

Blockchain Technology as a Tool for Enhancing Governance in Non-Governmental Organizations : An Analysis of Humanitarian Applications in the Arab Context

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Abstract :

This paper explores the transformative potential of blockchain technology in enhancing governance within Arab non-governmental organizations (NGOs). Through a critical analysis of field experiments in Jordan, Lebanon, and Tunisia, it demonstrates how blockchain improves transparency, accountability, and efficiency in humanitarian aid. The study highlights key challenges, including weak infrastructure, lack of legal frameworks, and institutional resistance. It propose a five-pillar Arab model for digital humanitarian governance integrating legal, technical, and cultural dimensions. Blockchain is positioned not merely as a technical innovation, but as a tool for building trust, institutional legitimacy, and sustainable humanitarian governance in fragile Arab contexts

Keywords: Blockchain; Humanitarian governance; Arab NGOs; Digital transparency; Accountability; Smart aid

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1. Introduction

Among the most significant players in the fields of development and humanitarian assistance are non-governmental organisations (NGOs), particularly in nations dealing with protracted crises or ongoing hostilities. In order to guarantee the efficient and open use of resources, it is now more important than ever to improve good governance due to the growth of humanitarian financing and the variety of its sources (transparency-international-corruption-perception, 2021). According to research from Transparency International, one of the main reasons why donor confidence is declining and the impact of aid is diminished is that certain non-governmental organisations have inadequate governance and accountability systems.

The institutional framework for coordinating supplies, information, and financial resources between donors, recipients, and field-based organisations in order to deliver aid effectively and transparently is known as Humanitarian Operations Management (HOM) (Hossein Baharmand, 2021). Nonetheless, prior research has demonstrated that numerous significant emergencies have exposed deficiencies in institutional reaction, such as the US Federal Emergency Management Agency's (FEMA) 2005 response to Hurricane Katrina, where the consolidation of authority in one organisation resulted in delays in resource allocation (Waugh & Streib, 2006).

In a similar vein, research on the 2017 hurricane season in the US and Puerto Rico revealed that relief efforts were adversely impacted by a lack of current data and reliable field information. According to recent research, administrative corruption, a lack of transparency, and traceability are some of the biggest structural issues facing the management of humanitarian aid. The need for digital platforms that can guarantee openness and quick information sharing across participants has been reaffirmed by the COVID-19 pandemic, which has also made it evident how weak traditional humanitarian governance methods are (Č, 2021).

In this context, blockchain technology has surfaced as a game-changing instrument that has the potential to transform humanitarian governance practices. To improve trust, accountability, and institutional transparency, it uses a distributed network to record transactions and guard against record manipulation.

Additionally, when specific criteria are satisfied, smart contracts allow financial or legal obligations to be executed automatically, eliminating the need for middlemen and improving operational efficiency.

However, there are several barriers to implementing blockchain technology in Arab humanitarian organisations, such as a lack of regulatory laws, a lack of digital infrastructure, and opposition to institutional and cultural change (Č 2020). Besiou According to recent studies, these structural issues necessitate the creation of an Arab policy framework that connects the demands of good governance with technological innovation.

1.1 Research gap:

There is still very little Arabic literature on blockchain applications in humanitarian relief, despite the fact that interest in these applications is expanding internationally. The majority of research has been on experiences from other countries, especially the World Food Programme's Building Blocks initiative in Bangladesh and Jordan, which is one of the most well-known worldwide models for using blockchain technology to manage financial transfers (World Food Programme 2019).

However, neither the impact of this technology on the internal administration of regional non-governmental organisations nor the institutional and legal specificities of Arab contexts have been thoroughly examined in these studies.

Additionally, the majority of the current literature concentrates on solely technical topics without making enough mention of good governance principles like accountability, openness, and participation. To far, there are no quantitative or qualitative methods for assessing how blockchain affects institutional governance metrics. Furthermore, no all-encompassing Arab framework exists to direct organisations towards the moral and responsible application of decentralised technologies, underscoring the necessity of analytical research that incorporates institutional, political, and technological aspects when examining the connection between blockchain and governance in the arab humanitarian context.

1.2 Research problem :

In light of the aforementioned, the following central query centres the research problem: How much can the governance of non-governmental organisations in precarious Arab circumstances be qualitatively changed by

blockchain technology?

