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STRATEGIES TO EFFECTIVELY ENGAGE PARTICIPANTS IN DECENTRALIZED
GOVERNANCE – A CASE STUDY AT Q PROTOCOL

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Abstract

This thesis aims to identify effective stakeholder engagement strategies in decentralized governance systems. Focusing on the 'Q' community that governs a Web3 protocol, a mixed-methods approach combining a community survey, interviews, and participant observation is employed to uncover opportunities and challenges for stakeholder engagement in decentralized governance. Key findings highlight the importance of trust, social influence, and accessibility in governance engagement. The elements that determine engagement are translated into an engagement framework. In addition to informing the Q community, the presented framework can assist practitioners and researchers in developing effective governance models that include stakeholder engagement in blockchain-based contexts.

Keywords: Decentralized Governance, Web3, Blockchain Technology, Decentralized Autonomous Organizations, Governance Engagement

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1. Introduction

In the rapidly evolving domain of Web3 technologies, decentralized governance emerges as a critical concept, reshaping the interaction and organization of digital communities and technologies. Unlike traditional centralized organizations, Decentralized Autonomous Organizations (DAOs) distribute decision-making power across their member base by launching and selling cryptographic governance tokens. This paradigm shift, however, has led to numerous crypto exploits. In 2021, crypto theft related to poor governance practices amounted to U.S. \$2.84 billion (Cong et al. 2023).

In governance attacks, bad actors do not steal private keys or exploit technical weaknesses; instead, they exploit loopholes in a project's governance rules. All attackers need to launch a governance attack is most of a project's voting power to, for example, drain a protocols treasury or implement malicious code. Surprisingly, only a few tokens are often needed to achieve a majority, as not many token holders actively participate in governance (Schmidt 2023).

Central to this study is Q, a protocol for developing organizational constitutions that are enforced by smart contracts and include means for resolving off-chain disputes that code cannot handle—a significant security upgrade to current Web3 governance frameworks (Singh 2023). Q's governance-as-a-service features lay the groundwork for developers to build high-value products on-chain. Concrete use cases offered by Q include DAO treasury protection, decentralized smart contract upgrades without admin keys, and Decentralized Finance (DeFi) parameter protection. Some of these governance services address existing challenges in the crypto ecosystem, while others pave the way for new business models on blockchain.

The engagement of Q's community is crucial, serving as the cornerstone for governance oversight and project development. While Q's governance framework is theoretically robust and designed to protect against governance rug-pulls, its practical effectiveness relies on collective stakeholder input and engagement.

This thesis centers around the research question: How can stakeholders be effectively engaged in decentralized governance? On one hand, despite the growing interest in decentralized governance, there remains a significant gap in understanding the dynamics and factors that drive participant engagement. On the other hand, there is an intense debate within the industry on how to engage participants in decentralized governance. Hence, using a mixed-methods approach, this study examines the various factors, opportunities, and challenges that influence stakeholder engagement in decentralized settings. The study proposes practical strategies for enhancing stakeholder engagement in blockchain-based environments by combining its findings into a coherent framework. Furthermore, this research aims to provide valuable insights that can inform the practical implementation of effective decentralized governance systems, thus making a meaningful contribution to the ongoing discussion of governance in the Web3 domain.

The following section is a literature review that provides background on decentralized governance, outlines its evolution in DAOs, and explores the opportunities and challenges highlighted in the existing literature. Next is a detailed explanation of the mixed-methods research approach used to address the research question outlined earlier. Subsequent sections present and discuss the findings of this study. Finally, the conclusion synthesizes key findings and provides recommendations for future research.

2. Literature Background

The emergence of decentralized projects built on blockchain technology marks a new era in organizational structure and governance. This innovative approach, commonly referred to as Web3, can revolutionize how individuals coordinate, innovate, and engage in collective decision-making (Huang et al. 2023). Despite their transformative potential, it is important to understand that purely technocratic solutions often oversimplify the complexity of human societies. Consequently, the pivotal role that individuals play in establishing and upholding the

digital ecosystem cannot be overlooked (Rennie et al. 2022). This literature review examines the emergence of decentralized governance and the factors that influence stakeholder engagement in the governance of decentralized protocols.

2.1 Terminology

Decentralization refers to the distribution of authority, power, and control from a single central location or authority to multiple, often geographically dispersed, entities or nodes (Hoffman, Ibáñez, and Simperl 2020). Its primary objective is to enhance efficiency, responsiveness, and adaptability by enabling decision-making and operational activities to be carried out in proximity to the source of relevant information or activity. Hence, decentralization may be desirable in various contexts, such as political, organizational, or technological infrastructure.

In the case of Web3, there is a desire to decentralize the World Wide Web for various reasons (Zarrin et al. 2021). Firstly, on a foundational layer-1 network, the downtime of a single node will not typically compromise the entire system. This grants greater resilience against attacks, censorship, or any form of centralized control over a blockchain network. Also, decentralization distributes power, reducing the likelihood of absolute control or monopolistic behavior, and can lead to improved scalability, as adding new nodes does not require oversight by a central authority (Alabdulwahhab 2018). However, managing and coordinating a decentralized system can be more complex than managing a centralized one. Especially in the absence of a central authority, mechanisms for accountability and governance may differ and require innovative approaches (Arruñada and Garicano 2018).

Governance comprises the mechanisms, frameworks, and organizational practices that determine power distribution, the extent to which stakeholders participate, and the enforcement of decisions. This includes both formal and informal arrangements, institutions, and norms that enable coordinated action and effective decision-making. In the case of Web3 protocols, governance comprises procedures for making decisions about the protocol, encompassing

changes to the code and other aspects of the protocol's operation. It also involves dispute resolution procedures and enforcement of governance decisions (Zwitter and Hazenberg 2020). Therefore, any Web3 organization that truly aims to achieve decentralization must possess the ability to self-govern effectively in a decentralized manner.

2.2 History of Decentralized Governance

The beginning of decentralized governance can be prominently traced to the Bitcoin community, where Bitcoin node operators play a pivotal role in defining the protocol. Regarding protocol upgrade proposals, operators coordinate informally through off-chain discussions and arrive at a consensus based on their actions, such as choosing to upgrade their software client and eventually hard-forking the blockchain. While Bitcoin's approach to decentralized governance resists censorship and centralized control, it can be cumbersome and slow, especially when faced with numerous and frequent decisions (Zohar 2015). The Bitcoin Civil War, a series of debates and disagreements within the Bitcoin community, primarily between 2015 and 2017, exemplified this challenge, showcasing how a deeply divided community can struggle to make timely decisions, ultimately leading to a hard fork and the creation of a new cryptocurrency, Bitcoin Cash (BCH), in August 2017.

In contrast to Bitcoin's often informal off-chain governance, "The DAO" institutionalized on-chain decision-making, enhancing transparency and auditability. In 2016, built on the Ethereum blockchain, "The DAO" was primarily used to decide on investment or funding decisions. Token-based voting was implemented, allowing token holders to vote in proportion to their holdings. Proposals were submitted on the blockchain, ensuring tamper-proof and transparent voting. Upon reaching sufficient support, decisions were autonomously executed through smart contracts, diminishing dependence on central authorities and human intervention (Morrison, Mazey, and Wingreen 2020). The same features that made 'The DAO' innovative—such as automated execution of decisions—also made it susceptible to unforeseen vulnerabilities. This

became evident when the 'DAO Hack' occurred, exploiting weaknesses in the code to drain \$60 million of its funds.

Nevertheless, the idea of on-chain governance and decision-making has persisted and evolved to accommodate various governance designs. A successful example is MakerDAO, which focuses on creating and managing the DAI stablecoin, a cryptocurrency pegged to the U.S. dollar, by utilizing on-chain decision-making. Subsequently, the first DAO platforms, such as Aragon, DAOstack, and JoinColony, arose, which made it possible to launch a DAO with a customized governance design. However, the increasing sophistication of blockchain use cases, such as in insurance or DeFi, has not been without issues.

Disputes arise in many areas that nation-state jurisdictions cannot adequately resolve due to the decentralized nature of many protocols (Wright and De Filippi 2015). Moreover, numerous business transactions lead to disputes that smart contracts cannot resolve due to the incomplete nature of contracts, as evidenced by the Nobel Prize-winning contract theory. To resolve them, human judgment and discretion are required (Hart and Holmström 1987). Recognizing the lack of adequate solutions in web3, the Q Protocol provides dispute resolution mechanisms with off-chain partners, such as the ICC Court of Arbitration, and enforcement of those decisions on-chain.

2.3 Decentralized Governance in DAOs

DAOs differ greatly from traditional organizational structures by merging collective decision-making based on trust, consensus, and the dynamics of a highly engaged community (Lumineau et al. 2021). Augustin et al. (2023) emphasize the important role of smart contracts in defining operational logic and governance rules, promoting governance efficiency by fostering transparency and automation. Further, Kurniawan (2022) illustrates the emerging variety of decision-making models within DAOs, demonstrating an adaptive environment that responds to both technological advances and socio-political needs.

In conclusion, the successful operation of DAOs relies on a mix of technological innovation and robust governance structures. Crucially, as De Filippi et al. (2020) emphasize, fostering trust and nurturing a dynamic community are fundamental to their efficient operation. Eventually, this interplay of technical expertise with a focus on human-centric values will strengthen resilience and amplify the effectiveness of DAOs.

2.4 Incentive Structures and Stakeholder Participation in DAOs

Incentives are pivotal in shaping stakeholder behavior and fueling active participation. This is a well-established notion supported by several studies (Liu et al. 2022; Laatikainen, Li, and Abrahamsson 2023). The design and nuanced differentiation of these incentives are critical in determining the DAOs' operational efficiency and longevity.

There is a notable distinction within incentive structures: tangible, immediate fungible currency rewards versus intangible, long-term reputation-based incentives. Fungible rewards tend to drive short-term motivation and transactional engagement (Kassen 2021). On the other hand, reputation-based incentives are linked to long-term commitment, fostering trust and a sustainable community ethos (Hassan and Filippi 2021; Pereira, Tavalaei, and Ozalp 2019).

Empirical analyses by Goldberg and Schär (2023) on metaverse governance and insights from Faqir-Rhazoui et al. (2021) on various incentive mechanisms in DAO platforms further highlight the impact of these structures on user involvement. Additionally, the incorporation of gamification addresses motivational gaps among blockchain participants. Denden et al. (2023) suggest that game-like elements such as points, badges, and positive feedback can significantly boost engagement. In conclusion, the effectiveness, sustainability, and resilience of DAOs are intrinsically linked to the strategic design of their incentive structures, whether based on currency or reputation.

