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Exploring transparency through centralized–decentralized control systems: A multidisciplinary experimental approach in organizational contexts

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Abstract

Failure in leadership has been one of the major constants in the continuous changes happening in society since memorial time. This failure is often linked to several factors, like governance system corruption and transparency. The purpose of this study is to provide a structured definition for transparency and to conceptualize a DCCS framework to achieve it. We used a multidisciplinary experimental mixed research methodology involving three parts: a literature review, an experiment, and a SWOT analysis to answer the research questions. We find that transparency is a paradoxical, complex, continuous process that requires a constant update and adjustment of its meaning and objective depending on the individual and/or organizational perspective. Furthermore, while a DCCS was effective in our experiment, it requires a practical adaptation to the specificity of each organization in order to achieve transparency. The results of this study can be used as a model for future research on transparency.

Keywords: Transparency; Organization; Centralization; Decentralization; Control system

1. Introduction

Transparency has become one of the most discussed concepts in academia and society (Paulraj et al., 2025; Liu et al., 2023; Changwony and Paterson, 2019; Brandes, 2017; Sovacool et al., 2016; Auger, 2014; Wehner, 2013; Williams, 2011; Burger, 2010; Rowlins, 2008; Grigorescu, 2003). In the past three decades, researchers from various disciplines have shown high interest on the topic of transparency globally (Kinda and Mien, 2024; Royo et al., 2020; Garrido-Rodriguez et al., 2018; Lee, 2013; Grimmelikhuijsen, 2012; Kolstad, 2009; Schneider, 2003; Shleifer, 1993) to the point where it has been seen as the new green in a recent study focusing on data-driven business model and user's decision on whether or not to adoption a digital platform (Trabucchi et al., 2023). The attractiveness of transparency is due to the potential it has to solve corruption, which is seen as the main reason why most organizations are struggling and, as a result, need the implementation of a transparency system. Several studies found a strong correlation between corruption and all society issues (poverty, inequality, unfairness, war, conflict, underdevelopment, discrimination, failure in leadership and governance, etc.) (Adekoya et al., 2025; Bagenholm et al., 2023; Bauhr, 2021; Gupta et al., 2002; Mauro, 1995; Malakar, 2023; Olken et al., 2012; Fearon, 2003; Roy, 2025; Anokhin, 2009; Hunt, 2007; David-Beret, 2019; Rothstein, 2005, Kaufman, d'Agostini, 2017; 2010; Pellegrini, 2006; Negura, 2020; Jain, 2001); As such, study transparency is a crucial step most researchers have to take in order to propose and/or build a framework or system that can be implemented in the real world to solve different/common society issues and achieved a fair, equal, just, safe, trustful, and sustainable society for all human being. However, taking such a step required a deep understanding of basics, finding guidelines, and a clear picture of "what has been done", "what is been done", and "what can be done" when it comes to research related to the concept of transparency. Finding and filling the gaps of previous studies is the way researchers find ideas, develop strong theories, debate, argue, make breakthroughs, create great organizations, build resilient structures, and develop cases that can last forever and/or have a tangible impact on society. There is an

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ongoing debate on the real meaning of transparency, its impact, and how to implement it in various organizations across all fields, with researchers finding both contradictory and complementary results. The debate involves questions like "what is transparency?"; "Does transparency matter?"; "what degree of transparency do organizations actually need?" and "how to actually achieve transparency?" These questions can be summarized into what, why, when, who, and how (Arkedis et al., 2021; Cooray, 2016; Parra et al., 2021; Lulaja, 2018, Fox, 2015; Shin, 2019; Axelheim, 2018; Gupta, 2010; Holland, 2017; Sampson et al., 2019; Ortega-Rogriguez, 2020; Albu, 2016; Ball, 2009; Farell, 2016; Michener, 2013; Wehmeier, 2012). Similarly, the objective of our research is to answer the above extended questions using a multidisciplinary experimental research methodology including a retrospective literature review (analyzed articles n=76), a blind experiment on a group of students and teachers (n= 38), and an adapted SWOT analysis of the experiment to identify the strength and weakness of our preliminary designed Decentralized-centralized control system (DCCS). Both traditional and new technologies were used to analyze our data. The next sections of our study will answer the following questions developed as a guideline for our research:

- What is transparency?
- Why do organizations need transparency?
- When and why does transparency matter?
- What are the most effective transparency systems?
- What are the challenges organizations and individuals face when implementing a transparency system?
- What are the factors that positively and or negatively influence transparency?
- How can we use such factors to develop and design an effective, efficient, and sustainable system in order to achieve transparency in any organization?

By answering these questions this research will contribute to the literature on transparency, propose a definition for transparency, serve as a guideline and model for future research on transparency, introduce an innovative system (DCCS) to achieve transparency, develop a fair and equal transparency system for voting in an organizational context, and propose a structural framework for organizations that aim to implement a transparency system to solve or control the degree of opacity and corruption in their structure. The remaining part of this paper is designed as follows: Section two reviews the literature associated with transparency across various disciplines, Section three describes the methodology and presents the results, Section four discusses the findings, and Section five concludes the research.

2. Literature Review

In this section, we review the literature on transparency across various disciplines and define key concepts such as society, organization, transparency, system, corruption, centralization, decentralization, and DCCS. The objective here is to (1) answer all the research questions of this study, and (2) lay the foundations for the final design of our Decentralized-Centralized Control system (CDCS).

