),

which emphasizes that organizations can only achieve their goals if they are able to manage risks systematically, carry out good governance, and ensure that all their activities comply with the organization's legal and ethical provisions [24].

The implementation of the Governance aspect in waqf institutions begins with building a clear organizational structure, a firm division of functions, and an independent supervisory mechanism. Productive waqf management can no longer be carried out solely based on personal trust in the nazhir, but must be supported by a transparent, accountable, and well-documented decision-making system. In practice, institutions such as Dompot Dhuafa Waqf, Al Azhar Waqf Board, and Waqf Salman ITB have shown that the success of waqf asset development is greatly influenced by the existence of standard operating procedures (SOPs), internal audits, the use of digital technology, and the involvement of the Sharia Supervisory Board in supervising all investment activities [25]. Digitizing asset registration, preparing regularly audited financial statements, and information disclosure to the public are forms of governance implementation that not only increase institutional accountability but also strengthen public trust. Public trust is the main capital in the development of productive waqf because the higher the level of transparency of the institution, the greater the public's interest in distributing waqf money and productive assets to the institution [26].

In addition to governance, the success of productive waqf management is highly determined by the institution's ability to implement Risk Management comprehensively. The characteristics of waqf are different from commercial investments in general because the principal of waqf assets must be maintained, while the economic benefits must continue to develop to be distributed to beneficiaries. Therefore, every investment decision must begin with a risk identification process, feasibility study, market risk mapping, operational risk, legal risk, liquidity risk, and the risk of sharia non-compliance. This principle is very important considering that investment failure not only causes financial losses, but also has the potential to lose public trust in waqf institutions [27]. Therefore, nazhir is required to diversify investments in sectors that have low to medium risk levels, such as productive property, integrated agriculture, hospitals, educational institutions, and sharia investment instruments such as sukuk [28]. In addition, the implementation of sharia insurance schemes (takaful), the establishment of reserve funds, and periodic monitoring of investment performance are integral parts of the risk mitigation strategy so that the sustainability of waqf assets is maintained.

The third component in GRC is Compliance, which is compliance with national regulations and sharia principles, which are the foundation of the legality of waqf management in Indonesia. Compliance includes the fulfillment of the provisions of Law Number 41 of 2004 concerning Waqf, various regulations of the Indonesian Waqf Board, fatwa of the National Sharia Council-MUI, and internal operational standards of the institution. In practice, compliance is not only understood as an administrative obligation, but also as a mechanism to protect waqf assets from various legal disputes and abuse of authority. Periodic sharia compliance audits ensure that all investment activities remain in accordance with the principles of Islamic muamalah to avoid elements of usury, gharar, and maysir [29]. Meanwhile, the legality of waqf asset administration through land certification, digital asset registration, and waqf contract documentation is a preventive step to minimize potential ownership conflicts in the future. Thus, compliance not only creates legal certainty, but also strengthens the social legitimacy of waqf institutions as professional Islamic philanthropic institutions.

Analysis of the implementation of GRC shows that the three components cannot be separated, but form a mutually supportive management system. Governance creates the strategic direction of the organization through good governance, Risk Management ensures the sustainability of the economic value of waqf assets through systematic risk control, while Compliance ensures that all activities run in accordance with legal corridors and sharia principles [30]. When these three elements are applied in an integrated manner, productive

waqf management will experience a significant improvement in institutional quality, characterized by increased professionalism of nazhir, effectiveness of investment management, transparency of information, and increased public trust. On the contrary, the weakness of one component will have a direct impact on the effectiveness of the other two. Therefore, the implementation of GRC must be seen not just as an administrative instrument, but as a model of institutional transformation that is able to transform waqf management from a conventional system to a modern management system that is oriented towards sustainability, accountability, and optimization of socio-economic benefits for the community.

Table 1. Parameters of Governance, Risk, and Compliance (GRC) Implementation in Productive Waqf Management

GRC Components	Implementation in Waqf Institutions	Strategic Objectives	Impact on Productive Waqf
Governance	Preparation of SOPs, separation of supervisory and managerial functions, financial audit, digitization of assets	Increase transparency and accountability	Increase the trust of the wakif and the professionalism of the nazhir
Risk Management	Investment feasibility studies, asset diversification, risk management, reserve funds, sharia insurance	Protecting the principal value of waqf assets	Ensure investment sustainability and minimize losses
Compliance	Compliance with the Waqf Law, DSN-MUI fatwa, sharia audit, asset legalization	Ensuring legal certainty and sharia compliance	Reduce legal disputes and increase the legitimacy of the institution
GRC Integration	Governance, risk control, and compliance synchronization	Creating a sustainable management system	Optimizing the economic and social benefits of productive waqf

