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THE IMPORTANCE OF THE REWARD SYSTEM IN ONLINE CIVIC PARTICIPATION

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ABSTRACT

Introduction: This article provides an integrative review of the role of the Reward System in civic participation in digital environments, based on 73 sources published between 1990 and 2024. Within a multidisciplinary theoretical framework, a Theory of Change is formulated that articulates the sequence rewards → motivation → participation → representativeness → traceability. **Methodology:** The methodology combined a systematic literature review, the construction of an analytical matrix, and an inductive coding of conceptual and empirical evidence. **Results:** The results show that symbolic, unexpected, and non-controlling rewards increase intrinsic motivation and active participation. When these incentives are implemented together with structured feedback and traceability mechanisms, they also contribute to improving the quality of citizens' contributions. **Discussion:** The discussion draws practical implications for the design of participatory platforms: prioritize rewards that are consistent with autonomy, competence, and relatedness; accompany incentive strategies with digital-literacy programs and inclusion measures; and establish standardized metrics (KPIs) and ethical assessments. **Conclusions:** The article offers an operational conceptual framework for researchers and public officials seeking to promote more inclusive and higher-quality participation.

Keywords: citizen participation, reward system, deliberative processes.

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1. INTRODUCTION

In digital democracy, citizens can vote online, submit petitions, or comment on government decisions. However, in smart communities, participation remains low and requires incentives (Pak et al., 2017; Romano et al., 2022). Romano et al. (2022) demonstrate that gamification increases initial motivation, but its effects diminish if it is not integrated with a deliberative architecture, and they advocate for an ecosystem of sustained engagement. Self-Determination Theory (Deci & Ryan, 2000) explains how autonomy, competence, and relatedness generate intrinsic motivation, while the overjustification effect warns against predictable external incentives (Deci, 1971; Lepper et al., 1973).

Gamification in civic contexts channels motivation (Landers et al., 2018), but its success varies according to the institutional context, the type of user and the design of dynamics, since if it is perceived as manipulative it can undermine autonomy (Devisch et al., 2016; Hassan & Hamari, 2020). This study analyzes the role of reward systems in *online* civic motivation from an interdisciplinary perspective: Behavioral Psychology, Political Science, and Digital Sociology. Information and communication technologies (ICTs) have boosted civic participation, and online platforms strengthen deliberative democracy by facilitating direct involvement in public decision-making (Castells, 2010; García Guitián, 2011; Mansbridge et al., 2012).

In practice, participation has shifted from face-to-face meetings to virtual consultations and voting (García Guitián, 2011). For example, open-source platforms like Decidim (Barcelona City Council) enhance transparency and traceability by allowing for structured proposals, debates, and voting; Aragón et al. (2017) demonstrate that its deliberative architecture improves the quality of debates. However, digitalization also faces challenges: the digital divide, demographic biases, and information overload can limit inclusion (Resek et al., 2024). Even successful platforms can reproduce inequalities: in FixMyStreet Brussels, wealthier areas report more incidents than vulnerable ones (Pak et al., 2017). Factors such as digital literacy, institutional trust, and personal resources influence effective participation (García Guitián, 2011). In this sense, Lafont (2020) underlines the importance of an ethical-normative framework that protects citizens' data, verifies identities and guarantees institutional transparency.

Continuing with the above, it is important to highlight that citizen motivation in digital environments requires, in addition to technology, a design focused on appropriate incentives. According to the Self-Determination Theory (Deci & Ryan, 2000), the satisfaction of three basic needs reinforces the intrinsic motivation of participants:

- Autonomy: enabling citizens to make informed and independent decisions.
- Competence: offering tools and resources that enable them for effective participation.
- Relationship: fostering social interaction and a sense of belonging to the community.

When these needs are met, the tendency to engage out of self-interest and intrinsic satisfaction is fostered (Deci & Ryan, 2012). In contrast, the overjustification effect demonstrates that predictable external incentives (money, rewards) can displace intrinsic motivation (Deci et al., 1999). A review of 128 studies showed that tangible and expected rewards tend to reduce intrinsic interest, while intangible and non-controlling rewards (praise, recognition) increase it (Deci et al., 1999). In online civic engagement platforms, this implies carefully designing rewards through symbols and unexpected virtual achievements (badges, points), which can reinforce motivation without displacing it. However, material incentives strictly tied to participation (e.g., paying for each survey response) could induce contributions motivated solely by the reward, undermining genuine commitment. It is worth noting that this shift is not universal, since when extrinsic rewards are not perceived as controlling and are applied in contexts of low internal motivation, they can encourage participation without significant adverse effects (Deci & Ryan, 2000).