2.1. Society and Organizations

Society can be conceptualized as a multidimensional and evolving system composed of diverse, interrelated organizational structures and ecological, social, and economic components. At its core, society represents an amalgamation of entities—both tangible and intangible—operating within defined or ambiguous parameters influenced by legal, normative, and systemic constructs. According to Giddens (1984) and Archer (2012), society may be understood as an ongoing interplay between structure and agency, where organizational forms both constrain and enable individual and collective actions. In contrast, Castells (1996) and Luhmann (1995) define society as a networked system of functions and meanings, dynamically shaped by institutional logics, technological infrastructure, and social differentiation. Although these definitions stem from different ontological and epistemological traditions, both converge in their emphasis on the coexistence and interaction of individuals, formal organizations (e.g., governments, corporations, NGOs, families), and environmental conditions (e.g., physical or socio-political environments). Within this framework, the organization emerges as a subunit of society—a deliberately constructed entity, either formal (legally recognized) or informal (community-based or illicit), endowed with a symbolic identity and a set of functional goals. Mintzberg (1983) views organizations as structurally differentiated systems with specific operational logics, while Scott and Davis (2015) emphasize their embeddedness in institutional environments. Organizations often arise from the need to solve complex problems or to achieve predefined objectives, as seen in movements, socio-political initiatives, or business ventures (North, 1990; DiMaggio & Powell, 1983). Importantly, the larger the organization becomes, the more susceptible it is to internal entropy and bureaucratic dysfunction—a phenomenon referred to as "organizational chaos" by Weick (1995). Organizations are broadly categorized into types such as governments, private corporations, non-profit entities, educational institutions, religious groups, and familial units. Irrespective of type, all organizations depend on four interdependent categories of resources: environmental (ecological and geopolitical stability), human (labor and intellectual capital), material (infrastructure and physical assets), and financial (capital reserves). Resource

prioritization, however, varies across organizational forms. Governments, for instance, prioritize environmental and material resources (e.g., military infrastructure and natural resources), whereas corporations predominantly focus on financial and material metrics such as Return on Equity (ROE) and Return on Assets (ROA). Conversely, non-governmental and humanitarian organizations typically prioritize human rights and environmental sustainability (Koppell, 2006; Anheier, 2014). While such categorizations are heuristic, they illustrate the functional divergence and complexity of organizational resource management. The efficacy of organizational performance is influenced by a host of structural and behavioral factors. These include universal variables such as leadership, corruption, governance models, and transparency mechanisms, as well as context-specific elements such as cultural norms, belief systems, socio-economic status, and demographic characteristics (Hofstede, 2001; House et al., 2004). Leadership has been consistently identified as a primary driver of organizational success or failure, yet its effectiveness is mediated by corruption levels, policy coherence, internal reward systems, and stakeholder trust (Van Wart, 2013; Treviño et al., 2000). The current global landscape—marked by armed conflicts, migration crises, inflationary pressures, declining birth rates, social alienation, and the diffusion of artificial intelligence—has amplified concerns regarding the effectiveness of organizational leadership and institutional responsiveness. Studies such as those by Acemoglu and Robinson (2019) and Fukuyama (2022) suggest a growing disenchantment among younger populations, evidenced in behavioral trends such as social withdrawal, career disengagement, and civic apathy. These emergent behaviors are symptomatic of systemic disillusionment and may be indicative of broader crises in social cohesion and institutional legitimacy. A thematic analysis of macro-level disruptions across nation-states and organizational sectors reveals latent but intensifying global crises. Whether examining governance failures, corporate scandals, or institutional inertia in education or family systems, one finds consistent evidence of structural opacity and accountability deficits (UNDP, 2023; Transparency International, 2022). Crises, defined as adverse events or disruptions rooted in systemic vulnerabilities, often expose leadership failures and highlight the fragility of institutional resilience (Boin et al., 2005; Rosenthal et al., 1989). Corruption remains a predominant explanatory factor in the failure of organizations and governance systems alike. Empirical research confirms that corruption perpetuates poverty, weakens public institutions, and exacerbates socio-economic inequality (Mungiu-Pippidi, 2015; Kaufmann et al., 2010). In particular, studies have shown that rent-seeking behavior among political elites undermines developmental agendas and distorts public resource allocation (Olken & Pande, 2012). Moreover, lobbying practices—especially in advanced democracies—have been linked to policy stagnation and legislative inefficiencies, further eroding public trust (Drutman, 2015; Gilens & Page, 2014). Research also points to the strong correlation between organizational failure and internal corruption, particularly in financial misreporting and corporate fraud cases (Dyck et al., 2010; Karpoff et al., 2008). Given the persistent and pervasive nature of corruption, combating it becomes imperative for sustainable development and social justice. Transparency has emerged as a vital antidote, with numerous studies documenting its inverse relationship with corruption incidence (Lindstedt & Naurin, 2010; Bauhr & Grimes, 2014). Accordingly, the present study explores transparency not merely as a normative principle but as a systemic outcome achievable through a novel governance configuration—namely, the Decentralized-Centralized Control System (DCCS). This architecture seeks to mitigate opacity through multi-layered oversight, checks and balances, and procedural accountability, particularly in decision-making and electoral processes. In doing so, this research contributes to the emerging literature by addressing identified gaps in prior studies and offering empirical and conceptual insights on how to operationalize transparency in complex organizational environments (OECD, 2022; World Bank, 2021).

2.2. Transparency

Merriam-webster's collegiate dictionary defines transparency as "the quality or state of being transparent. Being free from pretense and deceit or characterized by visibility and accessibility of information, especially concerning business practices". Oxford Advanced Learner's Dictionary defines it as "The quality of something, such as an excuse or a lie, that allows somebody to see the truth easily"; "The quality of something, such as a situation or an argument, that makes it easy to understand". And, in the Cambridge Advanced Learner's Dictionary, transparency is defined as "The quality of being done in an open way without secrets: we want more transparency in government". These definitions combined linked transparency to major organizations (Government and Business) and to the quality of a human or things by highlighting the need for openness, accessibility of information, and no secrecy. Similarly, several researchers have defined transparency as a process of making information visible to the public (See Alessandro et al., 2021; Arkedis et al, 2021; Pernagallo, 2020; Albu, 2016). The definitions above give a general view of transparency without stressing its complexity and paradoxical nature in relation to different organizations. The following subsection highlights a retrospective review of previous studies on transparency across various disciplines and different organizations, and consequently addresses our research objectives.