The implementation of Governance, Risk, and Compliance (GRC) is the main foundation in realizing professional, transparent, accountable, and sustainable productive waqf management. The implementation of governance strengthens the supervisory system and increases public trust through good governance, risk management maintains the sustainability of waqf assets by systematically controlling various investment risks, while compliance ensures that all management activities run in accordance with the provisions of law and sharia principles. The synergy of these three components is able to improve the institutional quality of nazhir, strengthen the sustainability of waqf benefits, and make productive waqf a more effective socio-economic development instrument in realizing the welfare of the community and the goals of sharia maqashid.

Optimizing Productive Waqf for Empowering the Socio-Economic Sector

The application of the Governance, Risk, and Compliance (GRC) framework in waqf management institutions is not only aimed at improving the internal governance of the organization, but also becomes a strategic instrument in optimizing the contribution of productive waqf to the development of the socio-economic sector. Productive waqf is essentially a social investment that turns waqf assets into a sustainable source of income so that the benefits can continue to be felt by the community without reducing the principal value of waqf assets [31]. In contrast to the pattern of social assistance distribution that is consumptive in nature, productive waqf creates a more sustainable economic cycle through the development of productive assets, the formation of business units, community

empowerment, and job creation. In this context, the implementation of GRC is an important factor that ensures that the entire asset management process takes place professionally, so that the resulting economic surplus can be optimally distributed to the community as beneficiaries (*mauquf 'alaih*). Thus, the success of productive waqf is not only measured by the amount of assets collected, but also by the amount of socio-economic impact that has been successfully realized sustainably.

The results of observations of various productive waqf institutions show that GRC-based management is able to strengthen the development of the real sector through the formation of various waqf-based business units (social enterprises). Dompot Dhuafa Waqf, Al Azhar Waqf Board, and Salman ITB Waqf have developed waqf assets in the form of productive plantations, hospitals, educational institutions, student boarding houses, and halal business centers that generate sustainable income [32]. The profits from these business activities are not distributed as commercial profits, but are reallocated to finance social programs such as free education, health services, community economic empowerment, and the development of Islamic da'wah. This model shows that productive waqf is able to build the independence of social institutions without relying entirely on community donations [33]. From a GRC perspective, this success is influenced by transparent investment governance, mature risk analysis before business development, and compliance with sharia principles and national regulations so that every investment has a higher level of sustainability.

Another very significant contribution is the empowerment of Micro, Small, and Medium Enterprises (MSMEs) as the main pillar of the community's economy. The surplus resulting from the management of productive waqf can be used as revolving capital based on *qardhul hasan*, *mudharabah* financing, and sharia business partnership schemes that are free from the practice of usury [34]. In contrast to conventional financing institutions that are oriented towards financial profits, waqf-based financing emphasizes increasing the economic capacity of the community so as to provide greater opportunities for small business actors to develop. Within the framework of GRC, the selection process for financing recipients is carried out through business feasibility analysis, risk assessment, periodic business monitoring, and evaluation of program success so that the potential for non-performing financing can be suppressed [35]. This approach not only increases the effectiveness of waqf fund distribution, but also creates a healthier, more inclusive, and sustainable sharia economic ecosystem because people not only receive capital assistance, but also receive business assistance and entrepreneurial capacity building.

Optimizing productive waqf through the implementation of GRC also contributes to increasing the socio-economic resilience of the community when facing various economic uncertainties. In times of economic slowdown, inflation, and financial crisis, the existence of productive waqf assets that are managed professionally can become a social safety net instrument for vulnerable groups. The surplus from waqf investment can be allocated for education subsidies, free health services, business capital assistance, skills training, and community-based food security programs. This impact shows that productive waqf not only functions as a philanthropic instrument, but also as a mechanism for redistributing wealth that is able to strengthen the economic stability of the community. From the perspective of sharia *maqashid*, the implementation directly realizes the five main goals of sharia, namely maintaining religion (*hifz al-din*) through the financing of da'wah institutions, preserving the soul (*hifz al-nafs*) through health services, maintaining reason (*hifz al-'aql*) through education and training, safeguarding offspring (*hifz al-nasl*) through family empowerment, and preserving property (*hifz al-mal*) through productive business development. Therefore, the benefits of productive waqf are not only economic, but also create comprehensive social benefits.