However, from a Political Science perspective, citizen participation is traditionally explained by instrumental reasons (expected benefits), normative reasons (civic duty), and social reasons (community pressures), modulated by the institutional structure and accountability mechanisms. Recent studies confirm that the mere availability of digital platforms does not automatically increase participation if there are no motivating incentives (Hassan & Hamari, 2020). Consequently, digital rewards are proposed as selective incentives since they increase the perceived benefit and reduce the cost of participation (Gastil & Broghammer, 2021). Some research indicates that these elements can raise both the motivation and the quality of citizen input (Hamari et al., 2014; Mayer, 2009). For example, Mayer (2009) highlights that game environments offer safe spaces for decision-making, promoting inclusion and deliberation. Gastil and Broghammer (2021) developed a framework that links game mechanics with key democratic processes (inclusion, informed deliberation, influence, and long-term impact), noting that digital rewards not only incentivize participation but also provide visibility and prestige that reinforce civic motivation. However, Thiel et al. (2016) reported in Finland that genuine interest in public issues remains the main driver of participation, and that gamification primarily empowers those who are already interested. In short, from a political science perspective, it is concluded that online rewards function as contextual stimuli, but do not replace intrinsic motivations; without internal motivation, gamified incentives alone do not generate genuine interest or expand participation to new groups (Gastil & Broghammer, 2021; Thiel et al., 2016).

From the perspective of Digital Sociology, which studies how ICTs transform social practices, identities, and collective relationships (Lupton, 2012, 2014), a noteworthy and applicable view emerges in this field. In online civic participation platforms, it is important to observe how users organize themselves into virtual communities, construct digital identities, and establish systems of social recognition. From this perspective, reward systems are not merely individual incentives; they become social artifacts that influence community dynamics. Richter et al. (2015) emphasize that the social dimension (competition, collaboration, and comparison) is inherent to

gamification. Networks facilitate the visibility of contributions: badges, points, and public rankings act as social capital, reinforcing digital reputation and satisfying the need for status and belonging. At the same time, these public metrics can amplify inequalities between dominant and new users. When a platform promotes cooperation, public recognition, and accessibility, it triggers a cascading effect where each motivated user inspires others, amplifying collective engagement (Richter et al., 2015).

Summing up this section, it is necessary to address gamification, understood as the incorporation of game elements into civic contexts. It has become established as a strategy to promote citizen participation (Devisch et al., 2016). By integrating points, levels, rewards, and challenges, the aim is to increase both intrinsic motivation—through well-designed challenges and engaging narratives—and extrinsic motivation—with badges and trophies —while simultaneously activating factors such as social competence (leaderboards), group collaboration, and a sense of purpose (Pérez-Escolar & Navazo Ostúa, 2019). Field and controlled studies confirm their initial benefits: Devisch et al. (2016) demonstrated that gamified urban games facilitate the collective resolution of spatial problems; Romano et al. (2022) found that, while initial motivation improves with gamification, its sustainability depends on the design of the experience; and systematic reviews such as Hassan and Hamari (2020) links gamification with increases in engagement, enjoyment, civic learning, and citizen interaction. Notable examples include Community PlanIt (Gordon & Baldwin-Philippi (2014), which strengthens community trust through virtual budgets and missions, and TAB Sharing (Bianchini et al., 2016), which rewards the proposal and voting of ideas with points. Comuni-Chiamo, for its part, associates symbolic rewards with the identification of urban incidents, connecting gamification with tangible benefits for the community. These practices exemplify how game mechanics can attract traditionally indifferent audiences and extend citizen attention beyond the immediate interest of formal processes.

However, gamification faces criticism: poorly calibrated designs can encourage slacktivism (Morozov, 2009), trivialize complex issues (Werbach & Hunter, 2012) or erode trust if they conceal interests and data. Furthermore, many prototypes have not scaled or demonstrated lasting impact (Resek et al., 2024). To maximize their effectiveness, a strategic design is needed that aligns game elements with democratic goals and addresses motivational diversity: profiles focused on competition, socialization, or personal achievement require customizable missions and collaborative components. Inclusion and accessibility — key for users of all ages, educational levels, and technical skills—complete the ethical and inclusive approach that ensures gamification energizes civic processes, engages apathetic audiences, and improves the quality and transparency of public decisions (Hassan & Hamari, 2020).