2.2.1. The Evolution and Multidisciplinary View of Transparency Research

The academic exploration of transparency gained prominence in the 1980s, notably with the establishment of Transparency International, an organization aimed at promoting transparency in governance and institutional practice

(Ball, 2009; Michener & Bersch, 2013). Early scholarly work on transparency primarily emerged from public policy and administrative analysis, emphasizing the processes of policy-making and institutional decision-making (Meijer, 2009, Meijer, A. 2018; Hood & Heald, 2006). Over time, however, transparency has evolved into a complex, interdisciplinary concept, widely recognized as a cornerstone of democratic governance, organizational legitimacy, and public trust. Despite this near-universal valorization, the concept remains highly contingent upon context, disciplinary lens, and sectoral application, often yielding contradictory outcomes.

Transparency in Education and Communication

In the educational domain, transparency has been examined with regard to language processing and pedagogical clarity. Auch et al. (2020) assessed the role of semantic transparency in lexical decision-making, demonstrating that the influence of compound word transparency on behavior is multifaceted, driven by diverse and interrelated semantic variables. This complexity underscores the notion that educational transparency is not uniformly predictive, but rather dependent on the linguistic and cognitive dimensions under scrutiny. In the communication field, Wehmeier and Raaz (2008) critiqued the superficial treatment of transparency within public relations, revealing a theoretical void in PR scholarship. Their content analysis of 105 articles found that while transparency is frequently celebrated, few works offer precise definitions or critical engagement, thereby limiting its conceptual development within the field.

Transparency in Business, CSR, and Management

Within business studies, transparency is often instrumentalized as a means of enhancing corporate legitimacy and advancing corporate social responsibility (CSR) agendas. Liu et al. (2023) investigated how transparent CSR communication influences consumer trust and organizational outcomes, concluding that transparency is increasingly demanded by stakeholders and instrumental to loyalty formation. Christensen and Cornelissen (2015) argue that transparency has assumed an almost mythical status in contemporary discourse, frequently conflated with ethicality despite its ambivalent outcomes. Meanwhile, Paulraj et al. (2025) demonstrated that internal transparency enhances organizational resilience in complex product-process environments. Yet, scholars like Etzioni (2010) caution against the blind pursuit of transparency, noting that its coexistence with institutional secrecy can yield paradoxical governance outcomes.

Organizational transparency is also a central tenet in trust-building. Schnackenberg and Tomlinson (2014) argue that transparency fosters stakeholder trust by mitigating uncertainty, a view echoed by Holland et al. (2017), who emphasize the role of clarity, disclosure, and accuracy in cultivating credibility. Goodman (2002) similarly views transparency as a tool for reputation management, while Dubbink (2007) defines a transparent organization as one that actively and adequately informs its stakeholders.

Transparency in Accounting, Finance, and Corporate Governance

Transparency is foundational to fiscal governance and corporate accountability. Changwony and Paterson (2019) showed that fiscal decentralization's effectiveness in curbing corruption hinges on transparent accounting practices. Chatzivgeri et al. (2019), analyzing the UK's implementation of EU transparency regulations in the extractive sector, concluded that while progress has been made, transparency initiatives often fall short of their stated aims. The role of transparency in financial markets has also received significant attention. Oxelheim (2018) illustrated how transparency in financial reporting—especially following international standards such as IFRS/IAS 1—helps bridge the information gap between firms and shareholders. Yet, despite regulatory frameworks, full alignment with shareholder expectations remains elusive.

Supply Chains, Leadership, and Sustainability

Transparency within global supply chains is critical to sustainable governance. Garner et al. (2018) introduced a typology of supply chain transparency, revealing that meaningful sustainability outcomes depend not merely on disclosure, but on the relevance and accuracy of the shared information. Transparency is thus not only a regulatory necessity but a design challenge. In leadership studies, transparency is framed as essential for trust and effective communication. Schmitz et al. (2012) confirmed a positive correlation between transparent leadership and trust-building. Nonetheless, Farrell (2019) highlighted the impracticality of absolute transparency in leadership, citing confidentiality and the complexity of strategic decision-making as limiting factors.

Transparency in Governance and Political Science

The role of transparency in government and democratic consolidation is extensively documented. Grigorescu (2003) and Michener and Bersch (2013) assert that transparency fosters accountability and legitimacy. However, Parra et al.

(2021) and Grimmelikhuijsen et al. (2020) demonstrated that transparency does not uniformly reduce corruption or increase trust. The effectiveness of transparency is often contingent upon the type of mechanism employed and the institutional context. For instance, Parra et al. found that transparency mitigates embezzlement but does not significantly affect bribery, while Grimmelikhuijsen et al. noted that awareness of transparency tools, such as FOIA, may not always enhance trust. In a different strand, Sabine et al. (2019) utilized complexity theory to analyze how digital transparency tools enable citizen alignment with public goals in areas like e-health and smart cities. Similarly, Hartman and Kern (2020) advocated for increased research transparency in political science, suggesting a "qualitative Metaketa" framework for aggregating qualitative evidence.

Transparency and Civil Society: NGOs and NPOs

Non-governmental and nonprofit organizations also grapple with transparency-related dilemmas. Roberts (2006) explored how diplomatic confidentiality hinders transparency in transnational NGOs. O'Dwyer and Unerman (2008) found that internal hierarchies may distort transparency efforts in advocacy organizations. Ball (2009) mapped three metaphors of transparency—anti-corruption, decision-making openness, and governance complexity—offering a nuanced view of its evolving nature. Fanny et al. (2021) proposed an integrative framework for understanding NPO transparency, while Auger (2014) emphasized the joint impact of reputation and transparency on stakeholder trust.

Digitalization, Algorithmic Governance, and Data Privacy

Transparency in digital environments is increasingly significant. Trabucchi et al. (2023) demonstrated that perceived transparency in digital business models shapes user adoption, especially when linked to data practices. Kos and Kloppenburg (2019) criticized the emergence of "hyper-transparency" in global food supply chains, warning that it can marginalize smallholders through asymmetrical data control. Sabine et al. (2019) and Sin and Park (2019) similarly focused on algorithmic affordances and how transparency mediates trust in AI systems and digital governance.