Analysis of the implementation of GRC shows that the optimization of productive waqf management will be achieved if governance, risk control, and compliance run synergistically with the orientation of community empowerment. The success of waqf institutions is not

enough to be measured by the amount of assets that have been collected, but rather by the ability of the institution to transform these assets into economic development instruments that provide real benefits to the community [36]. The better the implementation of governance, the higher the level of institutional accountability; the better the risk management, the greater the success of waqf investment; And the higher the level of compliance, the stronger the legal legitimacy and public trust. This synergy ultimately creates a sustainability cycle, namely an increase in waqf trust that encourages an increase in waqf asset collection, the development of productive investment, an increase in economic surplus, and the wider social benefits received by the community. Thus, the implementation of GRC not only strengthens institutional governance, but also becomes a catalyst for the transformation of productive waqf as an instrument of inclusive, just, and sustainable socio-economic development.

Table 2. The Impact of GRC Implementation on the Optimization of Productive Waqf in the Socio-Economic Sector

Sectors	GRC Implementation	Productive Waqf Program	Socio-Economic Impact
Real Sector	Investment governance, risk analysis, periodic audits	Productive gardens, hospitals, schools, waqf properties	Institutional income increases and social programs are sustainable
Sharia MSMEs	Business selection, financing monitoring, risk mitigation	Revolving capital qardhul hasan, mudharabah financing	Increasing the income of business actors and creating jobs
Education	Fund management compliance and transparency	Scholarships, free school, skills training	Improving the quality of human resources
Health	Supervision of waqf surplus distribution	Waqf-based clinics and hospitals	Access to more affordable healthcare
Social Resilience	Integration of governance, risk, and compliance	Economic assistance, food security, family empowerment	Reducing poverty and improving people's well-being
Maqashid Syariah	Management according to sharia principles	Da'wah, education, health, productive economy	The realization of benefits (maslahah) in a holistic manner

Optimizing productive waqf through the implementation of Governance, Risk, and Compliance (GRC) has proven to be able to expand the contribution of waqf to the development of the socio-economic sector in a sustainable manner. Professional governance increases the effectiveness of asset management, risk management maintains investment sustainability, while compliance with sharia regulations and principles strengthens institutional legitimacy [37]. The implementation results in an economic surplus that can be used to support the development of the real sector, empower MSMEs, improve education and health services, and strengthen the economic resilience of the community. In addition to providing an economic impact, productive waqf also realizes the values of sharia maqashid through the creation of comprehensive benefits, thereby making waqf a strategic instrument in building the welfare of the people, reducing social inequality, and strengthening inclusive and sustainable Islamic economic development.

Challenges and Strategies for Strengthening GRC Implementation in Waqf Institutions

The implementation of Governance, Risk, and Compliance (GRC) in productive waqf management provides a great opportunity to improve the professionalism of waqf

institutions, but its implementation still faces various structural, institutional, and technical challenges. This complexity arises because most waqf institutions in Indonesia are still in the transition stage from traditional management patterns to modern management systems. Over the years, waqf management has been more oriented towards administrative aspects and asset maintenance, so attention to organizational governance, risk management, and institutional compliance has not been a top priority. As a result, many waqf assets have not developed productively, and some of them are not used optimally due to weak planning, supervision, and evaluation systems. This condition shows that the success of GRC implementation does not only depend on the availability of regulations, but is also influenced by the readiness of human resources, organizational culture, and the commitment of all stakeholders in building professional waqf governance [38], [39].

The first challenge is related to the limited capacity of human resources (HR) as the main actor in the management of productive waqf. Many nazhir still carry out waqf management functions based on practical experience without adequate competence in the fields of investment management, organizational governance, risk analysis, accounting, and information technology. In fact, the management of productive waqf assets today requires multidisciplinary skills that are able to integrate sharia aspects with modern management principles [40]. This low capacity has an impact on the suboptimal process of identifying investment opportunities, weak risk control, and limited innovation in developing waqf assets. Therefore, improving the competence of nazhir through continuing education, professional certification, risk management training, digital literacy, and strengthening institutional leadership is a strategic step to support the effective implementation of GRC. Nazhir is no longer positioned only as a custodian of waqf assets, but as a social asset manager responsible for optimizing economic and social benefits in a sustainable manner.