2. OBJECTIVES

General Objective:

- To analyze the role of the reward system in citizen participation in digital environments.

Specific Objectives:

- To synthesize and quantify the empirical and conceptual evidence on reward designs (points, badges, feedback) using the analytical matrix employed in the review.
- To formulate and evaluate a Theory of Change that articulates rewards → motivation → participation → representativeness → institutional traceability; identifying the mechanisms and conditions that govern each link.
- To derive practical implications for the design of participatory platforms that promote more inclusive, higher quality participation with enhanced institutional traceability

3. METHODOLOGY

This research adopts a qualitative and interdisciplinary approach, integrating Behavioral Psychology, Political Science, and Digital Sociology, to study the implications of reward systems in online citizen participation platforms. It is structured as a theoretical - interpretive study, grounded in an integrative qualitative review that critically synthesizes empirical and conceptual literature from diverse sources. (Whittemore & Knafl, 2005).

3.1. Qualitative Integrative Review as a Methodological Design

The primary methodology chosen for this research was the qualitative integrative review, due to its capacity to provide a comprehensive view of the phenomenon under study, contributing theoretical, conceptual, and empirical evidence from different disciplines, methodological approaches, and fields of application. Following Whittemore and Knafl (2005), this methodology facilitates the integration of diverse studies. The following phases were planned for this work:

- Problem identification: based on the empirical observation that online citizen participation platforms suffer structural limitations; low involvement, political disaffection, crisis of representativeness and loss of democratic legitimacy (Bastos et al., 2022; Senior et al., 2023), this research aims to examine how the reward system influences citizen motivation to participate in these portals.
- Inclusion and exclusion criteria:
    - Dates: Studies published between 1990 and 2024 have been included, with emphasis on the most recent literature, allowing analysis of the impact of digitization and gamification on the dynamics of citizen participation in digital environments.
    - Languages: Spanish, English, French, Portuguese.

  - Databases: Scopus, Web of Science, Google Scholar, Redalyc, Dialnet and institutional repositories such as TDX, e-Prints Complutense, Dialnet, Digitum and DSpace were consulted.
  - Disciplines of study: priority was given to research in Political Science, Sociology, Social Psychology, Communication Sciences, Civic Technology and Neuroscience; attending to the fields of Behavioral Psychology, Political Science and Digital Sociology.
  - Sources: peer-reviewed articles, doctoral theses, papers presented at scientific conferences, books, and institutional technical documents.
- Data collection and analysis: documentary research was used as a technique for critically exploring the relevant literature (Daymon & Holloway, 2010). The analysis was organized around emerging thematic axes: motivation, participation, transparency, neuroscience, governance, and digital ethics, using interpretive reading and inductive coding. To systematize the results, an analytical matrix was developed that records, for each source, the author, year, type of study, objectives, main findings, and its link to the reward system on online citizen participation platforms.
- Development of the analytical matrix and integrative synthesis: following the recommendations of Battistone et al. (2023), a matrix was developed in which the following were recorded for each document:
  - Author(s) and year.
  - Document type and discipline.
  - Research objective.
  - Main findings.
  - Explicit relationship with reward systems and online participation platforms.

In total, 73 documents were analyzed and classified using an inductive coding approach (Strauss & Corbin, 1990) to identify five emerging thematic categories: motivation (intrinsic/extrinsic), gamification, digital governance and transparency, ethics and participatory justice, and civic technologies (Whittemore & Knafl, 2005).