Disclosures and Information Governance

The academic literature also examines the nuances of disclosure. Bernardi and LaCross (2005) studied ethics code disclosures on corporate websites, while Bushman and Smith (2003) identified disclosure as a key dimension of financial transparency. Coombs and Holladay (2013) argued that visibility and insight—hallmarks of transparency enhance stakeholder accountability. Yet, Albu and Mikkel (2016) cautioned that verifiability presumes cognitive capacity and willingness on the part of the audience, a problematic assumption. Gupta (2010), in his analysis of the Biosafety Clearing House, contended that the regulatory function of transparency is under-realized. Lee and Joseph (2013) identified persistent deficiencies in nonprofit financial disclosures, attributing them to organizational inertia.

Transparency in Sectoral Contexts: Energy, Voting, and Employment

In the energy sector, transparency facilitates informed consumer decisions, environmental accountability, and regulatory trust. It entails not only disclosing energy data but also ensuring accessibility and interpretability for end-users. In the electoral domain, transparency underpins democratic legitimacy. Mechanisms such as open audits, voter registration access, and campaign finance disclosure help curb electoral manipulation and foster civic engagement.

Employment transparency, particularly regarding pay and promotion, has been driven by legislative changes and organizational policies. Cullen (2024) showed that pay transparency fosters labor mobility and wage competitiveness, though concerns remain about over-optimization for measurable metrics (Harvard Business Review, 2023).

Transparency in Medicine and Scientific Rigor

In biomedical research, transparency intersects with scientific reproducibility. Menke et al. (2020) developed SciScore and the Rigor and Transparency Index (RTI) to assess methodological reporting in biomedical journals. Their findings reveal that essential rigor criteria are often neglected, despite journal impact factors. Coombs and Holladay (2013) argued that transparency in healthcare enhances accountability by providing stakeholders with insight into institutional processes and decisions.

2.2.2. Factors affecting transparency

Despite its widespread promotion, transparency is not without its challenges. As highlighted by multiple scholars, the concept of transparency is fraught with paradoxes and contradictions. For instance, Costas and Grey (2014) discussed the complex relationship between transparency and secrecy, noting that certain organizational settings require a delicate balance between openness and discretion. In some cases, the very promotion of transparency can lead to greater secrecy, as organizations may withhold information to protect sensitive interests. Additionally, Albu and Mikkel

(2016) argued that while verifiability is a key aspect of transparency, there is an assumption that all individuals involved in transparency processes are equally capable of interpreting and processing the information provided. This assumption often overlooks the varying levels of information literacy among stakeholders, potentially undermining the effectiveness of transparency initiatives. This is particularly relevant in contexts where transparency is intended to improve governance or stakeholder engagement, but the recipients of this information may lack the skills to fully comprehend or use it effectively. Furthermore, studies shows that People want transparency only when it benefits their personal interest, and vote against it when it exposes and goes against their personal interest by claiming their privacy rights. (Hood and Dixon, 2020; Grossman, 2017; Michener, 2015; Tyler, 2019; Ethan, 2014). Moreover, in a society where most leaders are considers to likely be corrupt it's almost impossible to implement an effective transparency policy, and make sustainable and impactful reform to benefit everybody because of personal interest, diversity, divergence belief and ideology, the lack of agreement, and lack of consensus in leadership and governance.

Several researchers have identified various factors affecting transparency and developed multiple frameworks and benchmarks to design and evaluate a transparency system (Kinda, 2024; Goodman, 2016; Kulesza et al., IUI15; Felzmann et al., 2019; Sherkat, 2021; Lourenço, 2023; Hevner et al, 2024; Ofem, 2024). The complexity nature of transparency and difference in industries make it difficult to have a uniformity across all organizations in relation to the impact and effect of diverse factors. However, inspired by these studies, we used a critical and context analysis of a set of articles (78) and successfully defined two main types of factors: 1) Factors of Transparency or Determinant of Transparency (positive and negative factors justifying the need for transparency in various organizations) and 2) Non-Transparency Factors or Factors of Non-Transparency (divided into two types: factors working against the need and/or the implementation of transparency; and factors affecting positively or negatively or working for and/or against transparency system). See Table 1 and Figure 1. It is important to note that corruption and information openness (clear and accessible) are consider to be the main factors of transparency regardless of its complexity and paradoxical nature (Parra et al., 2021; Brunswicker et al., 2019). This is primarily due to inequality (underdevelopment, poverty, discrimination and unfairness), education (critical thinking) and new technologies (IoT, Digital transformation).

Table 1 Factors affecting transparency

Effect/ Impact	**Factors affecting Transparency**		
	1) Transparency Factors	**2) Non-Transparency Factors**	
	Determinant of Transparency	**Non determinants (opposition)**	**Determinants (For/against)**
Positive (+)	Corruption Equality Poverty Awareness Freedom Willingness & Commitment Communication Clarity		NGOs Journalists Whistleblowers Citizens Government (Very few) Researchers Stakeholder Leadership (Performance Management) Technology (E.gov & Digital Platforms)
Negative (-)	Technology (IoT, DT, DP) Fairness Development Information Control & Power dynamics Accountability Culture & Norms Legal & Regulatory Frameworks Belief	Privacy Freedom Incompetence Corruption Human Nature Policy-Maker Leadership Etc.	Government Legal Framework Big Company Executive/Administrator Employee/Employer NGOs Organized Crime Systems (Economic, Political, Education, Legal, Information)

Note: The table was created based on the analysis of previous research and the authors' perspective.