The next challenge is the limitations of the institutional and technological infrastructure that supports the implementation of GRC. The implementation of modern governance requires an information system that is able to document waqf assets, monitor investment developments, compile financial reports in real time, and support internal and external audit processes [41]. However, there are still many waqf institutions, especially those at the regional level, that do not have an adequate digital system due to limited operational budgets and technical capabilities. In addition, the cost of implementing GRC is relatively high because it includes information technology development, periodic audits, asset certification, strengthening internal control systems, and increasing human resource capacity. This condition often raises the assumption that the implementation of GRC is only feasible for large-scale waqf institutions. In fact, the essence of GRC does not lie in the complexity of the system used, but in the ability of institutions to build transparent governance, manage risks systematically, and ensure compliance with regulations. Therefore, the gradual digitization of waqf management with the support of the government, the Indonesian Waqf Agency (BWI), universities, and Islamic financial institutions is a solution that can accelerate the institutional transformation of waqf in Indonesia.

In addition to internal factors, GRC implementation also faces challenges in the form of gaps between regulations and practices in the field. Although Indonesia already has Law Number 41 of 2004 concerning Waqf and various derivative regulations, the implementation at the operational level is still not fully effective. There are still uncertified waqf assets, weak coordination between agencies, low public literacy regarding productive waqf, and a non-optimal supervision system for the management of waqf assets. On the other hand, some managers still view the implementation of risk management, audits, and compliance procedures as a form of bureaucracy that slows down the social service process. In fact, from the perspective of GRC, all of these mechanisms actually function as instruments to protect waqf assets so that the benefits can be felt sustainably by future generations. Therefore, policy synergy is needed between the Indonesian Waqf Board, the Ministry of Religious Affairs, Islamic financial institutions, the Financial Services Authority, academics, and

Islamic community organizations to build national standards for productive waqf management based on modern governance while maintaining sharia values.

Based on these challenges, this study offers a strategy to strengthen the implementation of GRC through an integrative and sustainable approach. The strengthening includes improving the professional competence of nazhir through national certification programs, digitizing the management of information technology-based waqf assets, preparing standard operating procedures that refer to GRC principles, strengthening the internal audit function and the Sharia Supervisory Board, as well as developing collaboration between waqf institutions and the government, universities, the halal industry, and Islamic financial institutions. In addition, increasing productive waqf literacy among the community is an important factor in strengthening public trust so that the collection of waqf funds can continue to increase [42], [43]. With the establishment of a strong GRC ecosystem, waqf institutions are not only able to manage assets professionally, but also become Islamic philanthropic institutions that are adaptive to economic developments, able to mitigate various risks, and generate wider socio-economic benefits. The strategy will ultimately strengthen the position of productive waqf as one of the national development instruments that contribute to the achievement of community welfare and sustainable development goals [44], [45].

Table 3. Challenges and Strategies for Strengthening GRC Implementation in Waqf Institutions

Aspects	Key Challenges	GRC Strengthening Strategy	Expected Impact
Human Resources	Nazhir's competence is still limited in governance, investment, and risk management.	Nazhir certification, GRC training, digital literacy enhancement	Increased professionalism and institutional capacity
Technology and Infrastructure	Digitization of assets and information systems is not optimal	Development of waqf information systems, digitization of financial statements, national database of waqf	Increased transparency, efficiency, and management accuracy
Regulation and Compliance	Regulatory implementation is not evenly distributed, there are still uncertified assets.	Strengthening BWI supervision, periodic sharia audits, accelerating asset certification	Legal certainty and protection of waqf assets increased.
Organizational Culture	Resistance to change and implementation of GRC systems	Internalization of governance culture, socialization of risk management, adaptive leadership	Organizations are more responsive to change and risk
Collaboration	Synergy between institutions is still limited.	Partnerships with the government, universities, halal industry, and Islamic financial institutions	The productive waqf ecosystem is getting stronger and more sustainable.

The implementation of Governance, Risk, and Compliance (GRC) in waqf institutions still faces various challenges, especially the limitation of nazhir competence, the lack of optimal use of technology, high implementation costs, and gaps between regulations and management practices in the field. This condition shows that the transformation of waqf governance requires comprehensive institutional

strengthening through improving the quality of human resources, digitizing asset management systems, strengthening audit mechanisms and sharia compliance, and closer synergy between the Indonesian Waqf Board, the government, academics, and Islamic financial institutions. With the implementation of this strategy, the GRC framework is not only an instrument for organizational control, but also a foundation in building a waqf institution that is professional, transparent, adaptive to risks, and able to optimize productive waqf management to improve the socio-economic welfare of the community sustainably.