2.5 Challenges and Issues Related to Stakeholder Engagement

DAOs encounter several internal governance challenges. The diversity of stakeholders necessitates effective onboarding and training to acquaint them with DAO intricacies. However, coordinating a large, decentralized group without central authority is often complex and resource-demanding (Jha 2023). A common issue is low participation rates among voters, leading to decision-making dominance by a minority. Additionally, the high volume of proposals risks information overload, potentially deterring engagement and complicating digital governance processes (Chohan 2017).

Unbalanced power structures present another significant challenge. Wealthy stakeholders or early adopters might dominate decision-making, contrary to DAOs' decentralized ethos (Feichtinger et al., 2023; Sun et al., 2023). This becomes compounded when token representation in DAOs misaligns with actual stakeholder needs, a dissonance Karjalainen (2020) highlighted. Furthermore, the trade-off between short-term gains and long-term sustainability, coupled with the absence of traditional hierarchies, complicates dispute resolution. Luminaue et al. (2021) emphasize the necessity of human intervention in situations not accounted for in the original code.

Externally, DAOs confront several challenges. Their openness makes them vulnerable to Sybil attacks, where multiple false identities can be used to distort the decision-making process. However, the necessity of gas fees for on-chain governance acts as a participation barrier. Cultural and linguistic differences in international DAOs can also lead to misunderstandings, exacerbated by technological complexities (Zachariadis, Hileman, and Scott 2019), as stakeholders without technical expertise may feel alienated.

Another challenge is balancing transparency, which is crucial for trust, and privacy, which is essential for protecting interests. Lastly, the decentralized nature of DAOs introduces regulatory uncertainties, particularly regarding contractual obligations for DAOs initiators and members.

In summary, addressing internal and external challenges is fundamental for the effective functioning of DAOs and ensuring active, meaningful participation of their members. Successfully navigating these complexities is crucial for realizing the full potential of these innovative organizational structures.

2.6 Gaps in the Literature and Future Research Directions

Existing research has identified some of the most pressing challenges facing DAOs. Using on-chain data and advanced analysis techniques, researchers have pointed to a key problem: low voting participation in many DAOs. Depending on the structure of a DAO, this phenomenon can jeopardize the very decentralization of a Web3 project. Furthermore, some studies have employed a qualitative research approach to reveal complexities regarding the onboarding, support, and moderation of DAO members. Yet, what remains unaddressed in existing research is a comprehensive overview of the challenges associated with engaging stakeholders in decentralized governance and effective strategies and practical guidelines to foster effective engagement in light of these challenges. This study aims to fill these gaps.

3. Methodology and Research Design

This study combines insights from a quantitative survey with qualitative insights from expert interviews and participant observation in DAO environments. In doing so, the study responds to the call to integrate quantitative and qualitative insights to thoroughly understand the dynamics within DAO communities (Pereira, Tavalaei, and Ozalp 2019; Kassen 2021; Augustin, Eckhardt, and de Jong 2023).

3.1 Research Context

The research context is the Q community, a digital and decentralized environment that merges on-chain and off-chain elements. For instance, Q's governance activities, like voting and execution, are conducted on-chain via a decentralized application (DApp) developed by Q Development AG. In contrast, off-chain activities, such as governance discussions and

community interactions, predominantly occur on platforms like Discord, Telegram, and Reddit. The Q community comprises approximately 13,000 members. The Q Protocol's governance structure utilizes a decentralized approach that places the community at the forefront of the protocol's development (see Appendix 1). The community's members span globally, with a significant presence in Asia and Europe, offering a regionally concentrated yet diverse viewpoint.

The Q community's relevance to decentralized governance is multi-dimensional. Primarily, Q serves a dual function in this arena: it not only self-governs in a decentralized manner but also provides governance security for other Web3 entities—this dual capacity positions Q as an exemplary case for exploring decentralized governance. The author's internship at Q Development AG, further augments the research, as being involved in the Q Protocol's ecosystem and community development grants the author access to an in-depth perspective on community dialogues and a broad spectrum of viewpoints on governance issues.

3.2 Quantitative Methodology

Engagement in decentralized governance is driven by the usage and adoption of information systems. To partake in governance proposals, Q Token holders vote in the Q HQ. Furthermore, for discussions about the latest governance developments, Q Token holders use online platforms like Discord and Telegram. Consequently, to investigate the factors that drive engagement in decentralized governance, a survey scale was constructed, tailored to this digital context. The results of this survey will be used to evaluate the effectiveness of engagement strategies identified through qualitative methods.

The development of the survey scale is rooted in the Unified Theory of Acceptance and Use of Technology (UTAUT) model proposed by Venkatesh et al. (2003). This model encompasses key constructs such as Performance Expectancy (P.E.), Effort Expectancy (E.E.), Social Influence (S.I.), and Facilitating Conditions (F.C.), which have been instrumental in identifying

factors affecting the adoption and use of new technologies in various contexts (Williams, Rana, and Dwivedi 2015). The literature review shows that trust (T.R.) is a pivotal factor in shaping the Web3 community's attitudes toward engaging in a DAO. Hence, T.R. conceptualized as an external factor by Gefen, Karahanna, and Straub (2003), was integrated into the UTAUT model to broaden its theoretical scope.

Moreover, the UTAUT framework is applied to examine the relationship between the intention to participate in Q's governance and constructs related to political participation (Gopal and Verma 2017) and civic engagement (Doolittle and Faul 2013). These constructs have been tailored to fit the participatory nature of Q. The final analysis framework explores whether the intent to participate in Q's governance correlates with the desired behavioral levels of voting participation and civic engagement.

To ensure the survey's validity, it underwent a pre-test with one senior researcher and three experienced Q Contributors who have extensive knowledge of decentralized governance. The finalized survey comprised 42 questions: 10 were multiple-choice, 30 utilized a five-point Likert scale, and two were open-ended.

The survey was structured into three distinct sections (see Appendix 2). The first section measured nine control items, such as age, technical proficiency, and level of involvement with the Q protocol. The following section focused on the aforementioned constructs, evaluated through Likert-scale questions (see Appendix 3). The final section provided participants an opportunity to offer open-ended feedback on Q's governance and to enter a Q Token Raffle, which served as an incentive for Q Token holders to participate.

3.3 Qualitative Methodology

This study incorporated semi-structured interviews and participant observations to deeply understand decentralized governance dynamics within Q.

Semi-structured interviews were chosen to explore complex and subtle subjects, allowing for follow-up questions. They were conducted with four principal stakeholder groups within Q: Q token holders, Q root nodes, Q experts, and Q validator nodes. These groups were strategically chosen for their different roles in Q's governance framework to capture diverse perspectives and insights on Q's governance. It was also recorded whether the interviewee was a Q contributor. A total of 9 interviews were conducted, as detailed in Appendix 6. The design of the questionnaire aligned with the thematic areas of the quantitative survey, while also incorporating incentives and broader topics, such as regulatory issues, identified through a feedback process with two senior Q contributors (Appendix 7). The interview data was analyzed using a directed method (Gopal and Verma 2017), which focused on identifying the challenges and opportunities in stakeholder engagement. The findings were then systematically categorized using the established constructs and aggregated into a matrix for a comprehensive overview (Appendix 8).

Participant observation was employed as part of a directed research internship. The objective was to explore and record effective methods to facilitate engagement in decentralized governance. The researcher actively participated in various activities, including three live events, 24 team discussions, and ten community meetings, adhering to the dual role model proposed by Kawulich (2005). This involvement provided a comprehensive insight into the internal workings and decision-making mechanisms of a decentralized community. Field notes were taken and systematically arranged, emphasizing critical insights, especially those pertinent to engagement tactics and initiatives in decentralized governance (Appendix 9).

3.4 Data Collection

Utilizing the convenience sampling technique, the invitation to participate in the survey was posted in the "general" channel of the Discord community for Q on October 25, 2023. This channel is accessible to all Q stakeholders. At the launch of the survey, the "general" channel

had a membership of 13,000 individuals. The objective was to maximize participation from a diverse range of Q stakeholders. Also, a small incentive involving a raffle with 500 Q tokens was offered to three randomly selected participants to encourage participation. Additional reminders were sent in stakeholder-specific channels. The survey was created using Microsoft Office Forms. The survey period concluded on November 12, with a total of 90 responses collected.

Table 1: Summary of Data Sources

Source	Description	Quantity
Primary Data		
Q Community Survey	Surveys designed and conducted with the Q community.	79 valid responses
Qualitative Interviews	Interviews conducted with different stakeholders in Qs governance framework	9
Live Events	Field notes by the researcher after attending the live event	3
Q Contributor Meetings	Field notes by the researcher during and after meetings with Q Contributors	26
Q Community Meetings	Field notes by the researcher after community meetings	28
Secondary Data		
Document Analysis	Q Constitution, Q Whitepaper, community feedback documents	5
Community Posts	Review of relevant posts from communities.	120 (estimated)
Videos	Analysis of existing video content from conferences, tutorials and community calls	8

Recruitment of participants for the semi-structured interviews was twofold: a convenience sampling method allowed survey respondents to volunteer for interviews, and a quota sampling strategy involved directly inviting members of the Q stakeholder group for interviews. Interviewees were selected to ensure equal representation of different Q

stakeholder groups and balance the number of Q contributors and community members to mitigate potential bias. The interviews lasted an average duration of 30 minutes and were transcribed using the M.S. Teams transcription feature. One interview, disrupted by internet issues, was completed via email. The transcripts were then carefully revised in Microsoft Word, ensuring accuracy by correcting transcription errors and eliminating filler words to enhance clarity.

Observational data was supplemented by additional analysis of documents, community posts, and videos, the results of which were incorporated into the field notes. The observations were documented using Microsoft Word.

Ethical considerations were paramount throughout the research. Informed consent was obtained from all participants, ensuring that their data was used exclusively for research purposes. Measures were also taken to anonymize the data, which will be presented in an aggregated format to safeguard individual identities.

3.5 Data Analysis

During the initial stage of data cleaning, the raw survey data was scrutinized to identify any apparent discrepancies, such as missing data, anomalies, or trial entries. Subsequently, the responses to the survey questions were converted into measurable variables. A detailed account of data encoding methods, such as one-hot or ordinal encoding, is provided in Appendix 4. The standard deviation was also calculated for all questions measured on a Likert scale. A standard deviation of zero, indicating uniform responses across all such questions by a participant, was deemed implausible, leading to the exclusion of that response as invalid.