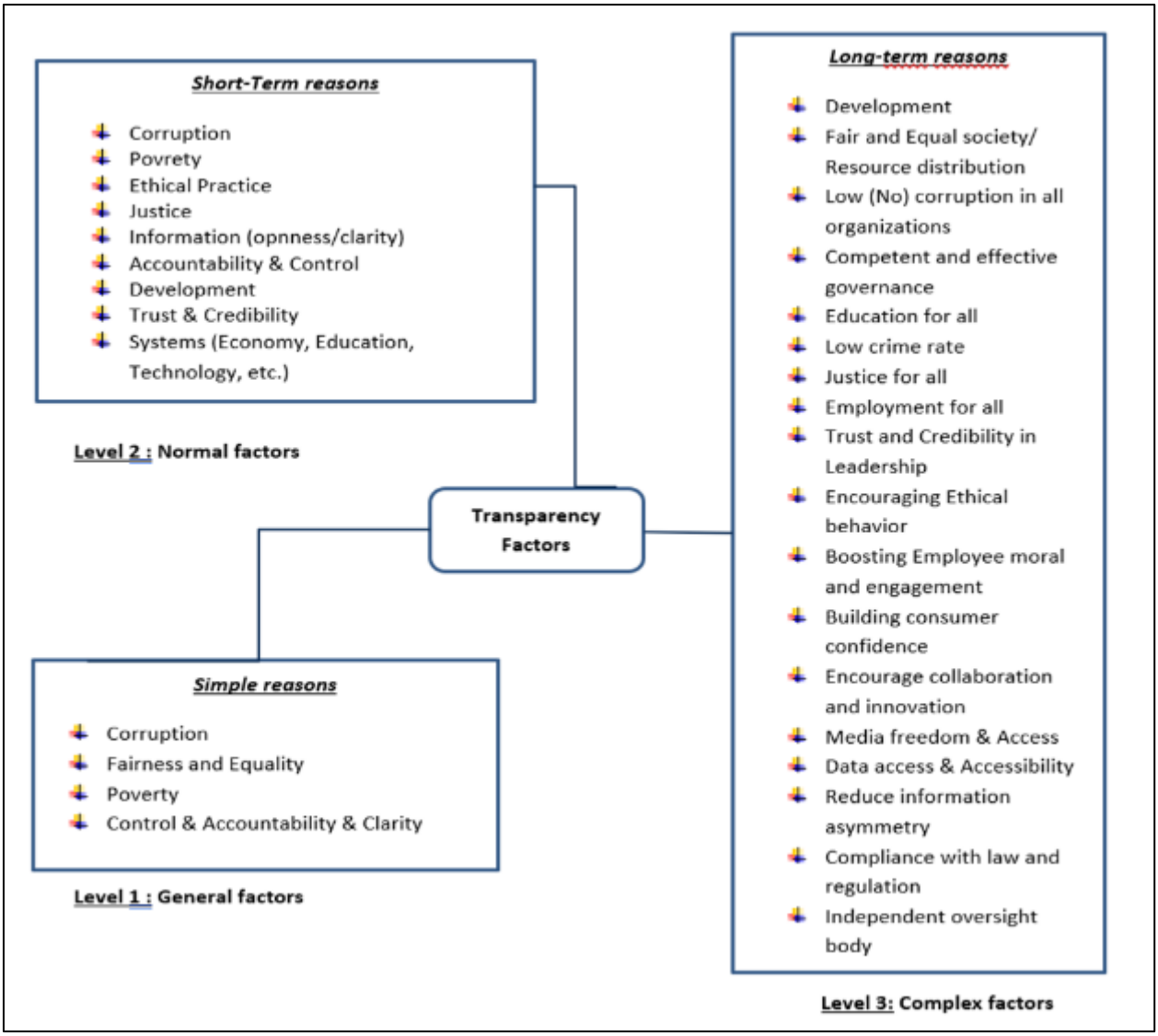

Figure 1 Panoramic view of Transparency factors

2.2.3. Transparency systems

A system is a process, a method, or an assembly of techniques and mechanisms used by one or multiple individuals in order to accomplish a specific task. Cambridge Dict. Define a system as " A set of computer equipment and programs used together for a particular purpose"; also "a particular method of counting, measuring, or weighting things" similarly Merriam-Webster's defines a system as " an organized set of doctrines, ideas, or principles usu. Intended to explain the arrangement or working of a systemic whole"; "a form of social, economic, or political organization or practice," also as " a manner of classifying, symbolizing, or schematizing". In short, a system is a way of doing things; an organization. Hence, a system can be defined as a way of doing thing in an organization. In the same context, a transparency system can be defined as an assembly of procedures, a set of method and guidelines conceptualized and established by a particular organization for a define society with the goal to solve a specific problem (corruption, information openness, trust & credibility, ect.). Several transparency systems (Indexes and Frameworks) have been developed by different researchers and organizations across various disciples and sectors (See Table 2). It is important to precise that no universal transparency system has been established but most researchers and organizations agree on the basics (what information need to be disclosed, to whom and for what purpose) even though some disagreement and debate still occur on some dimensions of these questions, International organizations and governments decide and enforce some level of transparency to all industries by the means of law and regulations, new policies, international agreements, and new committees. The most prominent examples will be The International Accounting standards (IAS), The International Financial Reporting Standards (IFRS), SDGs initiative, CSR disclosure, ISO code (ISO 370000&ISO 37101 ESG disclosure in relation to climate change and CO2 emission, the Paris agreement and the extractive industries transparency initiative (EITI). Table 2 below compare the top transparency systems selected based on our literature database and

the analysis of top international organizations online source like Amnesty international, Transparency international, International Monetary Fund, United Nation, World bank and many others (see Kinda and Mien, 2024; Liu et al., 2023; Dethier et al., 2021; Michener and Bersch, 2013; Brunswicker et al., 2019; Brown et al., 2009).