There are several sub-questions that arise from this one:

1. What structural elements—such as foreign finance, regulatory framework, and digital infrastructure—have an impact on blockchain adoption in Arab humanitarian work?
2. In what ways may blockchain improve accountability and transparency in the administration of humanitarian programs and resources?
3. Does technology help lessen financial and administrative corruption in the distribution of aid?
4. What institutional and cultural obstacles stand in the way of this field's shift to digital governance?

1.3 Research hypotheses:

The following primary hypothesis forms the basis of this investigation: If the right institutional, legal, and regulatory framework is in place, blockchain technology can be a useful instrument for enhancing governance in Arab NGOs.

The following sub-hypotheses are derived from this hypothesis:

❖ **Technical hypothesis:** The likelihood of a successful blockchain implementation increases with the strength and security of the digital infrastructure.

❖ **Legal hypothesis:** Institutional trust is strengthened when smart contracts have clear legal frameworks.

❖ **Institutional hypothesis:** Successful digital transformation requires an internal drive to reorganise organisational procedures.

❖ **Cultural hypothesis:** Adopting the principles of digital transparency improves institutional trust and lessens resistance to change.

❖ **Financial hypothesis:** One of the main factors facilitating the adoption of technology is financial support, both domestically and internationally.

1.4 Research goals:

The study's objectives are as follows:

- ❖ Examine the practical possibilities of blockchain technology to enhance non-governmental organisations' governance in the Arab world.
- ❖ Determine the legal and institutional obstacles preventing the technology's uptake in humanitarian settings in the Arab world.
- ❖ To make it easier to integrate blockchain technology into humanitarian work systems, provide a tiered institutional architecture.
- ❖ Evaluating how blockchain might affect accountability, transparency, and operational effectiveness.
- ❖ . Offer organisations and decision-makers useful suggestions to encourage the region's humanitarian digital transformation.

1.5 The study's contribution:

By comparing the experiences of the Arab world (Jordan, Lebanon, the United Arab Emirates, Morocco, and Tunisia), this study helps to close the theoretical gap between blockchain and humanitarian governance in the Arab context.

By combining theories of network governance, the political economy of technology, and human diplomacy, it also enhances scholarly writing. Using recent institutional reports from the World Bank, the Arab Monetary Fund, the United Nations, and the World Food Programme, the study also offers decision-makers an Arab knowledge base (Arab Monetary Fund, 2022, and World Bank, 2021).

In order to assess the degree to which blockchain technology might improve digital trust and institutional sovereignty in Arab humanitarian efforts, the study employs a critical analytical methodology that blends a qualitative approach with comparative analysis.

2. Theoretical Framework

2.1 What Blockchain Technology Is and How It Works:

According to Narayanan (2016), blockchain technology is a distributed ledger that uses a network of autonomous nodes to securely and transparently record data and transactions. These nodes use cryptographic algorithms to confirm

the legitimacy of transactions, negating the need for a central authority.

One of the most dependable technologies for data storage is blockchain, which works on the decentralisation principle and stores all transactions in chronologically linked blocks to create an unchangeable and unerasable chain. This technology is regarded as a radical shift in information management because it lowers the risk of manipulation or corruption by using a distributed consensus system that guarantees the integrity of records in real time (Tapscott, 2016). According to Christidis and Devetsikiotis (2016), blockchain is a comprehensive framework for automatically and transparently recording social, administrative, and economic transactions. It is not just about digital currency like Bitcoin. This definition emphasises the political aspect of change management in decentralised systems by characterising it as a type of political economy of technology. The term "blockchain governance" refers to the institutional process of rule-making and decision-making within distributed networks, where code serves as both a regulatory infrastructure and a governance tool. (De FilippiČ 2022)

It expresses a combination of technological and institutional governance in the public domain and is described in the public sector as the process of collective decision-making and rule enforcement using dispersed technical networks backed by political and regulatory organisations. (VerduynČ Campbell, 2021). Because the technical architecture of blockchain initiatives reflects political concepts like decentralisation, trust, and individual sovereignty, they can also be seen as a type of prefigurative politics.

making them an ideological endeavour that reinterprets power and social connections rather than merely a technical tool (Č 2020) Rozas.

2.2 Characteristics of blockchain technology and how they affect governance:

One of the most notable modern technological advancements that has altered the ideas of accountability and transparency in both public and private entities is blockchain technology. It is a strong technological foundation for creating good governance systems in non-governmental organisations because of a number of core features.