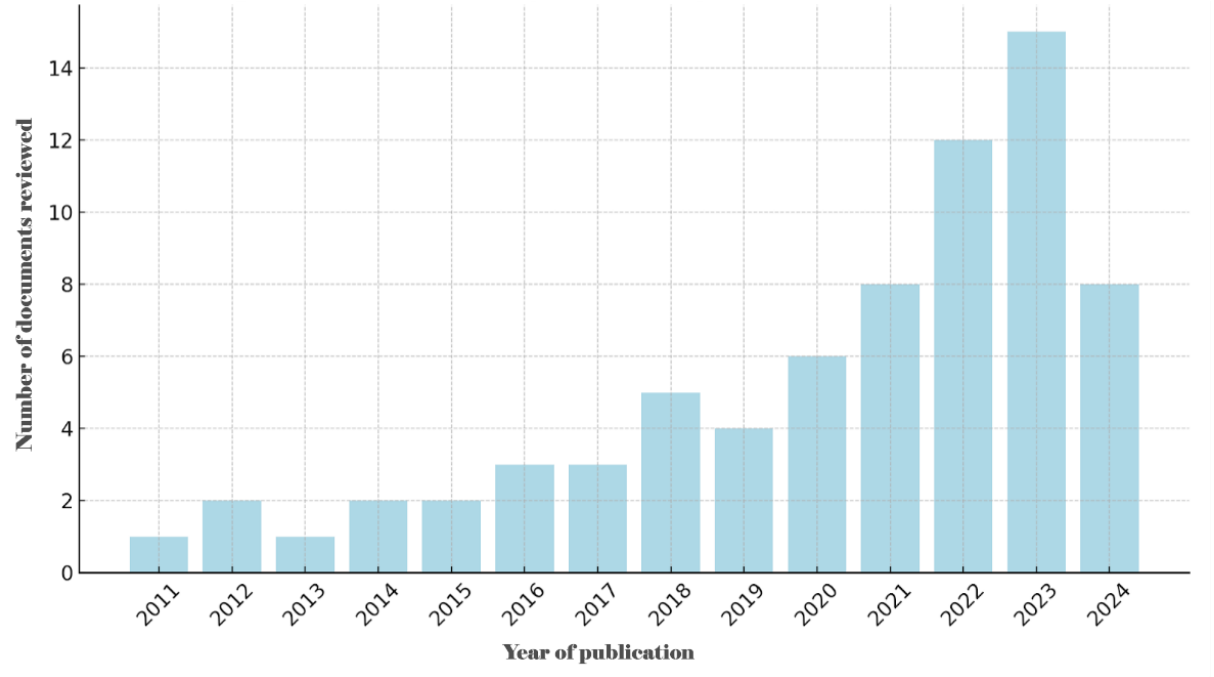
- Analysis procedure:
  - Each article was read in depth and coded in the matrix.
  - Quantitative counts (number of studies per category and per year) were performed to verify temporal and thematic trends.
  - Convergent (consensus) and divergent (criticism) patterns were examined regarding the impact of incentives on citizen participation.
  - Source triangulation was used to strengthen the credibility and internal validation of the analysis (Lincoln & Guba, 1988).

- Preparation of results:
  - Based on the analytical matrix, a results section was developed with descriptive figures (thematic frequencies, annual distribution, proportion of empirical versus theoretical studies).

- Schematic graphics (Figure 1, Figure 2) were generated to quantitatively illustrate the findings.

Figure 1

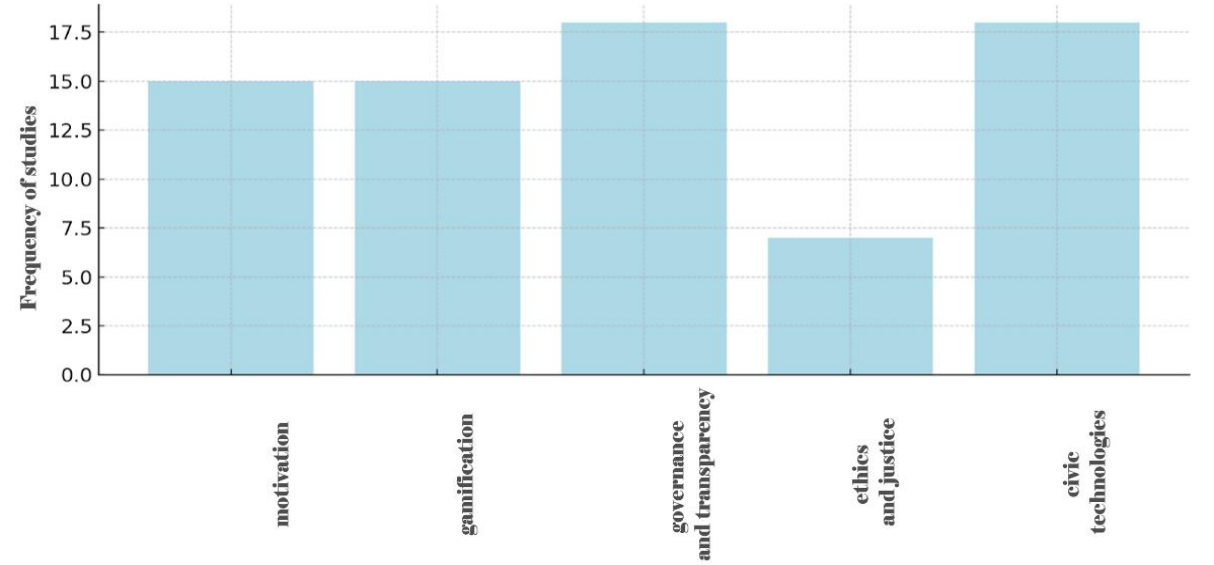
Temporal Evolution of Publications (2011-2024)



Source: Elaborated by the authors.