Table 2 Comparative list of Top transparency Systems

#	System / Framework	Type	Focus Area	Key Impact / Description	Cited In / Reference
1	Extractive Industries Transparency Initiative (EITI)	International Standard	Natural resources (oil, gas, mining)	Enhances governance through public disclosure of revenues from extractives. Adopted in 50+ countries.	Gillies (2010); Sovacool (2016); Kinda (2024) EITI.org
2	Right to Information (RTI) / Freedom of Information (FOI) Acts	Legal Framework	Public access to information	Empowers citizens to demand transparency from governments; used in 100+ countries.	Roberts (2006); Michener (2015); Banisar (2006)
3	Global Reporting Initiative (GRI)	Reporting Framework	Corporate sustainability (ESG)	Widely used for sustainability reporting across industries; promotes standardized ESG disclosure.	Brown, (2009); globalreporting.org
4	Corruption Perceptions Index (CPI) – Transparency International	Global Index	Public sector corruption	Most cited global index measuring perceived corruption. Influences policy, aid, and investor decisions.	Lambsdorff (2007); Hartman, 2020; Para et al., 2021, transparency.org
7	Country-by-Country Reporting (CbCR) – OECD / EU	Tax Transparency Regulation	Corporate tax avoidance	MNCs must disclose revenue, profit, tax per jurisdiction. Key tool in BEPS reforms.	Cobham & Janský (2018); OECD (2015)
8	Corporate Sustainability Reporting Directive (CSRD) – EU	Legislative Mandate	ESG reporting (business)	Mandates detailed ESG disclosures for large EU firms. Builds on GRI and integrates into EU law.	EU Commission (2022); KPMG (2023)
9	FAT Framework (Fairness, Accountability, Transparency in AI)	Research Framework	AI governance / algorithmic ethics	Promotes auditability, bias reduction, and trust in automated systems.	Selbst (2019); Mittelstadt (2016); FAT/ML community
10	Sustainability Accounting Standards Board (SASB) *(now part of IFRS)*	Financial Disclosure Framework	Industry-specific ESG metrics	Provides financially material ESG disclosure standards for investors.	Eccles (2018); sasb.org

Note: The comparison of the transparency systems on the table is done based on the design model, framework, guidelines and complexity of the system following the authors' transparency frameworks and measurement and the organizations focus sectors. (See appendix A.2 for the complete table)

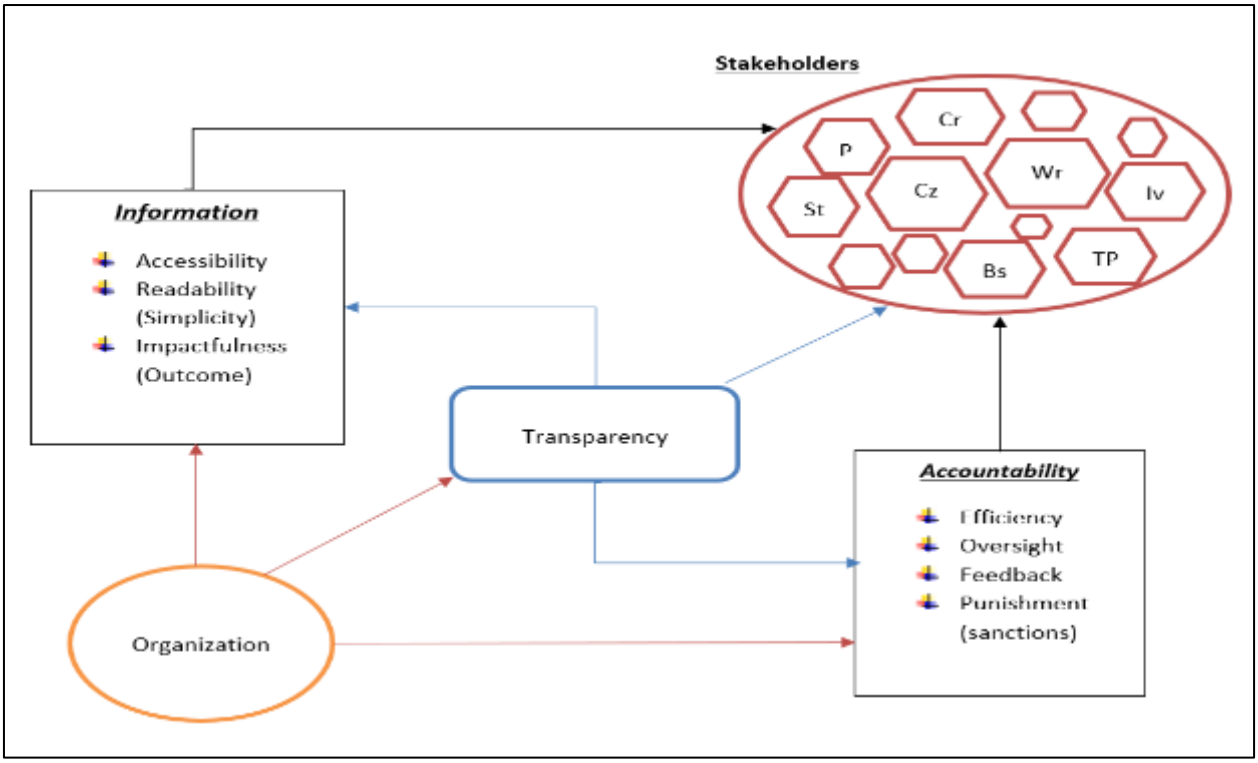

Figure 2 Transparency General Frameworks

2.3. Corruption

Corruption is a conditional negative (Bad) behavior caused by society (Organizations) and circumstances (Situations), and catalyzed by human nature (feelings and emotions) and life constraints (survival, stability, obligation, desire, belief, need, hope, wish). In Merriam-Webster's dictionary, corruption is primarily defined as an impairment of integrity, virtue, or moral principle: depravity. then, as an inducement to wrong by improper or unlawful means (as bribery). And finally, as a departure from the original or from what is pure or correct. Similarly, several researchers in their studies have defined, linked, or related corruption to the characteristics described above. For instance, while Johnston (2005) defines corruption as a behavior that diverges from formal duties because of private-regarding wealth or status gains. Transparency International defines it as the abuse of entrusted power for private gain. And classified it as grand, petty, or political, depending on the amount of money lost and the sector where it occurs. (See Rose-Ackerman, 1999; Johnston, 2005; Parra et al., 2021; Changwony et Paterson, 2019; Wabar, 2024). It is important to note that while the definition of corruption may slightly refer to the same attributes across disciplines, its focus and measurement completely differ depending on the subject studied. nevertheless, in the case of similar/different organizations, the measurement Index and metrics are often built on the same basics, even though the focus point may partially or completely be different (see Amnesty International, World Bank, Transparency International, and CPI). Corruption, like Transparency, has been widely discussed and studied across various disciplines and organizations in all industries due to the fact that these two subjects are common issues to all societies (all countries). In the past two decades, most researchers have linked transparency to corruption (or one or two dimensions/types of corruption) and found complementary and/or contradictory results. Similarly, our research on transparency is totally motivated by our hope and desire to eliminate or reduce to the maximum the level of corruption in any organization through a Decentralized-Centralized Control Transparency System (DCCTS) designed to counter the opacity of information and decision-making.