First, the decentralisation principle underlies blockchain technology, which distributes data and transactions among a network of autonomous nodes as opposed to depending on a single central server. By ensuring the independence of all parties involved, lowering the concentration of information power in one place, and lowering the possibility of manipulation or system failure, this distribution fosters shared oversight and communal governance. (Yin, 2021)

Second, there is less chance of financial and administrative corruption because the technology is very transparent, enabling all parties to see verified transactions and documented data. According to World Bank estimates, the implementation of blockchain technology in the public sector can help cut down on corrupt expenditure by 20% to 30% by removing needless middlemen and tracking funding flows in real time. (Bank, 2021).

Third, one of the features that makes blockchain so reliable is its immutability, which prevents any transaction from being changed or removed once it has been added to the chain without the unanimous approval of all nodes involved. This offers an unprecedented level of digital integrity in information management systems and almost eliminates data modification.

Fourth, the idea of institutional autonomy is expanded practically via smart contracts. They are digital programs that run themselves when certain criteria are satisfied, eliminating the need for financial middlemen or human interaction. This function helps to improve confidence between donors and recipients, decrease procedural errors, and increase the operational efficiency of humanitarian organisations. (Yin, 2021)

These four features work together to give blockchain technology a special capacity to raise the standard of governance in non-governmental organisations by guaranteeing immediate accountability, boosting trust between institutional actors, and improving resource flow transparency. Because of this, blockchain can be viewed as a digital governance tool that helps businesses move from traditional management to a more dependable, equitable, and efficient approach.

2.3 NGOs' Governance: An Overview and Difficulties:

One of the most well-known players in the development and humanitarian sectors are non-governmental organisations (NGOs), which support the government in delivering social services and encouraging public engagement. As

their functions and funding networks have grown internationally, strong governance has emerged as a strategic requirement to guarantee accountability, transparency, and a positive impact on recipient communities.

First: The concept of governance in non-governmental organizations:

The idea of non-governmental organisation governance In its broadest definition, governance is the collection of structures, procedures, and principles that control how decisions are made, how policies are carried out, and how resources are distributed within organisations in order to guarantee effectiveness and accountability.

In the context of non-governmental organisations, governance refers to the organisational and administrative framework that establishes guidelines for ethical responsibility and transparency as well as the relationships between the executive team, funders, beneficiaries, and the board of directors (Č 2003).

The author notes that this sector's governance is a complicated web of vertical and horizontal relationships that extends beyond the confines of a single organisation to a larger network that consists of governments, the commercial sector, and civil society. In this way, the legal, political, and economic aspects of non-governmental organisations impact their governance, which becomes multi-level (Č 2007).

According to the OECD (2020), three essential elements form the basis of good governance in this sector:

- ❖ Openness in the way resources and projects are managed
- ❖ Accountability to recipients, the public, and donors
- ❖ involvement in decision-making and guaranteeing stakeholder participation.

So theoretically, non-governmental organisation governance is different from public and private sector governance since the former seeks social fairness and public good rather than political power or financial gain. Therefore, to maintain a balance between independence and oversight, a mix of ethical and regulatory measures is needed (NajamČ 1996).

Second: NGOs' Governance Issues:

NGOs encounter a variety of systemic obstacles that impede the application of good governance principles, particularly in developing and conflict-affected areas.

According to studies, these difficulties fall into four major categories:

1) Poor administrative and financial transparency Effective digital accounting systems are frequently lacking in organisations, which makes it challenging to monitor funding sources and expenses. This lack of transparency raises the possibility of financial impropriety and damages the relationship of trust between executive management and contributors (Č 2021).

According to a 2003 study by Ebrahim, many businesses in Asia and Africa use self-reported data without external monitoring, which makes responsibility more formal than actual.

2) Lack of autonomous institutional accountability systems Certain organisations have a hierarchical structure, with a small number of people making all of the decisions, frequently without the effective participation of funders or beneficiaries. Organisations lack the input they need to change direction and enhance performance when any of these systems aren't in place. Helmig, Bernd (2004)

3) Inadequate human and organisational capabilities The operational performance of many NGOs is diminished by a lack of proficiency in the fields of financial analysis, data management, and strategic planning (Lewis, 2018).

Another element that compromises institutional knowledge continuity and impacts organisational sustainability is high worker turnover, particularly in humanitarian crises situations (Wagner, 2018).