Subsequent statistical analyses were conducted using the R Programming Language. Exploratory Factor Analysis (EFA) was also conducted to understand the underlying survey structure and confirm the validity of the survey constructs (Knekta, Runyon, and Eddy 2019). The EFA process included the Kaiser-Meyer-Olkin test and Bartlett's Test of Sphericity, which evaluated the appropriateness of the dataset for factor analysis. The number of factors within the survey data was identified through Parallel Analysis. Subsequently, the Promax rotation method was applied to the factor analysis, accommodating correlations between factors. Construct validity was affirmed if the Cronbach's alphas for each factor was above 0.7 (Tavakol and Dennick 2011).

To explore the relationship between the dependent variable (B.I.) and the independent variables (Control Variables, S.I., T.R., F.C., and P.E.), a sequential multiple regression method was employed, resulting in two distinct regression models. The independent variables, totaling 28, were categorized into two groups of predictors. The initial group contained all four latent

variables identified by the survey constructs: S.I., T.R., F.C., and P.E. In a subsequent group, after encoding, 24 control variables were introduced. Sequential multiple regression was used to assess the contribution of control variables in explaining the variance in intention to participate in Qs governance. This method facilitated a structured addition of blocks of variables, indicating the extent to which each set of variables added to the model's explanatory. This step was crucial to ensure that the effects of the main independent variables (S.I., T.R., F.C., and P.E.) were verified independently, free from the distortion of external factors.

In the final stage, correlation analysis was conducted to investigate the associations between B.I. and P.P. and between B.I. and C.E. This approach was intended to reveal both the magnitude and direction of these relationships. A summary of the quantitative analysis framework is presented in Appendix 5.

A structured conceptual framework was constructed to integrate findings from the literature review, open-ended surveys, participant observations, and interviews into practical engagement strategies. This framework was informed by a social constructionist perspective (Mallon 2019). It employed a deductive thematic analysis approach, echoing the methods Redmond et al. (2018) used to investigate online engagement in higher education settings.

The Framework Method (Gale et al. 2013), known for its application versatility, is utilized to systematically organize and interpret the data. This method is well-suited for diverse data types such as interview transcripts, documents, and field notes.

The construction of the conceptual framework followed the constant comparison method, as described by Glaser (1965), and was employed to identify themes, a technique not confined to grounded theory but also effective in discerning themes across various textual sources. This deductive procedure involved screening through elements, indicators, and implications derived from the literature, surveys, and interviews. The initial version of the framework underwent feedback from experts in Web3 online communities, which prompted further refinements.

4. Research Findings

4.1 Quantitative Findings

The survey received a total of 90 responses. A screening process was conducted to ensure the validity of the data. After data cleaning, 79 responses were valid for data analysis, of which the largest group of survey respondents comprised Q token holders (46%), followed by Q validator nodes (28%) and Q root nodes (12%). A smaller segment included Q experts (6%) and Q contributors (7%). This variation aligns with the constraints the Q constitution sets on the number of root nodes and experts.

Geographically, a significant portion of the participants hailed from Asia (41%) and Europe (33%), along with a substantial presence from Africa (16%). The age distribution was predominantly between 25 and 34 years (41%), with the next largest group being those aged 35-44 (28%). Regarding Web3 governance experience, a majority had moderate experience (44%), while 25% had minimal and 14% had extensive experience. Over half of the respondents (51%) reported an intermediate level of technical experience in Web3. Duration of involvement with Q varied, with most participants (57%) being involved for 1-2 years and 20% for less than six months. Additional detailed descriptive statistics for demographic variables, control variables, and responses to Likert scale items are provided in the Appendix (Sections 10 - 12).

The construct of E.E. was excluded from further statistical analysis due to a significantly lower number of responses received for the survey questions on E.E. (N= 44 vs. N = 79), which could potentially compromise the reliability and validity of any statistical conclusions drawn from this data. To ensure a comprehensive exploration of E.E., an in-depth investigation of the construct was conducted via qualitative interviews, thus complementing the quantitative findings from other aspects of the survey.

The EFA results show a robust factor structure consistent with the theoretical constructs of the UTAUT model, thereby validating the construct of the survey instrument for further analysis

in the study. The KMO measure of sampling adequacy yielded an overall MSA of 0.82, indicating high adequacy for factor analysis. Bartlett's Test of Sphericity was significant ($\chi^2 = 798.7982$, $df = 136$, $p < 0.001$), indicating that the factor analysis was appropriate for this dataset. According to the parallel analysis, the extraction of four factors was suggested, which is consistent with the theoretical constructs of the UTAUT model.

The Promax rotation method was utilized to achieve a clear and interpretable factor structure, leading to the identification of four factors: Trust (ML1), Social Influence (ML2), Facilitating Conditions (ML3), and Performance Expectancy (ML4) (Appendix 14). Factors with the weakest loadings (< 0.6) were selectively removed (Dash and Paul 2021) to improve the accuracy of the regression analysis and reduce potential bias (Appendix 13). This was done while ensuring that each survey construct retained at least three items for robustness.

Consequently, two items were excluded from further analysis: SI4 (with a loading of 0.58) and FC1 (0.48). Subsequently, the reliability of each construct was evaluated using Cronbach's alpha, and all constructs displayed robust internal consistency: TR. ($\alpha = 0.87$), Performance Expectancy ($\alpha = 0.85$), Social Influence ($\alpha = 0.83$), and Facilitating Conditions ($\alpha = 0.81$). The factor model demonstrated a satisfactory fit to the data, as demonstrated by a Tucker Lewis Index of 0.811 and a Root Mean Square Error of Approximation (RMSEA) of 0.105. The cumulative proportion of variance explained by the four factors was 61%, supporting the factor structure.

The regression analysis of the study was conducted in two phases. In the first phase, without control variables, the model focused on the impact of four key independent variables: P.E., T.R., F.C., and S.I. on the dependent variable (B.I.). The results showed that P.E., with a coefficient of -0.1123, did not significantly impact the dependent variable ($p = 0.39075$). T.R. displayed a positive and significant influence, indicated by a coefficient of 0.3489 and a p-value of 0.00926. F.C., with a positive coefficient of 0.1542, did not reach statistical significance (p

= 0.22631). S.I. stood out with a positive and significant effect, having a coefficient of 0.3195 and a p-value of 0.00560. The model fit was substantial, accounting for about 34.77% of the variance in the dependent variable (Multiple R-squared = 0.3477), with an Adjusted R-squared of 0.3124, suggesting a good fit. The overall model was statistically significant, as indicated by an F-statistic of 9.86 and a p-value less than 0.001.

The second phase included 24 control variables alongside the four latent variables measured by the survey. In this expanded model, the directions of the coefficients for P.E., T.R., F.C., and S.I. remained consistent with the first model, but this time, F.C., T.R., and S.I. were statistically significant. Notably, among the control variables, geographical location, particularly Africa and North America, and certain methods of acquiring Q tokens emerged as significant factors. Including these control variables enhanced the model's explanatory power, as seen in the increase of the Multiple R-squared to 0.6058 and the Adjusted R-squared to 0.4875 (Appendix 14 - 15).

T.R. and S.I. were consistently significant across both models, highlighting their crucial influence. P.E., however, remained non-significant in both models, suggesting its lesser or more nuanced role in this context. The significant control variables indicated the relevance of contextual factors, such as geographic location and Q token acquisition methods, in understanding the dependent variable.

A moderate to strong positive relationship was observed between B.I. and P.P., as indicated by a Pearson correlation coefficient of 0.5976. This significant correlation ($p = 6.07e-09$) suggests that higher levels of behavioral intention are associated with increased political participation (e.g., voting participation on governance proposals), highlighting the influential role of B.I. in P.P.

Furthermore, the relationship between B.I. and C.E. was slightly stronger, with a correlation coefficient of 0.6238. This strong and positive correlation, statistically significant ($p = 8.21e-$

10), underscores the substantial impact that B.I. has in fostering C.E. (e.g., contributing to discussions on governance proposals). These findings indicate the important influence behavioral intentions have on both political and civic domains within decentralized governance systems.

4.2 Qualitative Results

An in-depth analysis of semi-structured interviews with stakeholders in the Q governance framework reveals key findings (see Appendix 8). The primary challenge identified by root nodes is to thoroughly comprehend and stay abreast of Q's governance developments, a task made difficult by the untraditional nature of decentralized governance. The participants also see opportunities to increase engagement through easy-to-use support tools, such as simple user interfaces and clear process descriptions, and the adoption of standardized procedures.

Validator nodes emphasize the need for more explicit communication about the specifics of the protocol's validation mechanism, which is essential to reduce the complexity associated with stake delegation and the validator slashing mechanism. Q experts point out the obstacles posed by rapid technological progress and the need for a holistic view of the system. At the same time, they emphasize the need to align experts' incentives with the goals of the Q ecosystem to encourage their contribution to the protocol's innovation. Q token holders express a lack of interest in the intricacies of each governance proposal, citing the significant time required to understand governance details as a major barrier. However, they recognize the value of easy-to-understand governance explanations, educational materials, and accessibility of governance discussions.

A consistent theme across all groups is the importance of effective communication, coupled with clear motivational frameworks, trust-building initiatives, and a supportive environment that encourages participation. These findings provide a detailed understanding of the different

stakeholder perspectives and highlight the opportunities and challenges within the Q governance system.

Engagement, as discussed in the existing literature, includes several elements that, while distinct in definition, are interrelated in application due to their multifaceted nature. Figure 16 in the Appendix outlines a comprehensive framework with five key elements critical to effective engagement in DAO governance: educational engagement, community engagement, governance participation, incentive structures, and decentralized operations.

The framework represents a complex construct of engagement, with interrelated elements that influence participation in decentralized governance. This framework also includes a list of indicative measures and corresponding initiatives to assist practitioners in improving governance engagement; these indicators do not claim to be exhaustive and are not free from change due to the rapid advancements in this field. Further, the framework is neither hierarchical nor linear and does not suggest that each element be considered in isolation. Rather, it serves as a tool for dissecting the complexities of decentralized governance dynamics.

5. Discussion of Findings

This research seeks to answer the question: How can stakeholders be effectively engaged in decentralized governance? Given the different perspectives found in the existing literature and in conversations with DAO participants, it is important to clarify the prerequisite for engagement before discussing the results.

While effective strategies to foster engagement in decentralized governance are crucial, their success hinges on the inherent motivation of individuals to partake in the governance of a DAO. The nature of this motivation can vary widely. Some individuals may be driven by intrinsic factors, such as finding the process intellectually stimulating and engaging, at least “it's better than Netflix for me” (Interview #6). Conversely, others might be motivated by financial incentives, participating actively in governance to gain token-based rewards.

The underlying assumption is that as the ecosystem expands, so does the incentive to engage in governance activities. This expansion may manifest in two ways: firstly, through the deployment of more use cases on Q that hold relevance for its users, and secondly, by an increase in the monetary value governed on Q, subsequently heightening interest in effective governance. With this prerequisite, the focus shifts to how this motivation can be translated into active and effective engagement in the governance of a Web3 project.