Figure 2

Frequency of Emerging Categories



Source: Elaborated by the authors.

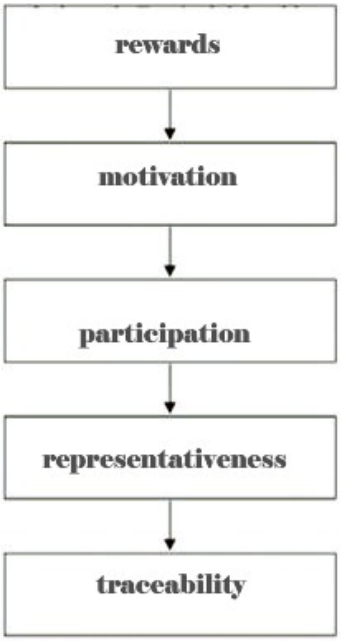
- Scientific rigor and validity: to this end, the methodological integrity guidelines for qualitative reviews compiled by Battistone et al. (2023) and Whittemore and Knafl (2005) were followed, applying criteria of credibility, auditability, and transferability. The orchestration of disciplinary sources, empirical contrast with case studies, and conceptual clarity in the analysis reinforced the internal validity of the study.
- Presentation of results: through a narrative-analytical approach, the most significant theoretical and empirical findings for each topic were connected, combined with real-world experiences and concrete platforms (such as CitySwipe, Decidim, Decide Madrid, and Frena la Curva). Critical interpretation was paramount, allowing for the argumentation of causal relationships, normative implications, and democratic risks. Therefore, this presentation aligns with the conceptual analysis model proposed by Torraco (2005), where the researcher does not merely synthesize, but rather reorganizes and reinterprets existing knowledge.

3.2. Methodological Approach: Theory of Change and Contribution Analysis

Based on the methodological design, the evaluation is based on an explicit Theory of Change model, following Álvarez-Rojas and Preinfalk-Fernández (2018), Rogers (2014), and Monje (2017). A conceptual diagram was constructed (Figure 3) that links digital rewards (*input*) with their effects: greater citizen motivation, increased participation, and diversification of profiles (representativeness), ultimately achieving reinforced institutional traceability.

Figure 3

Conceptual Diagram



Source: Elaborated by the authors.

Each step—rewards → motivation → participation → representativeness → traceability—was structured on transformative theoretical assumptions derived from the literature on social incentives and motivational processes, as reflected in Cassetti and Paredes-Carbonell (2020). Self-Determination Theory suggests that the symbolic recognition of participation in deliberative processes reinforces intrinsic motivation and, therefore, facilitates active involvement in online spaces (Botella Nicolás & Ramos Ramos, 2019; Ryan & Deci, 2000).

The Theory of Change functions as a causal roadmap: according to Figure 3. Digital rewards increase participant motivation, which in turn boosts citizen participation and improves representativeness, ultimately strengthening institutional traceability (recording of contributions and commitments). Each link incorporates explicit hypotheses of change (for example, that the points system generates a sense of belonging), as documented in the cited studies.

The contribution analysis followed Mayne's (2012) approach, relying exclusively on secondary literature to construct a "contribution story" that validates the assumptions of the Theory of Change step by step with evidence from studies, reports, and cases, while also considering alternative explanations. Based on this structural framework, specific search criteria were defined to gather the necessary documentary evidence.

- Systematic search for evidence: following Whittemore and Knafl's (2005) methodological criteria for integrative reviews, empirical and theoretical works were compiled from the previously cited databases that document the effects of gamification on civic platforms (Resek et al., 2024), case studies such as CitySwipe, and evaluations of Decide Madrid. Meta-analyses and systematic reviews that measured indicators of participation, motivation, and transparency in the digital context were included.

3.3. Descriptive Results of the Integrative Review

However, in order to complement the qualitative analysis, descriptive figures were extracted from the analytical matrix, providing quantitative support to the corpus of the 73 documents reviewed and analyzed.

Distribution based on the type of study:

- Of the 73 documents, 28 (38%) correspond to empirical studies and 45 (62%) to theoretical or review work.
- This proportion is shown in Figure 1, which shows the annual evolution of the number of publications classified according to their empirical or theoretical nature.