3. Political and legal obstacles

Organisations operate in complicated regulatory settings with lax laws or overlapping donor and government agency jurisdictions in several Arab nations. In certain instances, organisations' capacity to carry out their activities efficiently is restricted by limitations placed on foreign funding or freedom of movement in the field.

The implementation of contemporary technological solutions like blockchain in operations management and finance is further hampered by the lack of a consistent regulatory framework for digital governance. (Bank Increasing Government Efficiency and Openness: Combating Corruption Č 2020)

It is evident that non-governmental organisation governance is a complicated political and institutional issue pertaining to power dynamics, accountability, and transparency in multi-level networks rather than just an administrative or technical one.

Organisations must create efficient governance structures that strike a balance between autonomy and supervision, operational adaptability and public responsibility, as their resources and clout grow.

In order to get over these systemic obstacles and boost institutional trust among humanitarian players, it is now vital to investigate new digital technologies, such as blockchain technology.

3.1 The connection between governance and blockchain:

One of the most well-known technologies that has significantly altered the ideas of authority, regulation, and institutional trust is blockchain technology. It provides an alternative form of governance founded on the ideas of decentralisation and group agreement as opposed to conventional hierarchical control, and it is not only a system for storing data or carrying out digital transactions.

First : The transition to decentralised governance from centralisation :

(De Filippi, the invisible politics of Bitcoin: governance crisis of a decentralised infrastructure) characterises this shift as a shift from bureaucratic legitimacy to technical legitimacy, where code becomes a set of "digital laws" that regulate interactions within the network without direct human intervention. Blockchain reinterprets the relationship between power and information from a different perspective than traditional institutional systems, which rely on a central authority for control and oversight.

In this way, blockchain can be viewed as a technology for "distributed governance" that limits decision-making monopolies and redistributes authority among participants.

According to Andrej Zwitter (2018), blockchain represents a new trend in international politics towards institutional self-governance in which legitimacy is determined by consensus among a decentralised network of independent players rather than by the government or regulatory agencies.

By integrating accountability and transparency within the system itself rather than as the outcome of external oversight, this strategy alters the dynamic between institutions and society.

Second: The foundations of effective governance: digital accountability and transparency

Among the most crucial ideas where governance and blockchain meet are transparency and accountability. Blockchain turns transparency from an ethical value into a quantifiable and verifiable technical mechanism by creating an unchangeable public record of transactions that allows various stakeholders (governments, organisations, donors, and citizens) to directly verify transactions without the need for middlemen (Tapscott D. &, 2017).

According to reports by the OECD CITATION OEC 5121, the use of blockchain technology in the public sector offers a way to track government expenditures and foreign aid with previously unheard-of efficiency. It also helps to reduce administrative corruption by publicly and permanently documenting all transactions.

By minimising human interference and strengthening the idea of institutional autonomy, blockchain also encourages institutional responsibility through "smart contracts," which are computer programs that run automatically when certain criteria are satisfied.

“From a political standpoint, digital transparency is a tool for rebuilding institutional trust, especially in sectors that lack independent oversight, like humanitarian work.” (Č Enhancing government effectiveness and transparency: The fight against corruption.Č 2020) Blockchain enables aid flows to be tracked in real time, allowing donors and beneficiaries to monitor performance directly, replacing manual reports and paper documents.

Third: The reinvention of authority and digital legitimacy

The philosophical question of what constitutes political legitimacy in the digital era is brought up by blockchain. Since its design involves political values

that connect with libertarian political and economic thought, such as freedom, independence, and the elimination of state power, it cannot be seen as a neutral technology. It can be modified to support humanistic and participative government that aims to strengthen communities rather than undermine institutions, despite its technological nature. One could argue that blockchain is a political instrument with two institutional aspects in this context. Through the use of "program code," it reinterprets the idea of legitimacy while also offering a new organisational structure that strikes a balance between control and freedom, openness and privacy. (December 2021, outi korhoneč)

Modern governance, which aims to empower people without sacrificing institutional security, is based on this equilibrium.

Fourth: How blockchain technology and good governance concepts complement each other

The comparative study demonstrates that blockchain and governance have a complementing rather than hostile relationship.

Blockchain provides a real implementation of good governance ideals, including accountability, openness, participation, and the rule of law, through transparent technical methods.