2.3.1. Corruption and transparency

Understanding transparency necessitates an examination of its antithesis—corruption—and the myriad factors that influence both phenomena. Corruption, characterized by elements such as greed, deception, discrimination, bias, and inequality, has been empirically linked to transparency levels within organizations and societies. For instance, Parra et al. (2019) found that transparency mechanisms significantly reduced embezzlement but had no discernible effect on bribery, highlighting the complex interplay between different forms of corruption and transparency initiatives. Similarly, Chen and Neshkova (2019) demonstrated that fiscal transparency correlates with lower perceived corruption, particularly during the budget execution phase. However, Bauhr and Grimes (2017) caution that the efficacy

of transparency measures may be contingent upon various state attributes, suggesting that transparency alone may not uniformly deter corruption.

Societal factors, including family background, educational attainment, religious affiliation, and cultural norms, also play pivotal roles in shaping corruption levels. Zelekha and Avnimelech (2023) observed that countries with hierarchical religious structures tend to exhibit higher corruption levels, potentially due to institutionalized relationships between religious entities and the state. Furthermore, cultures characterized by high power distance and collectivism have been associated with increased corruption, as these cultural dimensions may foster environments where unethical practices are more readily tolerated (Zelekha & Avnimelech, 2023).

The impact of transparency on corruption is further influenced by the governance framework in place. While some studies suggest that transparency is more effective in decentralized systems where local accountability mechanisms are stronger, others argue that centralized systems may better enforce anti-corruption measures due to uniform policy implementation. This dichotomy underscores the need for context-specific approaches when designing transparency and anti-corruption initiatives.

It is important to note that, in an organizational context transparency is often measured by the level of corruption via an index (e.g. The Corruption Perception Index CPI) and/or by the quality of information disclosed through a set of policy and regulations following a defined guidelines and/or by using a standardized of personal designed model (metrics). In most societies, corruption is primarily associated with government, NGOs/NPOs and international organizations, business, religion, and individuals. This may be explained by the generalized perception people have of different organizations and the ease with which researchers and individuals study or judge an organization as a whole rather than a group of individuals to be studied (analyzed and examined) separately. This latter is a challenge most researchers have to cope with because of constraints like privacy, willingness, time, effort, finance, law and regulation, and power. The government is generally seen as the most corrupt organization around the world because of the massive amount and number of resources (financial, human, and material), power, and authority it holds. Today, even though few governments have managed to effectively reduce the level corruption and efficiently implemented a transparency system in their governance, most countries (both developing and developed countries) still struggle to meet the requirement and expectation in both aspects. However, various reforms have been undertaken globally by governments, NGOs, international organizations, and academic institutions to combat corruption, promote transparency, enhance equality and fairness, and foster sustainable development. For example, the United Nations Sustainable Development Goals (SDGs), adopted in 2015, include Goal 16, which specifically focuses on peace, justice, and strong institutions—emphasizing transparency, accountability, and anti-corruption. The ISO 37001 Anti-Bribery Management Systems, published in 2016), provides a globally recognized framework for organizations to prevent, detect, and address bribery. The Paris Agreement, adopted in 2015, encourages countries and corporations to disclose carbon emissions and implement transparency frameworks to combat climate change. In regards to financial reporting, IAS 29 addresses financial reporting in hyperinflationary economies, while IFRS 9 provides guidance on financial instruments and enhances transparency in risk reporting. The European Union's Artificial Intelligence Act, proposed in 2021, is designed to regulate AI systems by ensuring transparency, human oversight, and accountability. Additionally, initiatives like Environmental, Social, and Governance (ESG) reporting and the Extractive Industries Transparency Initiative (EITI) promote open access to financial and environmental data in the corporate and natural resource sectors. And, recently, the U.S. Office of Management and Budget (OMB) launched the Government Efficiency, Accountability, and Reform (GEAR) Center, along with transparency reforms under various federal departments to reduce waste and improve fiscal accountability—often colloquially referred to as "efficiency offices,". Similarly, even though the "Department Of Government Efficiency (DOGE)" is a temporary initiative it can also be seen as an example or a model for transparency and ant-corruption measure. These collective initiatives highlight a global shift toward organizational transparency through enhanced information accessibility (openness) and accountability (oversight and control).

2.3.2. Corruption and organizations

The topic of corruption has been study in all disciples across organizations and constantly discussed in society since medieval time (see kroeze et al., 2018; Damijan, 2023; Borlini and Peters, 2025). Corruption seems to be an eternal heritage, a hereditary disease, an indestructible virus, a human primary nature, an organization second identity, and an unsolvable problem that all people and societies have to deal with during their entire life or existence. Corruption like transparency is primarily associated with governments, NGOs/NPOs, Businesses and Individuals. Corruption has a tangling relationship with organizations and, it is considered to be main reason for underdevelopment, inequality and perpetual poverty (Barrington et al., 2022; Wabar, 2024).

The political, economic, and technological development of a country is significantly influenced by the strength and effectiveness of its governmental institutions. Research indicates that robust political institutions are foundational for economic growth and technological advancement. For instance, the OECD highlights that sound policy settings and institutional frameworks are crucial determinants of economic performance across countries. Additionally, Acemoglu, Johnson, and Robinson emphasize the pivotal role of inclusive political institutions in fostering sustained economic development (Acemoglu et al., 2005; Mauro1997; Tanzi, 1995). Furthermore, the government's role in technological innovation is underscored by its capacity to establish conducive environments for research and development. The MIT study on the political economy of technological innovation notes that domestic institutions can mitigate challenges associated with innovation, such as high uncertainty and transaction costs, thereby facilitating technological progress (MIT, 2006). In summary, the interplay between strong governmental institutions and a country's development trajectory is well-documented, with effective governance serving as a catalyst for economic prosperity and technological advancement.