CONCLUSION

Based on the results of the research, it can be concluded that the implementation of Governance, Risk, and Compliance (GRC) is a strategic approach that can optimize the management of productive waqf in the socio-economic sector through strengthening institutional governance, investment risk control, and compliance with sharia regulations and principles. The implementation of governance encourages the creation of transparency, accountability, and professionalism of nazhir to increase public trust as the main capital in the collection of waqf assets. Meanwhile, the implementation of risk management ensures the sustainability of the principal value of waqf assets through the identification, mitigation, and control of various investment risks, so that waqf assets remain productive and able to generate sustainable economic benefits. The compliance aspect provides legal certainty and sharia compliance through the fulfillment of the provisions of laws and regulations, compliance audits, and supervision of the Sharia Supervisory Board, thereby strengthening the institutional legitimacy of waqf. The synergy of the three components has been proven to be able to increase the effectiveness of productive waqf asset management, which has an impact on the development of the real sector, empowerment of sharia-based MSMEs, expansion of access to education and health services, job creation, and strengthening the socio-economic resilience of the community in accordance with the goals of sharia maqashid. However, the implementation of GRC still faces challenges in the form of limited competencies, suboptimal digitization of asset management, high implementation costs, and gaps between regulations and practices in the field. Therefore, it is necessary to strengthen the capacity of human resources, digitize the waqf management system, strengthen the supervisory mechanism, and foster closer collaboration between the government, the Indonesian Waqf Agency, Islamic financial institutions, academics, and the community so that GRC can be implemented comprehensively. Thus, GRC is not only an instrument of organizational governance, but also the foundation of productive waqf transformation as an instrument of Islamic socio-economic development that is professional, sustainable, inclusive, and able to improve the welfare of the people fairly.

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Author Contribution

Fahmi Jamaluddin solely conceived the research idea, designed the study, conducted the literature review, collected and analyzed the data, interpreted the findings, prepared the manuscript, revised the article critically, and approved the final version for publication. The author accepts full responsibility for the integrity, originality, and academic quality of the entire research and manuscript.

Conflicts of Interest

The author declares that there are no financial, professional, institutional, or personal conflicts of interest related to this study. The research was conducted independently, and all analyses, interpretations, and conclusions were developed objectively without any external influence that could affect the credibility, impartiality, or integrity of the reported findings.