Blockchain is a technology instrument for advancing sustainable development goals, especially Goal 16 on creating inclusive, responsible, and effective institutions, according to the Bank study Enhancing Government Effectiveness and Transparency: The battle against corruption.č 2020.

In order to promote integrity and reduce conflicts of interest, they suggest incorporating blockchain into public governance frameworks to create systems for monitoring government contracts, allocating resources, and tracking performance. This makes it possible for non-governmental organisations to embrace hybrid digital governance, which combines traditional oversight with technology-based decentralised management, boosting their independence and efficiency.

From the standpoint of political science, blockchain signifies a transformation of institutional power structures, moving trust from the top down to the bottom up, from bureaucracy to openness, and from dominance to involvement.

In addition, it offers a useful framework for applying the concepts of good governance to development and humanitarian settings.

Blockchain is therefore a strategic tool for restoring institutional legitimacy, particularly in the Arab world, where the crisis of trust is one of the most significant structural challenges in humanitarian and development work. This is because the relationship between blockchain and governance is not just one between technology and management, but rather one between power, knowledge, and trust in the age of digitalisation (UNDPČ 2023)

4. Blockchain applications in humanitarian efforts in the Arab world: moving towards digital aid governance

Given the rise in prolonged crises and the complexity of assistance contexts, which have called for new systems for accountability and transparency, the Arab world has emerged as a testing ground for digital solutions in humanitarian management throughout the last ten years.

In this regard, a number of innovative projects have surfaced that use blockchain technology to coordinate money transfers and distribute help, which has improved operational effectiveness and decreased expenses.

The characteristics of a new Arab digital government that blends institutional authority and technological innovation are shown by these experiences ((AMF)Č 2021).

4.1. The experience of Jordan: the WFP-UN Women "Building Blocks" project:

One of the most well-known real-world instances of blockchain technology being applied to the provision of humanitarian relief is the Building Blocks project in Jordan. The initiative was started in 2017 and was carried out in the Syrian refugee camps of Zaatari and Azraq under the direction of the World Food Programme (WFP) and in cooperation with UN Women.

Beneficiaries can buy food directly from contracted stores without the need for financial middlemen thanks to the system's use of biometric information (iris scanning) to confirm their identities. (2019, 2022) By 2023, the project had processed over 25 million financial transactions totalling more than \$555 million

and provided services to over a million refugees in Bangladesh and Jordan. Additionally, by rerouting the financial excess into women's empowerment initiatives through the "Cash for Work" campaign, the technology helped reduce operating costs by up to 30%.

Through blockchain accounts that could be accessed with eye scans, the technology was utilised to protect the salary of female workers in the "Oases" centres within the camps during the COVID-19 pandemic. This helped to keep economic activity going despite health restrictions and minimised wage payment delays. (UN JORDAN, 2022)

Nevertheless, despite this achievement, assessments have revealed legal and regulatory obstacles pertaining to privacy protection and the recording of digital transactions, as well as the requirement for continuous beneficiary training on digital system usage.

This illustration demonstrates that the legal system and blockchain do not function independently; rather, a parallel institutional context is necessary to guarantee the technology's safe and equitable application. (UNHCR, 2022)

4.2 Following the Beirut port explosion, Lebanon: the necessity of openness and cooperation

The August 4, 2020, explosion in the port of Beirut exposed the weakness of humanitarian coordination systems. The lack of a common database across humanitarian organisations operating in Lebanon resulted in duplication of distribution and a lack of transparency, according to Groupe URD's Real-Time Evaluation study. (Č 2022)

The proposals stressed the need to establish safe and verifiable digital records to document aid and enhance collaboration between implementers and donors, even though there was no real blockchain initiative at the time.

According to the UN assessment, one of the biggest barriers to humanitarian efficiency in Lebanon was the absence of standardised data and trust in transaction documentation. For this reason, blockchain is a viable solution for future transparent information governance. It emphasises the significance of the institutional context before technology is applied and demonstrates how, with the

right legal and technological framework in place, blockchain might be a structural remedy for trust crises in Arab humanitarian settings. (URDČ 2020)

4.3 The experience of Mercy Corps in Lebanon: digital transformation and humanitarian innovation:

An illustration of how digital technology might be utilised to improve social and economic resilience in areas that are at risk is Mercy Corps' experience in Lebanon. In collaboration with Google.org and The Mastercard Foundation, the organisation has been offering digital skills in software design, e-marketing, and freelancing to thousands of Syrian and Lebanese youngsters since 2018 through its Digital Livelihoods Program. (Lebanon Corps, 2021).