5.1 Educational Engagement

The concept of educational engagement refers to an individual's learning journey. It begins with initial information that helps a new member understand the governance system. This leads to an ongoing effort to stay informed about governance advancements. Such engagement often encourages self-education and skill development. The facilitating conditions measured by the survey capture this aspect of engagement and suggest a positive impact on the willingness to participate. However, these conditions only show a marginal significance and only when accounting for control variables, as in Model 2.

One explanation may be that having well-structured learning resources does not necessarily translate into increased engagement with those materials. However, the interviews indicate that community members support the relevance of presenting these educational resources in an appealing format, such as step-by-step guides, to aid a better understanding of Q's governance design and procedures.

5.2 Community Engagement

The concept of community engagement refers to the collegial experience of a participant. It involves collaborative initiatives, such as developing or discussing governance proposals. Through active participation, community members eventually build a strong reputation and can become thought leaders within their community.

The success of a project's governance depends critically on community engagement. The community survey results show a significant and positive correlation between social influence and willingness to participate in Q's governance. Moreover, constructive interactions between community members and Q contributors were observed, especially during events such as the Q Community Meetup.

However, engaging communities in anonymous online environments presents unique challenges. The primary problem lies in the uncertainty about participants' authenticity and intentions. To address this, it is critical to facilitate the open development of governance proposals within the community. Token holders need clear information about the author(s) of the proposal, its purpose, and the specifics of the proposed changes. Introducing reputation systems could also provide valuable insights into the quality of contributions from different participants, thereby enhancing the overall integrity of the engagement process.

5.3 Governance Participation

Governance participation refers to the direct involvement of individual members in shaping the protocol. This primarily occurs through voting on governance proposals and extends to electing stakeholder roles within the governance framework and collaboratively creating governance proposals. Network analytics also plays a crucial role in this context. While the active engagement in governance processes is recorded on-chain, this raw data must be effectively processed and synthesized to extract meaningful insights about governance participation.

Furthermore, the effect of P.E. is not significant, implying that the specific attributes of Q's governance system might be less crucial in influencing an individual's decision to participate. Instead, the key determinant appears to be trust in Q's governance framework's integrity. One possible explanation for this could be attributed to the still nascent and rapidly evolving nature of decentralized governance. At first, a Q token holder may not be familiar with governance

specifics and Q's unique characteristics and often finds the practical use cases that can be built on Q and the services provided more compelling. In addition, the industry has yet to develop anything resembling a standard for decentralized governance.

Moreover, within the root node panel, participants recognize that while Q's governance framework already provides a secure foundation, it is designed to be continuously improved by leveraging the expertise and diverse perspectives of its community members. Their trust in the project and belief in the establishment of a truly decentralized governance system, rather than the perception that Q's decentralized governance was already fully developed, has been the primary driver of their decision to participate in the root node panel in the first place.

5.4 Incentive Structures

In the existing literature, incentive structures encompass both tangible rewards, like monetary benefits, and intangible rewards, such as recognition, to motivate participant engagement. A critical aspect of these structures is tokenomics, which plays a pivotal role in effectively incentivizing stakeholders in a project. It is essential that the fairness and sustainability of tokenomics align with the specific goals of the project for various stakeholder groups. For example, active participation in governance could be acknowledged through gamified elements like badges or leaderboards, offering non-material forms of recognition and motivation. Additionally, token holders might participate in determining budget allocations for community-driven initiatives.

Findings from interviews and community feedback underscore the critical need for each stakeholder group to understand the supply of tokens and their expected return from participating in the protocol. Therefore, achieving widespread understanding is vital and depends on communicating incentives and prominently integrating educational materials into the user interface.

5.5 Decentralized Operations

The concept of decentralized operations is characterized by community members proactively taking ownership of tasks and contributing to the development of the Q protocol. The results of this study suggest that distributing a wider range of development tasks can be beneficial as community contributors develop a sense of ownership and belonging. Facilitating this requires clear processes for proposing, approving, and funding projects. Additionally, providing adequate support and resources for project management and execution is essential to foster active participation from fellow community members.

This transition is particularly difficult for early-stage Web3 projects, where development is largely driven by the project initiators. It is therefore even more important for development decisions to be made through decentralized processes that ensure broad accessibility and community participation.

5.6 Limitations of This Study

The study's insights into the Q community, comprising approximately 13,000 members, are constrained by a modest sample size: 90 survey respondents and nine interviewees. While providing valuable perspectives, this sample may not capture the full spectrum of views within the community, thereby limiting the breadth and applicability of the findings. Additionally, the reliance on convenience sampling for acquiring survey and interview participants introduces potential biases. For instance, participants who are more active on the Discord channel or more willing to engage might also be more likely to participate and hold differing views from their less active or engaged counterparts.

Finally, extrapolating the findings to other Web3 communities is challenging. The unique characteristics and governance structure of the Q community may limit the generalizability of the results to broader contexts within the field of blockchain and DAO studies.

6. Conclusion

This thesis explored the research question: How can stakeholders be effectively engaged in decentralized governance? It presented a comprehensive framework of engagement elements, illustrative indicators, and practical initiatives. Effective governance in decentralized contexts requires more than high voting participation due to the diverse motivations of stakeholders. The findings emphasize that strategies for effective engagement should foster community trust and social influence and prioritize accessibility to governance.

Engagement in decentralized governance manifests in various ways, involving distinct but interrelated factors. For example, participation in voting on governance proposals is more likely when there is active discussion and collaboration in developing proposals. Therefore, improving decentralized governance depends on considering these elements of engagement collectively. While this thesis primarily examines the Q community and does not claim to be a universal solution to all challenges of decentralized governance engagement, its findings have significant relevance for Web3 founders, DAO members, and governance researchers. These findings can guide the development or improvement of decentralized governance systems that rely on stakeholder engagement. In addition, they can provide a valuable audit and reflection tool, encouraging critical consideration and potentially challenging strategies for facilitating different types of governance engagement in blockchain-based contexts.

To increase the reliability and generalizability of this study's findings, future research should expand its scope to include a larger and more diverse group of respondents from various projects implementing decentralized governance. As decentralized governance is still in the nascent stages and primarily practiced by early adopters of Web3 technology, its progression is inevitable with broader adoption. This transition not only promises to change traditional forms of governance, but also opens exciting areas for future research.

7. References

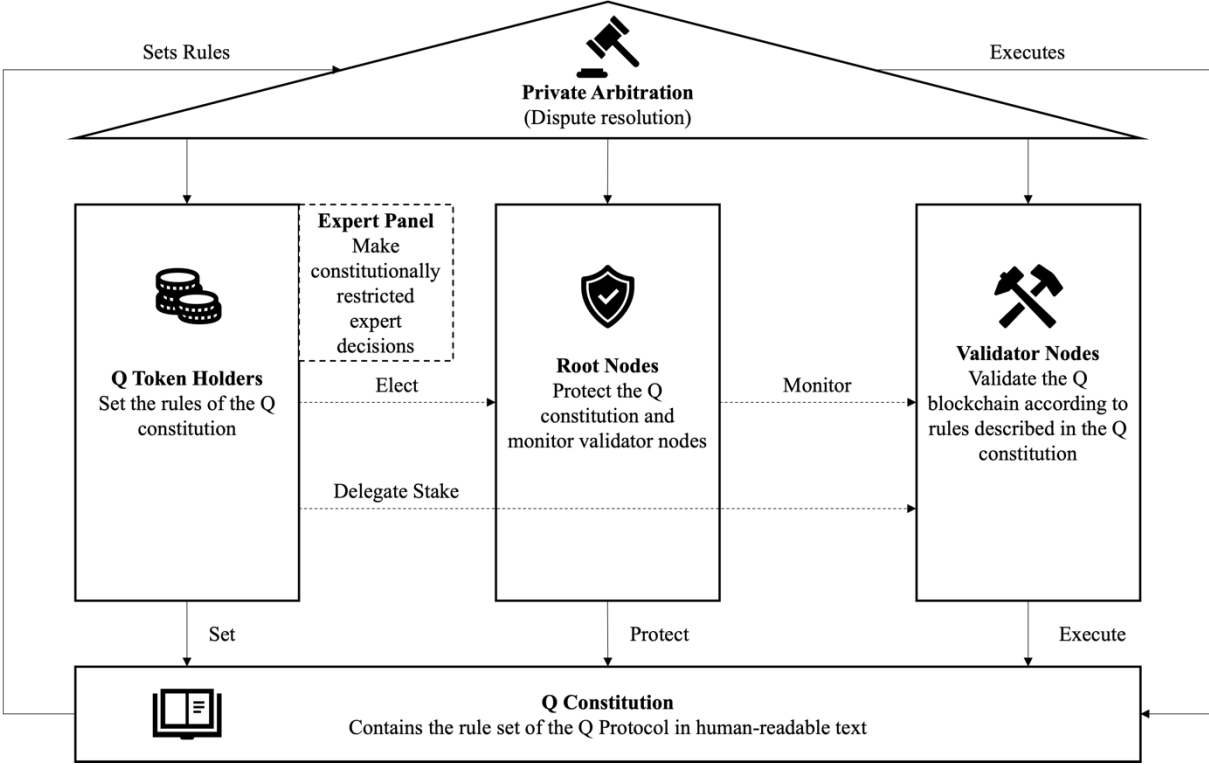
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8. Appendix

Table 1. Q Governance Framework



Note: This graphic is based on the graphic you can find at <https://q.org/about-q> (last accessed on 30.11.2023) and has been modified to include concise role descriptions of the various stakeholder groups.

Table 2. Complete Survey Questionnaire

Governance Survey of the Q Community

Purpose: This survey aims to understand the reasons why Q protocol stakeholders participate in governance decisions.

Participation: "Participation" refers primarily to voting on governance proposals, which can be found at <https://hq.q.org/>, but also includes proposing, commenting on and monitoring the content of an on-chain governance proposal.

Estimated Time: ~8 minutes.

Q Token Raffle: Please find participation details at the end of the survey.

Data Privacy and Anonymity Disclaimer: Your privacy is of utmost importance. All responses are anonymous and will be used solely for research purposes. No personal identifying information will be collected or stored. Any data or findings presented will be in aggregate form. This survey is voluntary and adheres to the highest standards of ethical research practices and data protection. If you have concerns about the privacy of your data, please reach out.