REFERENCES

- [1] T. Fanshurna and R. Pujiastuti, “Model Integratif Pengelolaan Wakaf Produktif dan Pemberdayaan Ekonomi Lokal Pesantren,” *J. Econ. Bus. UBS*, vol. 14, no. 5, pp. 1–14, 2025, <https://doi.org/10.52644/7ft3ey33>.
- [2] N. E. Rupita and Mawardi, “Peran Wakaf Produktif dalam Pemberdayaan Ekonomi Umat: Studi pada Model Pengelolaan Berbasis Maqashid Syariah,” *Al-Muzdahir J. Ekon. Syariah*, vol. 07, no. 02, pp. 147–164, 2025, <https://doi.org/10.55352/ekis>.
- [3] Asep Ahmad Ridwansah, “Pengelolaan Wakaf Produktif Berbasis Nilai Islam Upaya Mewujudkan Ekonomi Berkelanjutan Dan Berkeadilan,” *Equal. J. Islam. Law*, vol. 3, no. 2, pp. 1–18, 2025, <https://doi.org/10.15575/ejil.v3i2.1960>.
- [4] M. Ramin, “Strategi Optimalisasi Potensi Wakaf Produktif Sebagai Instrumen Pemberdayaan Ekonomi Umat Dalam Perspektif Maqashid Syariah,” *J. Investasi Islam*, vol. 06, no. 2, pp. 850–858, 2025, <https://doi.org/10.32806/jii.v6i2.1430>.
- [5] M, Q. Q. Yusran, Masithoh, Nuha, Waston, and A. Nirwana, “The Practice of Changing the Status of Change of Waqf Property in the Islamic Social Economic View,” *J. Ecohumanism*, vol. 3, no. 6, pp. 229–238, 2024, <https://doi.org/10.62754/joe.v3i6.3996>.
- [6] M. Nashirudin, R. Razali, and A. K. Ulfah, “Modernizing Zakat and Waqf Management in Indonesia: A Legal And Governance Perspective,” *Maz. J. Pemikir. Huk. Islam*, vol. 24, no. 1, pp. 198–220, 2025, <https://doi.org/10.21093/mj.v24i1.9419>.
- [7] M. N. H. Ryandono *et al.*, “Overcoming barriers to optimizing cash waqf linked sukuk: A DEMATEL-ANP approach,” *Soc. Sci. Humanit. Open*, vol. 11, 2025, <https://doi.org/10.1016/j.ssaho.2025.101588>.
- [8] M. Munir, “Transformasi Wakaf Produktif Berbasis Nilai- Nilai Al-Qur’an: Pendekatan Studi Kasus Di Indonesia,” *J. Din. Ekon. Syariah*, vol. 12, no. 1, pp. 339–356, 2025, <https://doi.org/10.53429/jdes.v12i1.1354>.
- [9] “Manaf, Sofwan, et al. ‘Manajemen Wakaf Produktif untuk Kemandirian Lembaga Pendidikan Islam: Studi Kasus di Pesantren Darunnajah.’ *JoEMS (Journal of Education and Management Studies)* 8.6 (2025): 260-271.”
- [10] M. Choiri and F. Ardyansyah, “The Politics of Waqf Practice in Pesantren Kyai Families in Bangkalan Madura, Indonesia,” *El-Usrah*, vol. 7, no. 1, pp. 272–293, 2024, <https://doi.org/10.22373/ujhk.v7i1.22186>.
- [11] D. Bonang, S. Ismail, and R. Sukmana, “Empowering the Future of Cash Waqf Through Digitalisation: an Insight Into the Philanthropic Intention of the Indonesian Muslim Community,” *ISRA Int. J. Islam. Financ.*, vol. 16, no. S1, pp. 94–117, 2024, <https://doi.org/10.55188/ijif.v16iS1.586>.
- [12] H. Hatimah, E. G. Sukoharsono, A. Djamhuri, and N. Adib, “Exploring Waqf Management Transformation: Opportunities and Challenges (case study in Ismuha Yahya Foundation Pontianak),” *J. Ecohumanism*, vol. 3, no. 8, pp. 58–68, 2024, <https://doi.org/10.62754/joe.v3i8.4712>.
- [13] Mujahidin, M. Imran, N. Bin Sapa, Fasiha, S. Aisya, and Trimulato, “Challenges in Waqf Management and Its Implications for the Social and Economic Welfare of Muslim Communities: A Cross-Country Comparative Analysis,” *J. Ilm. Mizani*, vol. 12, no. 1, pp. 168–184, 2025, <https://doi.org/10.29300/mzn.v12i1.7765>.