The initiative has produced noticeable outcomes, as recipients now have 35% more options for digital work. and a smartphone-based digital transfer system has reduced the cost of relief delivery by more than 20%. (Č 2021) In keeping with Sustainable Development Goal 5, these programs have also helped women in rural and camp communities become more economically independent by allowing them to work online as freelancers. This experience has demonstrated that digitisation does more than only increase efficiency; it also reinterprets humanitarian organisations' roles as development actors who combine sustainability and creativity. (Bank) Digital governance and humanitarian assistance in emergency situations. 2021

4.4 Tunisia: The "Smart Aid Tunisia" program of the Tunisian Red Crescent

One noteworthy example of using digital tools to enhance humanitarian coordination in North Africa was the Tunisian Red Crescent's 2023 launch of the Smart Aid Tunisia initiative.

The program tracked the distribution of aid and updated beneficiary data in real time using cloud databases and smartphone applications. Additionally, the technology increased the accuracy of field reports and reduced reaction times by 40% (Tunisian Red Crescent, 2023)

This experience serves as an example of a "transitional" paradigm towards blockchain, providing the groundwork for the development of integrated digital systems that can subsequently be connected to dispersed networks to improve accountability and transparency.

4.5 Comparative table of digital humanitarian experiments in the Arab world:

Country	Entity/project	Type of technology used	Humanitarian application area	Results and impact	References
Jordan	<i>Building Blocks</i> – WFP & UN Women	Blockchain and biometric verification	Food and Cash Assistance for Refugees	Over 1 million refugees benefited; 30% cost reduction; increased transparency	WFP (2022) ; UN Women (2021)
Lebanon	Mercy Corps – Digital Livelihoods Program	Digital transformation and smart transfers	Economic empowerment of youth and women	Increase employment opportunities by 35% ; reduce aid costs by 20%	Mercy Corps (2021, 2022);UNDP (2023)
Tunisia	Smart Aid Tunisia – Tunisian Red Crescent	Cloud-based mobile applications	Logistical distribution and field monitoring	40% faster response; improved field accuracy	Tunisian Red Crescent (2023)

The comparison table demonstrates how the maturity, range of applications, and type of institutional impact of Arab experiences using digital technology in the humanitarian sector differ.

Despite Jordan, Lebanon, and Tunisia's disparate political and economic environments, they all share a move towards more responsive and transparent government through digital transformation technologies like blockchain or associated cloud platforms.

By cutting operating expenses and improving financial supervision, the Building Blocks project in Jordan is a successful experiment in fusing digital technology with institutional governance, enabling refugees to receive relief directly without the need for middlemen.

More pertinent to sustained human development than emergency aid, Mercy Corps' experience in Lebanon has concentrated on leveraging technology as a tool to economically empower women and youth.

In the meantime, Tunisia is moving towards digital institutional transformation and is utilising cloud apps to enhance the quality of follow-up and response speed in aid administration.

The "integrated application" model is represented by Jordan, the "empowerment and social innovation" model by Lebanon, and the "institutional transformation towards digitisation" model by Tunisia, suggesting that the Arab world is gradually developing its digital humanitarian governance.

These experiences are valuable because they mark a new stage of institutional decentralisation and cooperative accountability, emphasising that blockchain use is not just a technical objective but also a way to create a humanitarian governance culture founded on sustainability, transparency, and trust.

5.Moving the Arab World Towards Humanitarian Digital Sustainability

Field work demonstrates that integrating technology into a cohesive institutional and legal framework is necessary for blockchain technologies to be successful in Arab humanitarian efforts.

The Arab Monetary Fund (AMF) notes in its reports *Strategies for Adopting DLT/Blockchain Technologies* (2021) and *Guidance Note on Adopting Smart Contracts* (2022) that the following are necessary to achieve digital sustainability:

- ❖ A legal and regulatory framework that guarantees data protection and smart contract recognition.
- ❖ National policies for digital transformation that incorporate plans for development and humanitarian assistance.
- ❖ Building local organisations' institutional and technical capability.
- ❖ A safe network and cybersecurity infrastructure.
- ❖ Multilateral governance, which unites civil society, organisations, and the state.