Important Note: This survey is initiated and administered by Benedikt Braun as part of his master thesis at NOVA School of Business & Economics. You can contact him on:

Discord: @benebrn

LinkedIn: <https://www.linkedin.com/in/benedikt-braun-b194a5201/>

General Information

You can consider the questions within this section as control variables. By measuring these factors, one can ascertain the independence of findings, such as from demographic information, and achieve generalizability in the decentralized governance realm.

1. Select a stakeholder group. Choose "Q community member" only if you participate in Q governance discussions but don't own Q tokens yet. Multiple options are allowed, as you can be both a Q tokenholder and a Q validator node, for example. *

- Q community member
- Q validator node
- Q tokenholder
- Q expert
- Q root node
- Q contributor (e.g., working for Q Dev AG)

Sonstiges

2. Select your age range. *

Under 18

18-24

25-34

35-44

45-54

55 and above

3. Select your location. *

Africa

Asia

Australia /Oceania

Europe

North America

South America

Prefer not to say

4. Before joining the Q community, how would you rate your previous experience with governance in web3? *

No experience

Minimal experience (voted or participated a few times)

Moderate experience (regularly participate but not deeply involved)

Extensive experience (actively engage, propose, and debate regularly)

Expert (have a leading role or responsibility in web3 governance)

5. How would you rate your technical proficiency related to web3 technologies? *

- Novice (little to no knowledge)
- Basic (understand fundamental concepts)
- Intermediate (comfortable with most aspects, but not an expert)
- Advanced (deep technical knowledge)
- Expert (could teach or lead in this area)

6. Duration of your involvement with the Q protocol? *

- < 6 months
- 6 months - 1 year
- 1 - 2 years
- More than 2 years

7. How did you first hear of Q *

- Social Media (e.g., Twitter, LinkedIn)
- Word-of-mouth
- Event
- Outreach by a core team member
- Internet search (e.g., medium article)
- Sonstiges

8. How did you acquire your first Q tokens? *

- Incentive Program (e.g., Incentivized Testnet)
- Gifted by another Q tokenholder
- Faucet
- Private Sale
- Sonstiges

9. How many Q tokens do you possess? (Note: This is for research purposes only. Your response remains anonymous.) *

- 0
- < 10
- 10 - 50
- 51 - 500
- 501 - 10,000
- > 10,000
- Prefer not to say

Governance Experience in Q

This section is designed to identify areas that influence your engagement. It is important to assess each question honestly to ensure accuracy and meaningful insights.

10. Please evaluate your governance experience in Q by rating the following statements on a scale of 1 to 5. *

	Fully disagree	Disagree	Nor agree, nor disagree	Agree	Fully agree
I believe that Q's governance frameworks lead to better decisions for the Q protocol.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q's governance will improve the quality and security of the Q protocol.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in voting is a meaningful way to contribute to the Q protocol's decision-making process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I see benefits in Q's "beyond code is law" approach including the Q Constitution and off-chain dispute resolution mechanisms such as the ICC.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a social responsibility to participate in the governance of Q protocol.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

My peers in the Q community believe that I should actively participate in decentralized governance.

Active members of the Q community encourage and appreciate my proactive participation in the governance of the Q protocol.

Participation in governance activities, such as voting, is a social norm within the Q community.

Negative views or criticisms within the Q community motivate me to participate more actively in governance to address and improve issues.

I have access to the necessary resources (like documents or guides) to participate effectively in Q's governance.

The Q community provides adequate support when I face challenges in the governance process.

Off-chain discussions, such as those on Discord servers, provide me with the necessary context and understanding to make informed decisions on Q HQ.

The tools and platforms (like Q HQ and Discord) effectively support my participation in decentralized governance.

I feel confident in the security and integrity of Q's governance system.

I feel that Q's governance system is fair and adequately addresses my interests and concerns.

I believe that decisions made through Q's governance system will be executed reliably.

I trust Q's governance mechanisms to reach decisions in the best interest of the Q Protocol.

11. Please evaluate your governance experience in Q by rating the following statements on a scale of 1 to 5. *

	Fully disagree	Disagree	Nor agree, nor disagree	Agree	Fully agree
Qs governance processes are easy to understand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in decentralized governance, both on-chain and off-chain, is user-friendly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy for me to understand new governance proposals on Q HQ.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident in my ability to follow the process of proposing, commenting on and monitoring governance proposals on Q HQ.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please evaluate your participation in Q's governance using the following statements on a scale of 1 to 5. Use the final section for open-ended feedback. *

	Fully disagree	Disagree	Nor agree, nor disagree	Agree	Fully agree
When collaborating with other Q community members, I contribute to discussions that enhance the functionality or efficiency of the Q protocol.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I keep myself updated about the latest proposals and discussions within the Q community.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I assist other Q community members in understanding and participating in governance processes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I always vote on governance proposals presented on Q HQ.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I discuss Q governance topics with fellow stakeholders, be it tokenholders, root / validator nodes, experts, or core team members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I participate actively within Q's governance process to address and resolve challenges or issues.

I have a general intention to participate in the governance of Q in the future.

I predict I would participate in Q's decentralized governance in the future.

I have specific plans or commitments to participate in Q's governance activities in the near future.

Final Remarks

Share your final thoughts! Every response will be carefully evaluated.

13. Please provide any additional feedback, insights, or experiences you'd like to share about your participation in Q's governance processes. If you would like to meet and chat, we can schedule a 30-minute expert interview. You can book a meeting to your availability using the following Calendly link: <https://calendly.com/ben-q-protocol/q-expert-intervei>

14. Raffle Terms & Conditions - Participation is Voluntary

You can win up to **250 Q tokens** for your valuable contributions. Here's the prize pool distribution:

- **1st place:** 250 Q tokens
- **2nd place:** 150 Q tokens
- **3rd place:** 100 Q tokens

How to Participate:

1. **Input Public Key:** Enter the public key of your mainnet Q wallet into the provided text box. Ensure that you input only your public key, for example, "0x522Ba764ADE1824968a508057d3408ec05a6199d."
2. **Accept Terms:** Select "I hereby voluntarily participate in the raffle and accept the terms and conditions" from the available options in the subsequent question.
3. **Submit "done" on Jokerace:**
Visit <https://jokerace.xyz/contest/qchain/0xE6d8ac3c11f5c5CA2F47Fa15C84025eB9a29b1cA> and ensure you connect to the wallet using the public key entered previously. Submit "done" on the jokerace contest page afterward. If you need Q tokens to pay for transactions fees, you can claim some for free here: <https://faucet.q.org/>

Await Results & Prizes

Winners will be chosen using a transparent, random selection process. You can find detailed information under "Winner Selection." Winners will receive rewards sent directly to the public keys on the Q mainnet by the survey initiator. Proof of transactions will be shared on Discord.

Winner Selection

- A specific future block on Q's blockchain will be announced on Discord after the submission period (November 8th, 3pm CET), mined approx. 48 hours post-announcement.
- Based on the blocks hash, a random number will be determined using the following formula:
Random Number = Integer Value of Block Hash % Total Number of Participants
- The random number will correspond to the index position of the raffle winner.
- The positioning is determined chronologically based on jokerace submissions. 2nd place is 20 positions below the winner, and 3rd place is 20 positions above.

- Valid entries are those with complete and genuine answers and correct raffle participation. Incomplete responses or incorrect participations will be bypassed, reading indices from left to right, looping from the end to start, or vice versa, when necessary.
- Results, along with detailed methodologies, will be shared publicly, allowing for independent verification of the selection process.

15. To enter the prize draw, please select the correct answer based on the information in question 13.

- I don't want to participate in the raffle
- I choose not to participate in the raffle.
- I hereby voluntarily participate in the raffle and accept the terms and conditions
- I don't accept the terms and conditions of the raffle

Disclaimer: Participation in this raffle is voluntary. The organizer holds the right to modify or cancel the raffle at any point, without prior notice. By participating, individuals agree to release and hold harmless the organizers from any liability, loss, litigation, claim, or damage directly or indirectly relating to the participation in or conduct of the raffle. Participants are responsible for understanding and complying with all applicable laws and regulations concerning raffle participation, and by entering, participants confirm their actions are compliant with such laws and agree to indemnify the organizer against any legal claims.

Table 3. Survey Constructs & Questions

Construct	Construct Item	Survey Item	Sources
Performance Expectancy: This construct assesses beliefs about the effectiveness of Q's governance system. It measures perceptions of how this system impacts decision-making, improves the quality and security of the Q Protocol, and provides meaningful participation through voting. It also evaluates views on the benefits of Q's unique governance approaches, like the Q constitution and off-chain dispute resolution mechanisms.	PE1	I believe that Q's governance frameworks lead to better decisions for the Q Protocol.	(Venkatesh et al. 2003)
	PE2	Q's governance will improve the quality and security of the Q Protocol.	
	PE3	Participating in voting is a meaningful way to contribute to the Q Protocol's decision-making process.	
	PE4	I see benefits in Q's "beyond code is law" approach including the Q constitution and off-chain dispute resolution mechanisms such as the ICC.	
Social Influence: This construct gauges the social pressures or motivations to participate in Q's governance. It measures feelings of social responsibility, peer expectations, community encouragement, the role of participation as a social norm, and how community criticisms motivate involvement in governance.	SI1	I feel a social responsibility to participate in the governance of Q Protocol.	(Venkatesh et al. 2003)
	SI2	My peers in the Q community believe that I should actively participate in decentralized governance.	
	SI3	Active members of the Q community encourage and appreciate my proactive participation in the governance of the Q Protocol.	
	SI4	Participation in governance activities, such as voting, is a social norm within the Q community.	
	SI5	Negative views or criticisms within the Q community motivate me to participate more actively in governance to address and improve issues.	
Facilitating Conditions: This construct is about the availability of resources and support systems that enable effective participation in Q's governance. It evaluates access to necessary resources like documentation, community support, the usefulness of off-chain discussions for informed decision-making, and the effectiveness of tools and platforms for participation.	FC1	I have access to the necessary resources (like documentations or guides) to participate effectively in Q's governance.	(Venkatesh et al. 2003)
	FC2	The Q community provides adequate support when I face challenges in the governance process.	
	FC3	Off-chain discussions, such as those on Discord servers, provide me with the necessary context and understanding to make informed decisions on Q HQ.	
	FC4	The tools and platforms (like Q HQ and Discord) effectively support my participation in decentralized governance.	
Effort Expectancy: This construct measures the perceived ease of understanding and participating in Q's governance processes. It assesses the user-friendliness of the governance process, ease of understanding new proposals, and confidence in following the proposal and voting process.	EE1	Q's governance processes are easy to understand.	(Venkatesh et al. 2003)
	EE2	Participating in decentralized governance, both on-chain and off-chain, is user-friendly.	
	EE3	It is easy for me to understand new governance proposals on Q HQ.	
	EE4	I feel confident in my ability to follow the process of proposing, commenting on and monitoring governance proposals on Q HQ.	
Trust: This construct evaluates the confidence in the security, fairness, reliability, and overall integrity of Q's governance system. It measures beliefs about the system's ability to protect interests, execute decisions reliably, and make decisions in the best interest of the protocol.	T1	I feel confident in the security and integrity of Q's governance system.	(Gefen, Karahanna, and Straub 2003)
	T2	I feel that Q's governance system is fair and adequately addresses my interests and concerns.	
	T3	I believe that decisions made through Q's governance system will be executed reliably.	
	T4	I trust Q's governance mechanisms to reach decisions in the best interest of the Q Protocol.	
Civic Engagement: This construct measures the extent of collaborative and proactive involvement in the Q community. It assesses contributions to discussions that enhance the protocol, staying updated on proposals and discussions, and assisting others in understanding and participating in governance.	CE1	When collaborating with other Q community members, I contribute to discussions that enhance the functionality or efficiency of the Q Protocol.	(Doolittle and Faul 2013)
	CE2	I keep myself updated about the latest proposals and discussions within the Q community.	
	CE3	I assist other Q community members in understanding and participating in governance processes.	
Political Participation: This construct focuses on the active involvement in governance processes. It includes consistently voting on proposals, discussing governance topics with stakeholders, and actively participating in addressing challenges within the governance system.	PP1	I always vote on governance proposals presented on Q HQ.	(Gopal, K. and Verma, R. 2017)
	PP2	I discuss Q governance topics with fellow stakeholders, be it tokenholders, root / validator nodes, experts, or contributors.	
	PP3	I participate actively within Q's governance process to address and resolve challenges or issues.	
Behavioral Intention: This construct measures the intent to participate in Q's governance in the future. It assesses general intentions, predictions about future participation, and specific plans or commitments to engage in governance activities.	BI1	I have a general intention to participate in the governance of Q in the future.	(Venkatesh et al. 2003)
	BI2	I predict I would participate in Q's decentralized governance in the future.	
	BI3	I have specific plans or commitments to participate in Q's governance activities in the near future.	