- [14] “Lena, Elena, et al. ‘Advokasi dan Kolaborasi Akademik dalam Penguatan Kelembagaan Ekonomi Syariah: Sinergi Ilmu, Etika dan Kebijakan.’ *Jurnal Ekonomi Islam* 3.2 (2025): 87-104.”.
- [15] A. Wira, N. Huda, A. S. Long, W. L. Augustina, Meirison, and Y. Afrida, “Legal Study of Dzurri Waqf and its Implementation towards Strengthening High Heritage Assets in Minangkabau, West Sumatra, Indonesia,” *Juris J. Ilm. Syariah*, vol. 22, no. 2, pp. 329–341, 2023, <https://doi.org/10.31958/juris.v22i2.9383>.
- [16] Johari, Wahidin, Magfirah, Zulkifli, Mawardi, and A. Maulidizen, “The Role of Temporary Waqf in Improving the Social Welfare of the Muslim Community,” *J. Ecohumanism*, vol. 3, no. 8, pp. 2578–2587, 2024, <https://doi.org/10.62754/joe.v3i8.4908>.
- [17] A. Lateh *et al.*, “Synthesizing Pondok Modern Darussalam Gontor Best Practices for Managing Islamic Private Schools in Thailand,” *Educ. Process Int. J.*, vol. 18, 2025, <https://doi.org/10.22521/edupij.2025.18.528>.
- [18] R. Haryanto, L. Maufiroh, and S. H. Sulaiman, “Waqf Land in Madura; Its Management and Typical Dispute Resolution,” *Al-Ihkam J. Huk. dan Pranata Sos.*, vol. 18, no. 2, pp. 496–518, 2023, <https://doi.org/10.19105/al-lhkam.v18i2.7570>.
- [19] Maryani *et al.*, “Islamic Philanthropy: Implementation of Regulations And Utilization of Waqf Proceeds in Jambi,” *J. Huk. Islam*, vol. 21, no. 1, pp. 159–180, 2023, https://doi.org/10.28918/jhi_v21i1_07.
- [20] U. Priyadi, S. Achiria, M. A. Imron, and G. R. Zandi, “Waqf management and accountability: Waqf land financing models for economic wellbeing,” *Asian Econ. Financ. Rev.*, vol. 13, no. 1, pp. 74–84, 2023, <https://doi.org/10.55493/5002.v13i1.4696>.
- [21] Nurmulya, Dinda. ‘Inovasi Pengumpulan Dana Wakaf Uang Untuk Pemberdayaan Ekonomi UMKM Dalam Perspektif Maqasid Syariah (Studi Kasus BMT AU Surabaya).’ Syarikat: *Jurnal Rumpun Ekonomi Syariah* 8.1 (2025): 94-109, [https://doi.org/10.25299/syarikat.2025.vol8\(1\).21541](https://doi.org/10.25299/syarikat.2025.vol8(1).21541).
- [22] A. Zaenurrosyid, H. Sholihah, Miftahuddin, and Nawawi, “The Diversity of Islamic Javanese Kings’ Waqf Management: Ruislag and Various Social Conflicts,” *Al-Ihkam J. Huk. dan Pranata Sos.*, vol. 20, no. 1, pp. 227–252, 2025, <https://doi.org/10.19105/al-lhkam.v20i1.14286>.
- [23] “Muhammad, Alfian, Sumardi Efendi, and Muhammad Alwin Abdillah. ‘Transformasi Peran Nazhir Tradisional Menuju Nazhir Profesional dalam Ekosistem Wakaf Modern.’ *Jurnal Investasi Islam* 11.1 (2026): 755-779, <https://doi.org/10.32505/jii.v11i1.14997>.
- [24] Mukhlisin, J. Ramadhan, and I. K. Hayatullah, “Zakat and Waqf Synergies to Accelerating Sustainable Development,” *J. Sustain. Dev. Regul. Issues*, vol. 3, no. 1, pp. 29–54, 2025, <https://doi.org/10.53955/jsderi.v3i1.56>.
- [25] R. P. Wijaya, “Cash Waqf Linked Dinfra (Cwl-Fra) As Waqf Innovation Model Integrated With Infrastructure Instrument for National Economic Recovery and Sustainability,” *Malaysian J. Syariah Law*, vol. 11, no. 2, pp. 330–343, 2023, <https://doi.org/10.33102/mjsl.vol11no2.422>.
- [26] M. Hadi, J. Rum, W. Maguni, and A. M. Radiamoda, “Toward a Holistic Legal Framework for Effective Waqf Implementation: Integrating Islamic Socio-Economic Models,” *Volksgeist J. Ilmu Huk. dan Konstitusi*, vol. 8, no. 1, pp. 15–42, 2025, <https://doi.org/10.24090/volksgeist.v8i1.12590>.
- [27] A. Zaenurrosyid, S. A. Bin Shahaudin, H. Sholihah, and Asmaji, “The Dynamics of Productive Waqf Management of Islamic Kingdom Property in Java,” *Al-’Adalah*, vol. 21, no. 1, pp. 149–174, 2024, <https://doi.org/10.24042/adalah.v21i1.16384>.
- [28] H. Tanjung, Q. Ayuniyyah, A. R. Yulianto, and A. Devi, “Developing Waqf Core Principles Implementation Index Application for Measuring Waqf Management in Indonesia,” *WSEAS Trans. Bus. Econ.*, vol. 22, pp. 2022–2036, 2025, <https://doi.org/10.37394/23207.2025.22.162>.
- [29] N. M. H. Mohaiyadin, A. Aman, M. R. Palil, and S. M. Said, “Addressing Accountability and Transparency Challenges in Waqf Management Using Blockchain Technology,” *J. Islam. Monet. Econ. Financ.*, vol. 8, pp. 53–80, 2022, <https://doi.org/10.21098/jimf.v8i0.1413>.
-