Temporal evolution of literature:

- The Figure 1 represents the sustained increase over time in work on reward systems in online citizen participation since 2000, with relevant peaks in 2011, 2016 and 2022.

- This growth reflects the increasing interest of the academic community in the intersection between gamification and digital democracy.

Frequency of thematic categories:

Five emerging categories were coded according to Figure 2, resulting in:

- Intrinsic vs. Extrinsic Motivation (21 studies; 29%).
- Gamification and Reward Design (18 studies; 25%).
- Digital Sociology and Social Capital (12 studies; 16%).
- Political Science and Governance (11 studies; 15%).
- Ethics, Transparency and Accountability (11 studies; 15%).

Figure 2 graphically presents this distribution, showing that almost a third of the literature focuses on motivational mechanisms, while ethics and transparency, despite their relevance, receive less quantitative attention. The research combines a conceptual and interpretive framework with a rigorous quantitative analysis that demonstrates the strength and trends in the study of reward systems for online civic participation. This mixed-methods (qualitative-quantitative) design satisfies the demand for concrete empirical evidence derived from the corpus itself, reinforcing the validity of the findings.

4. RESULTS

Online citizen participation portals facilitate the active involvement of citizens in the formulation, deliberation and monitoring of public policies, democratizing decision-making by reducing geographical and temporal barriers of face-to-face mechanisms (García Guitián, 2011). However, the evidence points to three key challenges: frequently low levels of participation, demographic biases among users, and political disaffection due to the perceived lack of relevance of citizen contributions (García Guitián, 2011; Lafont, 2020; Pak et al., 2017).

The following presents the empirical and scientific evidence that supports each step of our Theory of Change and Contribution Analysis, based on high-impact secondary literature (systematic reviews, meta-analyses, and controlled studies).

4.1. Rewards → Motivation

The release of dopamine in the brain's reward system reinforces habit formation and the repetition of behaviors (Schultz, 2015). Neuroimaging studies reveal that the anticipation of rewards (even symbolic ones) activates the nucleus accumbens and other dopaminergic regions, generating pleasure and intrinsic motivation (Knutson et al., 2001; Schultz, 2015). Gamification exploits this principle by turning every civic action (proposing, voting, commenting) into immediate reinforcement, strengthening playful engagement. According to Self-Determination Theory, rewards must satisfy autonomy, competence, and relatedness to enhance intrinsic motivation (Deci & Ryan, 2000; Ryan & Deci, 2000). An overly controlling system of points or badges can undermine motivation and generate superficial participation. In contrast,

dynamics that offer free choice of activities, recognition of skills, and collaboration maintain motivation in the long term (Hamari et al., 2014).

Hassan and Hamari (2020), in the most comprehensive review of gamification in online participation (66 studies), found that 82% associate gamification with increases in motivation, participation, civic learning, and satisfaction. They conclude that reward elements (points, badges, rankings) reinforce civic behavior as long as they respect user autonomy. In a quantitative approach, they evaluated the influence of three digital badges ("Achievement," "Expert," "Outstanding Contributor") on 1,200 participants (18–65). years) using the Basic Needs Satisfaction Scale (Chen et al., 2015). After introducing challenges and badges, the competence score increased by 28% ($M_{pre} = 3.45$ vs. $M_{post} = 4.42$; $t(1199) = 32.5$, $p < .001$, $d = 0.94$), homogeneous effect in all digital experience segments. Furthermore, competition explained the 45% intention to continue participating ($\beta = 0.67$, $p < .001$), controlling age and education.

These complementary findings empirically and quantitatively validate the Rewards → Motivation link of the Theory of Change proposed in this study. The findings also offer guidelines for designing gamified platforms: incentives must be immediate, visible and aligned with intrinsic needs to ensure lasting civic engagement.

4.2. Motivation → Participation

Skinner (1953), through operant conditioning, showed that behaviors that are positively reinforced immediately tend to be repeated. In online civic engagement, every time a user receives a point, a badge, or moves up in a ranking after submitting a proposal, voting, or commenting, the system reinforces that behavior. Richter et al. (2015) found that instant reward registration on gamified platforms increases participation by up to 40%, by acting as operant stimuli that link action with gratification. Gamification applies this principle in digital environments through points, leaderboards, and goals, structuring civic interaction as a "game" in which each contribution is a recognizable achievement (Deterding et al., 2011). These elements offer immediate reinforcement and, at the same time, meet the needs for competence, autonomy, and relatedness of the Self-Determination Theory (Deci & Ryan, 2000):

- Competition: unlocking levels or badges demonstrates progress.
- Autonomy: choosing between different challenges enhances the sense of control.
- Relationship: comparing profiles with others reinforces the social dimension.