Table 4. Survey Scale Variable Encoding.

ID	Scale Variable	Type of Encoding	0	1	2	3	4	5
#1	Stakeholder group	One-hot	n/A	n/A	n/A	n/A	n/A	n/A
#2	Age	Ordinal	Under 18	18 - 24	25 - 34	35 - 44	45 - 54	55 and above
#3	Location	One-hot	n/A	n/A	n/A	n/A	n/A	n/A
#4	Previous Web3 governance experience	Ordinal		No experience	Minimal experience	Moderate experience	Extensive experience	Expert
#5	Previous Web3 tech experience	Ordinal		Novice	Basic	Intermediate	Advanced	Expert
#6	Involvement duration with Q	Ordinal		< 6 months	6 months - 1 year	1 - 2 years	More than 2 years	
#7	First point of contact with Q	One-hot	n/A	n/A	n/A	n/A	n/A	n/A
#8	Acquisition method first Q Tokens	One-hot	n/A	n/A	n/A	n/A	n/A	n/A
#9	Q Token possession	Ordinal	Zero	< 10	10 - 50	51 - 500	501 - 10,000	> 10,000
#10	Likert-Scale items	Ordinal		Strongly disagree	Disagree	Nor agree, Nor disagree	Agree	Strongly agree

Table 5. Quantitative Analysis Overview

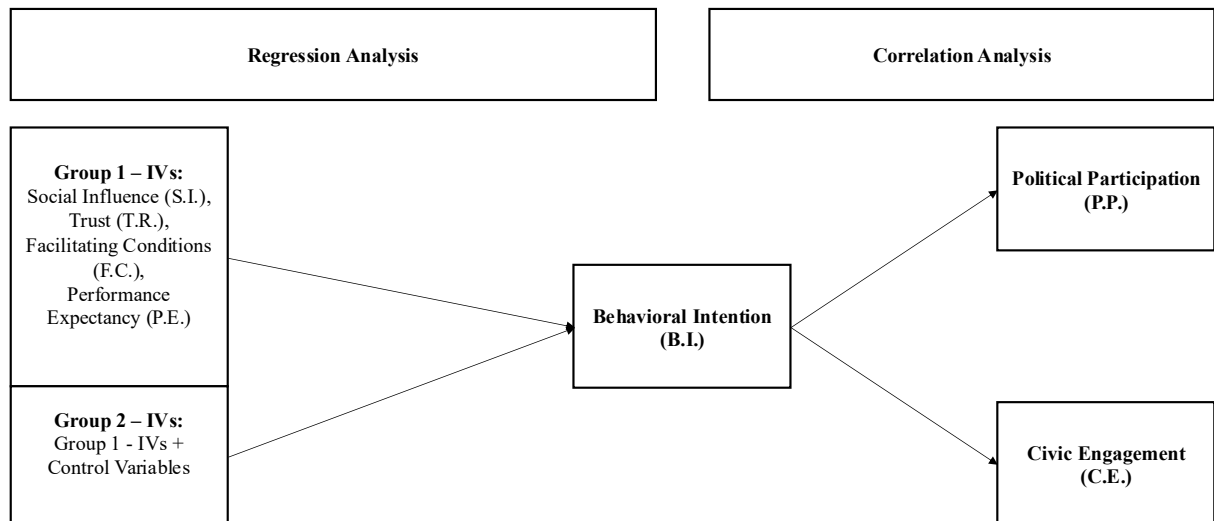


Table 6. Interview Frequency Across Q Stakeholder Groups

Interview ID	Mode	Q Token Holder	Q Validator Node	Q Root Node	Q Expert	Q Contributor
#1	MS Teams	X			X	X
#2	MS Teams & E-Mail	X				
#3	MS Teams	X	X		X	X
#4	MS Teams	X				X
#5	MS Teams	X	X			X
#6	MS Teams	X		X		
#7	MS Teams	X	X	X		
#8	MS Teams & E-Mail	X				X
#9	MS Teams & E-Mail	X				
Total		9	3	2	2	5

Table 7. Interview Questionnaire

Aim	Topic / Coding Category	Questions
Background of interviewee		Can you describe your role within the Q ecosystem? What initially motivated you to become involved with Q?
Extent of participation in Qs governance		How would you characterize your level of engagement in Q's governance decisions? How crucial do you believe community engagement is in making governance decisions within Q?
Engagement opportunities and challenges for stakeholders in Q	Effort Expectancy	Do you find the governance mechanisms of Q easy to comprehend and participate in?
	Incentives	Do you feel adequately incentivized, both monetarily and in terms of reputation, to partake in governance?
	Performance Expectancy	In your opinion, how effective is the current governance system at making high-quality decisions for the Q Blockchain?
	Social Influence	How has the Q community shaped your involvement in governance processes? For instance, have social pressures or norms within the community influenced your participation?
	Facilitating Conditions	Are there any resources or support systems that have been notably beneficial in aiding your participation in governance? Are there any additional supports you wish were available?
	Trust	How much do you trust the security and integrity of Q's governance decisions? How significant is this trust in influencing your participation in Q's governance?
	Others (e.g., regulatory concerns)	Have you perceived any other opportunities or challenges that could influence your engagement in Q's governance decisions?
Governance Outlook	Participation Intention	What alterations or advancements would motivate you to engage more actively in governance decisions?
Closing Thoughts		Is there anything else you'd like to share concerning your experiences or thoughts on the governance of the Q Blockchain?

Table 8. Opportunities and Challenges in Stakeholder Engagement

Q Token Holder			Q Root Node		
	Opportunities	Challenges	Opportunities	Challenges	
Performance Expectancy	<ul style="list-style-type: none"> Leveraging community perspectives to contribute to quality decision making 	<ul style="list-style-type: none"> Illustrating the tangible impact of governance participation on the Q ecosystem 	<ul style="list-style-type: none"> Standardizing governance processes Leveraging root node expertise and feedback to enhance governance procedures 	<ul style="list-style-type: none"> Optimizing operational collaboration Developing technical and governance proficiency of new joiners 	
Social Influence	<ul style="list-style-type: none"> Contributing to informed decisions by fostering a diverse community Supporting community-led governance initiatives and working groups 	<ul style="list-style-type: none"> Bridging the gap between passive and active participants Navigating a meaningful community discourse 	<ul style="list-style-type: none"> Building a strong community culture among root nodes Establishing peer-to-peer learning networks 	<ul style="list-style-type: none"> Accommodating varied preferences in communication channels. Consolidating differing perspectives on governance matters 	
Facilitating Conditions	<ul style="list-style-type: none"> Integrating with renowned web3 projects and resources Providing comprehensive documentation 	<ul style="list-style-type: none"> Ensuring accessibility and simplicity of support materials Streamlining proposal feedback process 	<ul style="list-style-type: none"> Simplifying the interface for governance activities Automating manual tasks 	<ul style="list-style-type: none"> Bridging varied technology expertise and experience 	
Trust	<ul style="list-style-type: none"> Publishing governance reports to foster transparency and highlight achievements 	<ul style="list-style-type: none"> Reducing uncertainty about the backgrounds of proposal authors Preventing centralization of decision-making power 	<ul style="list-style-type: none"> Publishing Q governance case studies Showcasing the impact of governance decisions on the Q ecosystem 	<ul style="list-style-type: none"> Overcoming negative sentiments based on historic Web3 failures 	
Effort Expectancy	<ul style="list-style-type: none"> Developing an intuitive governance interface 	<ul style="list-style-type: none"> Reducing the complexity in understanding the governance system 	<ul style="list-style-type: none"> Utilizing visual aids to improve comprehension of governance processes 	<ul style="list-style-type: none"> Reducing time required to fulfill governance responsibilities 	
Incentives	<ul style="list-style-type: none"> Establishing recognition systems for active contributors. Incentivizing community-driven projects to foster a sense of ownership Introducing micro-rewards for consistent participation in governance activities 	<ul style="list-style-type: none"> Addressing the lack of direct tangible benefits for participating in governance Ensuring fair and equitable distribution of rewards among token holders 	<ul style="list-style-type: none"> Facilitating intellectual stimulation and collaboration opportunities Creating a tiered recognition system to acknowledge different levels of contributions and engagement 	<ul style="list-style-type: none"> Clarifying the tangible value of incentives to ensure they are compelling Ensuring fairness in the distribution of incentives, considering the diversity in contribution levels. 	
Other	<ul style="list-style-type: none"> Extending reach through cross-chain governance Showcasing the contributions and success stories of individual token holders 	<ul style="list-style-type: none"> Managing the varying perceptions of stakeholder roles 	<ul style="list-style-type: none"> Establishing standard for decentralized governance Exploring partnerships with external organizations to supply additional resources 	<ul style="list-style-type: none"> Overcoming potential legal and regulatory hurdles in decentralized governance 	