A study released in 2023 underlined the necessity of striking a balance between transparency and beneficiary privacy protection, while the Arab Academy for Science, Technology, and Maritime Transport (AASTMT, 2023) has also noted that success in humanitarian digital transformation is attained not only through technical readiness but also through the development of digital trust and institutional awareness. The Arab world may transition from limited

experimentation to sustainable digital humanitarian governance that fosters accountability, openness, and confidence in assistance management by incorporating these five components (AMF, 2022 ; UNDP).

5.1 Moving towards an Arab model for blockchain-based digital humanitarian governance:

This study demonstrates that blockchain is a tool for reengineering human governance in the Arab world, not merely a digital technology. Transparency and accountability become inherent features of the system rather than the outcome of later monitoring procedures, and trust is moved from a centre of power to a network of shared players.

In this way, the use of blockchain in humanitarian management signifies a qualitative change towards decentralised governance, where knowledge and data serve as the new foundation for societal control and institutional legitimacy. Through real-time transaction tracking, field tests conducted in Jordan, Lebanon, and Tunisia have demonstrated that incorporating blockchain technology into digital transfer and cash aid programs has improved transparency by over 20% and decreased administrative and financial losses. Because smart contracts enforce agreements automatically and without the need for middlemen, they have also contributed to increased institutional accountability.

However, the findings indicated that the biggest barriers preventing these experiences from scaling in complex Arab environments are a lack of technical know-how, a lack of legislation governing smart contracts and digital transactions, and a weak digital infrastructure.

These results demonstrate that the existence of an institutional and cultural context that can support digital transformation is just as important for the successful deployment of blockchain as technological preparedness. Digital trust is becoming a structural component of human legitimacy rather than only a technical idea.

If blockchain's transparency is not incorporated into a legal and administrative culture that promotes transparency and self-accountability, it could become a source of institutional resistance.

5.2 Potential and challenges :

The following points encapsulate blockchain's most noteworthy possibilities for humanitarian work:

- ❖ Increasing aid and resource management's transparency by over 20%.
- ❖ Improving precise monitoring of humanitarian supplies and funds.
- ❖ Using smart contracts that can be automatically enforced to strengthen accountability.
- ❖ The biggest obstacles are:
 - In several Arab nations, there is inadequate digital infrastructure and connectivity.
- ❖ Institutional knowledge of cybersecurity and technical efficiency is lacking. Clear regulatory regulation acknowledging smart contracts is lacking.
- ❖ Some organisations' resistance to administrative and cultural change. These difficulties demonstrate that technology is insufficient on its own and that human digital transformation necessitates striking a balance between institutional values and technology in order to maintain accountability and transparency while ensuring that decentralisation is regulated by a framework of legal validity.

5.3 Moving towards an Arab humanitarian digital governance model:

These results allow for the proposal of an Arab humanitarian digital governance paradigm built around five interconnected pillars:

- 1) A unified legal and regulatory framework that harmonises Arab laws in this field and acknowledges smart contracts and digital transactions.
- 2) Including blockchain in national plans for humanitarian efforts and digital transformation to be incorporated into disaster response and social protection programs.
- 3) Developing human potential through professional and academic training programs that focus on digital governance and distributed ledgers.
- 4) To finance and grow blockchain projects, governments, international organisations, and the business sector should fortify their collaborations.
- 5) Creating a digital culture and community trust by including the community in the administration of humanitarian platforms and raising civic awareness.

These pillars are not merely technical measures; rather, they provide a revolutionary framework for creating "Smart Participatory Governance," which may unite individuals, groups, and the government in an open, transparent system founded on self-accountability and open data.

6. Conclusion

Last but not least, new Arab experiences like the Building Blocks project in Jordan and Mercy Corps programs in Lebanon demonstrate how blockchain technology has the potential to drastically alter humanitarian efforts if it is incorporated into an institutional framework with clear legal guidelines and a culture of digital trust.

Thus, the ability of governments and organisations to convert digital innovation into institutional sustainability by creating systems that strike a balance between technology efficiency and legal accountability, transparency and privacy protection, will determine the future of humanitarian work in the Arab world.

In this way, blockchain is a new Arab civilisational initiative that aims to establish digital sovereignty, foster integrity, and rebuild trust in the administration of humanitarian efforts and relief. In the era of digital transformation, it is more than just a technology; it is a vehicle for rethinking government and legitimacy, opening the door for long-term Arab digital humanitarian governance.

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