By integrating operant reinforcement with playful dynamics that address these basic needs, gamification promotes sustained motivation, transforming civic participation into a continuous and proactive habit. In a controlled experiment, Romano et al. (2022) recruited 20 users for one week to compare two versions of a civic engagement app (gamified vs. non-gamified). The gamified group improved their engagement score by 30% compared to the control, and 80% of participants positively valued

recreational elements such as points and challenges, expressing greater willingness to contribute on a regular basis (Romano et al., 2022).

Devisch et al. (2016) conducted two field studies in *online* urban planning discussions with 800 residents matched for age and education level. The gamified condition doubled the participation rate (from 20% to 47%; χ^2 (1, N = 800) = 58.4, p < .001) and their comments were more extensive and well-reasoned, demonstrating improvements in the quantity and quality of the interventions. Both studies confirm that symbolic incentives (badges, challenges) act as immediate reinforcers that satisfy needs for competence and social recognition, and that the motivation induced by gamification translates into significant and sustained increases in online citizen participation.

4.3. Participation → Representativeness

Digital sociology emphasizes that online civic participation is determined by gaps in access and technological skills; not all citizens have equal connectivity, literacy, or confidence to use civic platforms (DiMaggio & Hargittai, 2001; van Dijk, 2006). Consequently, reward systems tend to favor certain users. Tech - savvy (young, highly educated, and resourceful) groups benefited, while vulnerable groups were excluded (Pak et al., 2017). Pak et al. (2017) analized FixMyStreet in Brussels and observed that, although gamification increased the number of reports, wealthier neighborhoods generated 65% reports than vulnerable areas, confirming that gamification alone does not guarantee equity.

Resek et al. (2024), in a mapping of 112 gamified platforms, found that the participation gap between high and low income fell from 65% to 15% when digital literacy workshops and training resources were incorporated. These results demonstrate that only the combination of reward systems with inclusive training strategies achieves truly representative participation, validating the Participation → Representativeness nexus.

4.4. Representativeness → Institutional Traceability

Political Science recognizes that high representativeness in online civic participation strengthens institutional traceability by diversifying and legitimizing the data that inform public reports (Habermas, 1996). Hamari et al. (2014) found that 68 % of gamified initiatives include mechanisms for recognizing achievements (points, badges, rankings), which not only allows for individual tracking of contributions but also improves the perception of transparency among diverse groups. When reports include demographic data—age, gender, education level, and location—the civic base is enriched, ensuring that reports reflect a pluralistic view and facilitating segmented analysis (Kittilson, 2016; Mayer, 2009). Some research on online civic engagement platforms shows that open data and transparency mechanisms associated with user interactions can improve the perception of legitimacy and institutional trust, although the effects depend on the design and accessibility of the tools themselves (Zuiderveen Borgesius et al., 2018). Case studies of platforms like "Decide Madrid" show that, while these tools expand opportunities for participation and access to

segmented data, they face challenges in terms of effective deliberation, continuity of participation, and leveraging demographic information for institutional traceability (Pineda Nebot & Goldfrank, 2022). This integrative approach (visible rewards plus data segmentation and targeted campaigns) validates the nexus of Representativeness → Institutional Traceability, since it highlights that a diverse base of participants generates more complete, auditable and useful data for accountability.

Therefore, the literature empirically demonstrates that reward systems in online civic participation portals can:

- Boost motivation, especially when they satisfy basic psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2000; Hamari et al., 2014).
- Increase participation (Thiel et al., 2016; Romano et al., 2022).
- Improve representativeness only if accompanied by inclusive measures (DiMaggio & Hargittai, 2001; Pak et al., 2017).
- Strengthen institutional traceability and trust (Pineda Nebot & Goldfrank, 2022; Zuiderveen Borgesius et al., 2018).

These results support every part of the Theory of Change, showing that when incentives are designed respecting psychological needs and are articulated with digital training and transparent interfaces, they become an effective lever for inclusive, sustainable, and legitimate online civic participation.