Validator Node			Experts		
	Opportunities	Challenges	Opportunities	Challenges	
Performance Expectancy	<ul style="list-style-type: none"> Supporting real-time monitoring of validator performance 	<ul style="list-style-type: none"> Communicating unique validation features and benefits to validator candidates 	<ul style="list-style-type: none"> Establishing standards for expert decision-making 	<ul style="list-style-type: none"> Avoiding echo chambers within expert panels 	
Social Influence	<ul style="list-style-type: none"> Encouraging community-led initiatives and forums for validators to exchange insights and strategies 	<ul style="list-style-type: none"> Navigating effective communication among validators from varied backgrounds and levels of expertise 	<ul style="list-style-type: none"> Cultivating a culture of knowledge sharing and mentorship Facilitating discussions 	<ul style="list-style-type: none"> Communicating complex expert matters in a way that is accessible to the broader community Maintaining a high level of independence among experts 	
Facilitating Conditions	<ul style="list-style-type: none"> Creating specialized support documentation, such as for monitoring and operational guidance 	<ul style="list-style-type: none"> Navigating diverse technical setups and proficiency among validators 	<ul style="list-style-type: none"> Accessing a broad array of resources and tools for comprehensive research and analysis 	<ul style="list-style-type: none"> Ensuring adequate onboarding processes for new joiners 	
Trust	<ul style="list-style-type: none"> Publishing regular transparency reports on network status and validator activities Implementing percentage locking of delegations to strengthen confidence 	<ul style="list-style-type: none"> Ensuring the decentralization of validator nodes Obtaining a clear and comprehensive understanding of the rewards distributed 	<ul style="list-style-type: none"> Building trust through consistent and transparent communication of expert activities and decisions 	<ul style="list-style-type: none"> Assuring the quality of expert input Balancing expert anonymity with the demands for credibility 	
Effort Expectancy	<ul style="list-style-type: none"> Providing extensive educational material for new validators 	<ul style="list-style-type: none"> Addressing the initial learning curve associated with unique protocol features, such as slashing 	<ul style="list-style-type: none"> Providing organizational support for the activities of expert panels Establishing a robust framework for expert collaboration and communication 	<ul style="list-style-type: none"> Supporting a deep understanding and specialized expertise in proposal matters 	
Incentives	<ul style="list-style-type: none"> Demonstrating reward distribution and delegation processes 	<ul style="list-style-type: none"> Missing direct incentives for active governance participation 	<ul style="list-style-type: none"> Providing opportunities for professional growth and learning within the blockchain industry Establishing significant recognition and reputational incentives 	<ul style="list-style-type: none"> Aligning experts' incentives with the long-term objectives of the Q ecosystem Enhancing the visibility and recognition of experts' contributions within the community 	
Other	<ul style="list-style-type: none"> Partnering with educational institutions for training and certification of aspiring validators 		<ul style="list-style-type: none"> Engaging experts from cross-disciplinary fields to provide diverse perspectives Utilizing data-driven approaches to inform and guide expert recommendations 		

Note: These topics are actively addressed in the Q community. The added value of this mapping is the overview of opportunities and challenges for each stakeholder along the different aspects of engagement.

Table 9. Key Insights Derived From Participant Observations

Source	Source Description	Date	Duration	Key Insight
Live Events				
VC Builders Party (Lisbon)	Approximately 170 participants attended this event, co-hosted with HansaVC, to network and discuss decentralized governance. Many of the attendees were building web3 applications and wanted to learn about the benefits of deploying their application on Q's blockchain.	2/11/23	4h	<ul style="list-style-type: none"> Decentralizing governance structures in projects presents a notable challenge, characterized by: <ul style="list-style-type: none"> The considerable effort required to develop a secure and decentralized governance system. The need to ensure sufficient involvement and authority within this system. 'Governance as a Service' (GaaS) meets market demands by: <ul style="list-style-type: none"> Offering stable governance security that is less costly and complex. Allowing projects to concentrate on business growth without the overhead of managing their governance infrastructure.
Reg3 Conference (Lisbon)	Approximately 60 people attended this event hosted by Reg3.eu to discuss the state of crypto regulation in Portugal. Among the participants were thought leaders from the web3 domain, regulators and academics.	6/11/23	5.5h	<ul style="list-style-type: none"> Progress in regulation can provide more certainty and security, which in turn could have a positive impact on value creation within Web3. Regulating decentralized organizations is complex as they can operate outside of traditional legal jurisdictions. Decentralized governance can provide certainty and security independent of the progress of regulators.
Q Protocol Community Meet-Up (Lisbon)	Approximately 130 people attended the event to network, learn about Q developments, and hear from projects that have already deployed on Q.	8/11/23	4h	<ul style="list-style-type: none"> Participants showed strong interest in various facets of the Q Protocol, with the main areas of focus being <ul style="list-style-type: none"> Opportunities to contribute to the development of Q Benefits of deploying projects on Q Governance and security aspects of Q Conversations and inquiries increasingly focused on: <ul style="list-style-type: none"> The characteristics of Q's governance and security measures Vulnerabilities and attack vectors of Web3 governance
Meetings				
Q Contributor Team Meetings	These meetings were held with Q contributors. Often these meetings focused on organizing engagement initiatives. For example, contributors would meet to discuss the agenda and content of community calls and brainstorm ideas to facilitate Q stakeholder engagement.	05/09/2023 - 30/11/2023	1h each	<ul style="list-style-type: none"> Essential actions by Q contributors to foster stakeholder engagement include: <ul style="list-style-type: none"> Organizing community meetings Developing educational materials Facilitating off-chain discussions Addressing community feedback on product improvement Comprehension of the governance framework and Q Protocol features is a critical prerequisite for stakeholder engagement Significant resources are required to facilitate participation opportunities
Q Root Node Meetings	A bi-weekly series of meetings with all root nodes and root node candidates on mainnet to discuss governance developments in Q.	05/09/2023 - 28/11/2023	1h each	<ul style="list-style-type: none"> The responsibilities of root nodes must be clearly defined in the Q constitution and periodically reviewed in the root node panel. While the Q-Constitution is crucial for setting out root node duties, it needs additional clarifications for practical understanding, achievable through extra explanations with clear, real-world examples. Utilizing diagrams and detailed process descriptions is beneficial for creating a common understanding and advancing process development. The Q governance framework values human judgment from root nodes but stresses the importance of improving user experience and automating tasks where feasible. This approach aims to prevent root node overload, allowing them to focus on their governance duties.
Q Community Calls	Three community calls were organized as Twitter spaces by Q contributors to discuss recent governance developments with the wider Q community.	1. 12/10/2023 2. 26/10/2023 3. 24/11/2023	30 min each	<ul style="list-style-type: none"> Community meetings, including Ask Me Anything (AMA) sessions, elicit positive response and active participation from the community. Direct participation in community meetings tends to build trust between community members and contributors. These meetings provide critical insight into complex governance matters and aid a better understanding of governance frameworks.

Table 10. Descriptive Statistics on Demographic Information

Stakeholder	Frequency	Percentage
Q token holder	50	46%
Q root node	13	12%
Q validator node	30	28%
Q expert	7	6%
Q contributor	8	7%
Total	108	100%

Note: Q Token holder includes Q community members. Total exceeds 79 participants as respondents were allowed to check multiple stakeholder groups.

Age Range	Frequency	Percentage
Under 18	1	1%
18 - 24	13	16%
25 - 34	32	41%
35 - 44	22	28%

45 - 54	6	8%
55 and above	5	6%
Total	79	100%

Location	Frequency	Percentage
Africa	13	16%
Asia	32	41%
Australia	1	1%
Europe	26	33%
North America	6	8%
South America	0	0%
Prefer not to say	1	1%
Total	79	100%

Table 11. Descriptive Statistics on Control Variables

Web3 Gov XP	Frequency	Percentage
No experience	10	13%
Minimal experience	20	25%
Moderate experience	35	44%
Extensive experience	11	14%
Expert	3	4%
Total	79	100%

Web3 Tech XP	Frequency	Percentage
Novice	6	8%
Basic	17	22%
Intermediate	40	51%
Advanced	13	16%
Expert	3	4%
Total	79	100%

Q Involvement	Frequency	Percentage
< 6 months	16	20%
6 months - 1 year	11	14%
1 - 2 years	45	57%
More than 2 years	7	9%
Total	79	100%

FPOC with Q	Frequency	Percentage
Social Media	40	51%
Event	3	4%
Word-of-mouth	11	14%
Outreach by core team	12	15%
Internet search	9	11%
Other	4	5%
Total	79	100%

First Q Tokens	Frequency	Percentage
Private Sale	1	1%
Incentive Program	51	65%
Faucet	9	11%
Gifted	11	14%
Other	7	9%
Total	79	100%

Q Token Possession	Frequency	Percentage
Zero	6	8%
< 10	9	11%
10 - 50	5	6%
51 - 500	10	13%
501 - 10,000	41	52%
> 10,000	8	10%
Prefer not to say	0	0%
Total	79	100%

Table 12. Descriptive Statistics (Mean, Standard Deviation & Correlations) on Survey