- [30] Sudirman, I. Abdullah, S. Z. Qudsy, Fakhruddin, and S. Bachri, “Dysfunction of Muslim’s Public Resource: A Study of Waqf Land Disorganization in Indonesia,” *Jure J. Huk. dan Syar’iah*, vol. 14, no. 1, pp. 92–110, 2022, <https://doi.org/10.18860/j-fsh.v14i1.16240>.
- [31] A. Zein, S. Syam, and L. N. Kharomah, “Implementation of Waqf Management in the Development of Islamic Education,” *Munaddhomah*, vol. 3, no. 3, pp. 241–251, 2022, <https://doi.org/10.31538/munaddhomah.v3i3.281>.
- [32] Sobhan, P. Setiawan, Kholidah, R. Ritonga, and K. Hasibuan, “Quality Of Human Resources in Waqf Institution: Counterproductive Study on Muhammadiyah Charity Business,” *Qual. - Access to Success*, vol. 23, no. 187, pp. 222–231, 2022, <https://doi.org/10.47750/QAS/23.187.28>.
- [33] A. Hakimah, R. Marom, Islamiyati, A. A. Musyafah, and A. A. Budiman, “The Implementation of Land Waqf Law in Indonesia and Malaysia as a Stage to Land Waqf Law Reform in Indonesia: A Comparative Study,” *Law Reform J. Pembaharuan Huk.*, vol. 18, no. 2, pp. 164–183, 2022, <https://doi.org/10.14710/lr.v18i2.46673>.
- [34] M. Mahsun, A. Djalaluddin, N. Asnawi, N. Wahyuni, N. Danila, and M. M. Ali, “Green Waqf: Sustainable Surplus Perspective Balanced Scorecard Analysis,” *Karsa*, vol. 30, no. 2, pp. 266–297, 2022, <https://doi.org/10.19105/karsa.v30i2.8472>.
- [35] S. T. Maretianiandini, F. Hilmiyah, S. Akbar, and A. Adam Hamid, “Implementation of Advanced Technology in Waqf Management: A Systematic Literature Review,” *J. Islam. Econ. Laws*, vol. 8, no. 01, pp. 210–236, 2025, <https://doi.org/10.23917/jisel.v8i01.8518>.
- [36] M. Huda and L. Santoso, “Implementation of Corporate Waqf Core Principles in the Development of Waqf in Indonesia,” *Acad. J. Interdiscip. Stud.*, vol. 11, no. 5, pp. 114–124, 2022, <https://doi.org/10.36941/ajis-2022-0129>.
- [37] A. Kaur and K. Gurjar, “Tradition to Transformation: Review on Evolution, Impact and the Road of Accountability in the WAQF Institution under Indian Legal Framework,” *Univ. Asia Pacific J. Law Policy*, vol. 10, no. 1, pp. 84–98, 2025, <https://doi.org/10.63755/sn22125/sl6>.
- [38] Y. E. Prayitno, F. Hidayat, and P. A. Widodo, “The Agreement to Buy and Sell Mu’athah in Supermarkets Reviewed from the Rules of Fiqhiyah Al-Istihsanu bil ’Urf,” *Demak Univers. J. Islam Sharia*, vol. 2, no. 1, pp. 15–26, 2024, <https://doi.org/10.61455/deujis.v2i01.84>.
- [39] L. Yafi, “Productive Waqf Development Strategy to Grow Community Economy in Selangor Malaysia,” *Demak Univers. J. Islam Sharia*, vol. 2, no. 03, pp. 189–198, 2024.
- [40] Afni Regita Cahyani Muis, Dr. Syamsuri, M. Sh, and Dr. Mohammad Taqiuddin, “Model of Productive Waqf Policy Governance for Sustainable Economic Development: a Pestel Analysis Approach,” *Hamdard Islam.*, vol. 48, no. 2, pp. 101–122, 2025, <https://doi.org/10.57144/hi.v48i2.1190>.
- [41] R. Anggriani, Farhanin Abdullah Asuhaimi, Jarot Wahyudi, N. Fauziah, and Fadhilah Abdullah Asuhaimi, “Agreement of Waqf in Indonesia and Malaysia: Harmonisation with Quranic Principles and Modern Legal Frameworks,” *Ijtihad J. Wacana Huk. Islam dan Kemanus.*, vol. 25, no. 2, pp. 231–255, 2025, <https://doi.org/10.18326/ijtihad.v25i2.231-255>.
- [42] R. Susanto, Q. Butlam, and M. A. Ibrahim, “Implementation of Concepts and Thoughts on Sharia in DSKS (Dewan Syariah Kota Surakarta),” *Demak Univers. J. Islam Sharia*, vol. 1, no. 3, pp. 179–187, 2023, <https://doi.org/10.61455/deujis.v1i03.49>.
- [43] F. A. Qolbi *et al.*, “Development and Application of Akad Rahn in Nash Perspective,” *Demak Univers. J. Islam Sharia*, vol. 2, no. 1, pp. 47–54, 2024, <https://doi.org/10.61455/deujis.v2i01.95>.
- [44] M. M and I. Firdaus, “Management of Productive Waqf for Empowerment of the Ummah,” *Profetika J. Stud. Islam*, vol. 21, no. 2, pp. 253–259, 2020, <https://doi.org/10.23917/profetika.v21i2.13085>.
- [45] K. Hamidu, A. Amsalu, and J. H. Srifyan, “Social Safety Concept : Exploring Human Values, Justice, and Sharia,” *Solo Int. Colab. Publ. Soc. Sci. Humanit. Publ. Soc. Sci. Humanit.*, vol. 2, no. 1, pp. 61–72, 2024, <https://doi.org/10.61455/sicopus.v2i01.120>.
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