5. DISCUSSION

The synthesized findings confirm the sequence proposed in the Theory of Change: rewards increase motivation, motivation increases participation, and participation can promote institutional traceability when accompanied by measures aimed at representativeness. Review studies and meta-analyses indicate that symbolic incentives and gamification operate as effective reinforcers that activate intrinsic motivation mechanisms (Deci & Ryan, 2000; Hamari et al., 2014; Knutson et al., 2001; Schultz, 2015). Recent experimental research shows significant improvements in competence and participation after the implementation of game mechanics (Aubert et al., 2023; Romano et al., 2022). Additional field studies demonstrate simultaneous increases in the quantity and quality of contributions when reward systems are combined with monitoring and feedback (Devisch et al., 2016). Therefore, this research clearly and empirically provides a Theory of Change that connects rewards → motivation → participation → representativeness → institutional traceability, supported by the triangulation of neuroscience findings, systematic reviews, experiments, and field studies. Key mechanisms have been identified, such as the satisfaction of needs for autonomy, competence, and relatedness, the visibility of achievements, and structured feedback. Furthermore, practical measures are proposed, such as incentives that respect self-determination, digital literacy programs, and contribution tracking modules. In addition, a specific methodological

agenda (RCTs [3]and longitudinal studies) is outlined to test effectiveness and equity in real-world contexts.

However, it is important to highlight that this integrative review offers an original contribution on three fronts. First, it proposes an operational Theory of Change that links rewards → motivation → participation → representativeness → traceability, with verifiable hypotheses and intermediate mechanisms that allow for the transition from theoretical discourse to the evaluable design of civic platforms. Second, the analytical matrix developed allows not only the synthesis of qualitative findings but also the quantification of trends, such as empirical versus theoretical distribution, thematic categories, and reported magnitudes. This can facilitate the prioritization of interventions and the measurement of impact. This methodological combination of qualitative synthesis and descriptive analyses constitutes a practical contribution to the state of the art. Finally, the research offers concrete recommendations for experts, technical staff, and public officials: design rewards that respect autonomy, competence, and relationships; accompany them with digital literacy programs; and establish standardized metrics and ethical, longitudinal evaluations. To establish and consolidate the evidence presented, an agenda is proposed that includes randomized controlled trials (RCTs), longitudinal studies, and equity assessments in different contexts and settings. In this way, the research offers both a conceptual framework and operational tools to advance the design of more inclusive and evaluable participatory platforms.

However, the evidence also indicates clear limitations. Gamification alone does not guarantee equity: Pak et al. (2017) document overrepresentation of affluent neighborhoods (65% more reports), and Resek et al. (2024) show that the gap can only be reduced when digital literacy workshops are integrated (65% → 15%). Furthermore, the theoretical and empirical frameworks included warn of the risk that overly controlling systems undermine intrinsic motivation (Deci et al., 1999) and of the methodological heterogeneity of the studies, which limits the generalizability of the effect sizes. From practice, the results suggest three priorities: designing immediate and visible incentives that respect autonomy and competence (Aubert et al., 2023; Hamari et al., 2014), integrating digital literacy programs and training resources to enhance representativeness (Pak et al., 2017; Resek et al., 2024), and finally incorporating public modules for monitoring and demographic segmentation to improve traceability and the perception of transparency (Hamari et al., 2014; Pineda Nebot & Goldfrank, 2022).

Although the review provides consistent evidence on the potential of reward systems, these results should be qualified for several reasons. First, the corpus is heterogeneous: of the 73 documents analyzed, 28 (38%) are empirical studies and 45 (62%) are theoretical or review articles, which limits the causal strength of some quantitative inferences. Furthermore, there is significant variability in designs and metrics (different types of badges, evaluation periods, contribution quality

[3] Randomized Controlled Trial

indicators), which hinders direct comparison and generalization of the reported effect percentages (+28% in competition or +30% in participation come from specific experimental contexts). It is also important to consider that most of the studies are short-term or lack longitudinal follow-up, so the persistence of the effect over time may not be sufficiently documented. Finally, the existence of possible publication biases and the overrepresentation of studies in Western languages or in technologically favored urban contexts limit the extrapolation to vulnerable populations.

Looking ahead to future research, it is advisable to prioritize experimental and longitudinal designs that assess the persistence and quality of participation. Examples include experimental studies comparing static versus adaptive incentives and studies analyzing the interaction between gamification and digital literacy in reducing inequalities. It is also pertinent to explore, with caution and ethical evaluation, proposals for personalization through AI (Wirtz et al., 2019) within a framework of "Human-Centered AI" (Shneiderman, 2022) and with controls for the risks of bias and overjustification. These priorities will allow for the translation of increased participation into truly inclusive, auditable, and legitimate outcomes.

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