Constructs

	Mean	Std.Dev	PE1	PE2	PE3	PE4	SI1	SI2	SI3	SI4	SI5	FC1	FC2	FC3	FC4	T1	T2	T3	T4	CE1	CE2	CE3	PP1	PP2	PP3	BI1	BI2	BI3	
PE1	4.00	0.91	1																										
PE2	4.15	0.80	0.69	1																									
PE3	4.11	0.91	0.7	0.61	1																								
PE4	3.91	0.92	0.58	0.54	0.46	1																							
SI1	3.71	1.03	0.18	0.37	0.28	0.34	1																						
SI2	3.80	0.98	0.2	0.25	0.27	0.32	0.65	1																					
SI3	3.71	0.98	0.29	0.34	0.24	0.4	0.57	0.69	1																				
SI4	3.75	0.82	0.27	0.47	0.25	0.24	0.56	0.49	0.51	1																			
SI5	3.39	1.01	0.2	0.29	0.11	0.23	0.4	0.45	0.56	0.57	1																		
FC1	3.84	0.98	0.36	0.24	0.24	0.34	0.33	0.33	0.3	0.3	0.18	1																	
FC2	3.85	0.88	0.37	0.36	0.33	0.35	0.38	0.31	0.34	0.46	0.3	0.52	1																
FC3	3.90	0.93	0.4	0.35	0.41	0.23	0.3	0.23	0.34	0.28	0.29	0.52	0.67	1															
FC4	3.94	0.92	0.44	0.31	0.38	0.38	0.25	0.21	0.33	0.3	0.28	0.55	0.48	0.62	1														
T1	3.99	0.87	0.41	0.37	0.38	0.24	0.41	0.33	0.34	0.42	0.2	0.46	0.45	0.35	0.51	1													
T2	3.84	0.91	0.45	0.39	0.47	0.35	0.33	0.46	0.45	0.46	0.24	0.43	0.29	0.27	0.52	0.76	1												
T3	3.90	0.94	0.3	0.33	0.33	0.34	0.43	0.41	0.37	0.45	-0.01	0.33	0.42	0.25	0.32	0.59	0.62	1											
T4	3.89	0.89	0.41	0.44	0.35	0.28	0.51	0.28	0.32	0.34	0.09	0.37	0.44	0.4	0.44	0.64	0.54	0.63	1										
CE1	3.65	1.13	0.32	0.29	0.2	0.36	0.35	0.32	0.29	0.18	0.04	0.33	0.29	0.15	0.1	0.28	0.27	0.33	0.15	1									
CE2	3.72	1.15	0.28	0.39	0.19	0.3	0.49	0.34	0.33	0.26	0.23	0.48	0.31	0.27	0.21	0.38	0.33	0.29	0.33	0.68	1								
CE3	3.47	1.13	0.29	0.34	0.2	0.3	0.48	0.52	0.44	0.28	0.25	0.37	0.33	0.31	0.15	0.28	0.35	0.37	0.32	0.73	0.7	1							
PP1	3.48	1.16	0.24	0.18	0.28	0.21	0.46	0.41	0.32	0.26	0.25	0.3	0.19	0.16	0.29	0.47	0.47	0.26	0.37	0.39	0.57	0.53	1						
PP2	3.49	1.23	0.23	0.29	0.17	0.32	0.48	0.4	0.51	0.25	0.36	0.26	0.31	0.22	0.32	0.32	0.34	0.21	0.32	0.55	0.57	0.65	0.62	1					
PP3	3.54	1.13	0.15	0.19	0.14	0.28	0.44	0.32	0.46	0.27	0.19	0.28	0.21	0.09	0.19	0.33	0.4	0.35	0.24	0.6	0.57	0.62	0.68	0.76	1				
BI1	4.03	0.96	0.19	0.21	0.25	0.15	0.42	0.31	0.43	0.25	0.2	0.22	0.34	0.38	0.33	0.34	0.39	0.31	0.38	0.34	0.49	0.44	0.4	0.53	0.38	1			
BI2	4.05	0.88	0.23	0.26	0.27	0.2	0.52	0.42	0.53	0.37	0.25	0.35	0.36	0.39	0.38	0.4	0.48	0.44	0.45	0.48	0.5	0.57	0.4	0.56	0.5	0.82	1		
BI3	3.86	0.92	0.17	0.22	0.19	0.06	0.43	0.33	0.34	0.16	0.13	0.33	0.2	0.22	0.17	0.32	0.33	0.34	0.4	0.51	0.54	0.66	0.42	0.56	0.52	0.6	0.71	1	

Table 13. Pattern matrix with standardized loadings based upon correlation matrix

	item	ML1	ML2	ML4	ML3
T1	14	0.91			
T2	15	0.84			
T3	16	0.75			
T4	17	0.63			
SI2	6		0.82		
SI3	7		0.78		
SI5	9		0.7		
SI1	5		0.69		
SI4	8		0.58		
PE1	1			0.96	
PE2	2			0.74	
PE3	3			0.72	
PE4	4			0.63	
FC3	12				1.05
FC2	11				0.68
FC4	13				0.57
FC1	10				0.48

Note: This table presents the standardized loadings (pattern matrix) from a factor analysis conducted using the maximum likelihood (ML) method with a Promax rotation. The analysis identified four factors (ML1, ML2, ML4, ML3), as shown in the columns.

Table 14. Multiple Regression Analysis Results

Coefficients	Model 1				Model 2			
	Estimate	Std. Error	t value	Pr(> t)	Estimate	Std. Error	t value	Pr(> t)
Intercept	1.3045	0.5087	2.564	0.01237*	-0.59198	0.91115	-0.65	0.518363
PE	-0.1123	0.1301	-0.863	0.39075	-0.15982	0.12078	-1.323	0.190773
T	0.3489	0.1306	2.672	0.00926**	0.30948	0.12253	2.526	0.014207*
FC	0.1542	0.1264	1.22	0.22631	0.24865	0.11747	2.117	0.038442*
SI	0.3195	0.112	2.854	0.0056**	0.29523	0.10194	2.896	0.005264**
ctrl_location_Africa					0.85536	0.22055	3.878	0.000264***
ctrl_location_Asia					0.35188	0.18214	1.932	0.058098.
ctrl_location_Australia...Oceania					0.48164	0.62457	0.771	0.443643
ctrl_location_North.America					0.6168	0.29611	2.083	0.041521*
ctrl_location_Others					-0.39649	0.69383	-0.571	0.569827
ctrl_first_awareness_of_q_Others					-0.43123	0.22477	-1.919	0.059807.
ctrl_first_awareness_of_q_Word.of.mouth					0.04806	0.25241	0.19	0.849627
ctrl_acquisition_method_q_to_kens_Gifted.by.another.Q.tokenholder					1.20829	0.72801	1.66	0.102189
ctrl_acquisition_method_q_to_kens_Incentive.Program.e.g.Incentivized.Testnet.					1.24233	0.70686	1.758	0.083926.
ctrl_acquisition_method_q_to_kens_Others					1.46807	0.71855	2.043	0.045442*
ctrl_acquisition_method_q_to_kens_Private.Sale					NA	NA	NA	NA
ctrl_stakeholder_group_q_contributor					0.5007	0.2596	1.929	0.058497.
ctrl_stakeholder_group_q_expert					0.25554	0.28715	0.89	0.377054
ctrl_tech_proficiency_web3					0.10431	0.08282	1.259	0.212749
ctrl_q_tokens_count					0.08554	0.06275	1.363	0.177972

Note: This table presents results of the multiple regression analysis conducted in R programming language, with behavioral intention of participating in Q's governance system as the dependent variable. Significance codes used in the analysis are as follows:

- *** represents a significance level of 0.
- ** represents a significance level of 0.001.
- . represents a significance level of 0.01.
- . represents a significance level of 0.05.

Table 15. Model Summary

Model	R	R Square	Adjusted R Square	F-statistic	p-value
1	0.6833	0.3477	0.3124	9.86	1.89E-06
2	0.5899	0.6058	0.4875	5.122	7.89E-07

Table 16. Engagement Framework

Engagement Elements	Indicators (Illustrative)	Initiatives (Illustrative)
Educational Engagement	Onboarding Easiness	<ul style="list-style-type: none"> • Develop comprehensive onboarding materials for new members. • Provide on-demand and personal onboarding support.
	Awareness Building	<ul style="list-style-type: none"> • Create educational content about the DAO's mission, values, and operations. • Conduct regular "Ask Me Anything" (AMA) sessions with contributors or experienced community members.
	Skill Development	<ul style="list-style-type: none"> • Offer workshops, webinars, and training sessions on participation opportunities. • Provide resources for self-learning, like curated reading lists or online courses. • Support peer-to-peer learning and knowledge sharing sessions.
Community Engagement	Community Traction	<ul style="list-style-type: none"> • Host regular community calls or meetings to facilitate discussions and networking. • Create online forums or chat groups for members to interact and share ideas.
	Member Collaboration	<ul style="list-style-type: none"> • Organize virtual or in-person social events, such as meetups or workshops. • Implement collaborative tools and platforms for project management and communication. • Encourage joint ventures or partnerships within the DAO on specific projects.
	Reputation Building	<ul style="list-style-type: none"> • Facilitate mentorship programs pairing new members with experienced ones. • Implement a system that acknowledges and rewards contributions. • Create opportunities for members to establish their reputation within the DAO.
Governance Participation	Voting and Decision Making	<ul style="list-style-type: none"> • Provide clear, accessible information on voting procedures and decision-making. • Encourage active participation in governance through proposal discussions and educational resources. • Simplify the voting process using user-friendly DAO tooling.
	Proposal Development	<ul style="list-style-type: none"> • Organize workshops or brainstorming sessions for proposal development. • Facilitate open forums for members to propose and debate governance proposals. • Implement transparent processes for submitting and reviewing governance proposals.
	Electing Positions	<ul style="list-style-type: none"> • Establish clear criteria for eligibility and encourage diversity in panel members. • Facilitate a fair election process.
	Network Analytics	<ul style="list-style-type: none"> • Use analytics tools to understand participation and share insights with the community. • Leverage data-driven insights to improve participatory opportunities
Incentive Structure	Tokenomics and Rewards	<ul style="list-style-type: none"> • Develop a fair and transparent token distribution system. • Link token rewards to participation, contribution, or achievement milestones. • Educate members on incentive mechanisms.
	Recognition and Rewards	<ul style="list-style-type: none"> • Develop a system for recognizing member contributions, such as awards or tokens. • Implement gamification elements like badges or leaderboards for active participation.
	Investment and Funding	<ul style="list-style-type: none"> • Offer tangible rewards or incentives for significant contributions or achievements. • Create opportunities for members to invest in or fund DAO projects. • Provide clear, transparent information on financial health and project funding.
	Participative Budgeting	<ul style="list-style-type: none"> • Offer financial literacy sessions to educate members about DAO economics and investments. • Allow members to have a say in budget allocation, use tools for transparent and participative budgeting processes.
Decentralized Operations	Task and Project Ownership	<ul style="list-style-type: none"> • Encourage members to initiate and lead projects aligned with the DAO's goals. • Provide a clear framework for proposing, approving, and funding projects. • Offer support and resources for project management and execution.
	Contribution Opportunities	<ul style="list-style-type: none"> • Create a transparent system for members to find and take on tasks or roles. • Regularly update the community on open tasks and areas needing support. • Recognize and reward diverse forms of contributions, not just technical or financial.
	Smart Contract Development & Audit	<ul style="list-style-type: none"> • Involve members in smart contract development. • Ensure contracts are clear and accessible by educating on smart contract implications.
	Streamlining Decision-Making	<ul style="list-style-type: none"> • Use tools to capture off-chain sentiment. • Establish and educate clear processes for decision-making.
	Crisis Management	<ul style="list-style-type: none"> • Develop contingency plans, establish a rapid response team, provide clear guidance during emergencies.
	Risk Management	<ul style="list-style-type: none"> • Incentivize the identification of risks of a technical (e.g., bug bounty programs) or regulatory nature. • Implement risk mitigation strategies.