The financial health of a business is closely linked to the effectiveness of its governance structures. Studies have demonstrated that robust corporate governance practices such as active boards of directors, transparent reporting, and clear accountability mechanisms are positively associated with improved financial performance. For instance, research published in the *Journal of Financial Reporting and Accounting* found that firms with strong corporate governance frameworks tend to exhibit better financial outcomes (Nguyen, T. and Nguyen, H., 2021). Similarly, a study in the *Future Business Journal* highlighted that effective governance measures, including managerial oversight and board independence, significantly enhance firm performance (Bui and Nguyen, 2021). In the context of non-governmental organizations (NGOs), organizational strength and efficiency are often the result of collaborative efforts between leadership bodies and the general membership. The General Assembly, comprising all members, plays a pivotal role in guiding the organization's strategic direction, electing board members, and ensuring accountability. According to the Global Development Research Center, the General Assembly serves as the highest decision-making body, providing overall guidance and oversight (Hari scrinivas, 2015). Furthermore, a comparative study of NGOs like ActionAid International and Plan International emphasized that the General Assembly's involvement is crucial for legitimacy, stakeholder engagement, and effective governance (Jayawickrama and Ebrahim, 2013).

In an organizational context, conflict is generally the product of dissatisfaction in terms of resources (reward and benefit), opinion, responsibility, belief, and decision (vote or imposition/obligation), catalyzed and/or triggered by corruption. So, in order to avoid conflict, a fair, equal, and acceptable system (policy, rule, and regulations) must be designed and implemented to satisfy everybody, or at least minimize to the maximum the probability of conflict for present and future generations. However, because of the complexity of our society and human nature, a consensus on an idea is harder to reach even though not impossible; as such, our study aims to lay the foundations for an innovative organizational system (DCCS) based on transparency in order to achieve a fair, equal, efficient, balanced and Sustainable Society.

2.3.3. Psycho-social factors of corruption

Human Nature is a virus, Corruption is a disease, and transparency is the cure. Here we emphasized on Human, because organizations generally are not corrupt, people are. Humans are the reason why all organizations are corrupt (Ashforth and Anand, 2003; Kish-Gephart et al., 2010; Nieto-Morales,2021; Hortal and Martinez, 2024; Monteduro et al., 2024).

Corruption is not solely a product of institutional weakness or legal gaps; it also stems from complex psychological and social dynamics. Psychosocial factors refer to individual mental processes and social environments that shape behavior and decision-making. At the individual level, traits such as greed, moral disengagement, cognitive dissonance, and a low internal locus of control have been linked to corrupt behavior. Individuals may rationalize unethical actions to reduce internal conflict, especially when corrupt practices are normalized within their immediate environment (Gino et al., 2019). Studies in behavioral psychology suggest that when individuals observe others benefiting from unethical behavior without consequences, they are more likely to imitate such actions due to a breakdown in moral standards and the normalization of deviance (Bandura, 1999).

Socially, factors such as peer pressure, organizational culture, group conformity, and social inequality play a significant role in enabling or deterring corruption. Cultures that emphasize loyalty over integrity or reward results irrespective of the means often create fertile ground for corrupt practices. Moreover, social tolerance for corruption, influenced by historical, religious, or political contexts, significantly affects individual behavior. In hierarchical societies, obedience to authority may override personal moral codes, leading individuals to follow corrupt orders even against their ethical judgment (Ashforth and Anand, 2003). Additionally, weak social accountability mechanisms, such as limited media freedom or civic engagement, reduce the perceived risk of exposure and punishment, further incentivizing corrupt acts.

Psychologically, the “slippery slope” effect is important: minor unethical decisions may escalate into significant corruption over time due to desensitization. Emotional stress, economic hardship, and lack of job satisfaction also contribute to ethical erosion. Therefore, understanding corruption requires a multidimensional approach that integrates individual psychology, group dynamics, and the broader socio-cultural context. Effective anti-corruption measures must thus target both systemic reforms and behavioral change.

2.3.4. Corruption systems

Corruption systems refer to the structured, institutionalized, and often covert networks through which corrupt practices are planned, executed, and sustained within and across organizations. Unlike isolated instances of wrongdoing, corrupt systems are characterized by persistent patterns of unethical behavior, facilitated by social norms, power dynamics, and institutional weaknesses (Rose-Ackerman & Palifka, 2016). These systems often operate through collusion among key actors in both public and private sectors, such as politicians, bureaucrats, business leaders, and even law enforcement, who leverage their influence to manipulate rules, distort markets, or divert public resources for private gain. The systemic nature of corruption means it becomes embedded in institutional practices, often reinforced by informal codes of loyalty and secrecy, and protected by gaps in legal enforcement and oversight mechanisms (Mungiu-Pippidi, 2015).

Recent studies have highlighted that corruption systems are sustained by both "supply" and "demand" factors. On the demand side, public officials or institutional leaders exploit their discretionary power in environments with low accountability; on the supply side, private actors, such as corporations or contractors, willingly offer bribes or favors to secure benefits (Heywood, 2018). The complexity of modern corruption systems has been further exacerbated by globalization, the use of offshore financial networks, and technological tools that obscure transparency (Lessmann & Markwardt, 2019). Furthermore, in some cases, anti-corruption agencies themselves become entangled in these systems, undermining reform efforts.

A comprehensive understanding of corruption systems requires a multi-disciplinary approach involving political science, sociology, economics, and behavioral psychology. Structural reforms alone are insufficient; dismantling such systems demands the creation of transparent governance mechanisms, citizen empowerment, protection for whistleblowers, and international cooperation. Only by addressing the systemic root causes and reinforcing ethical norms across all levels of society can organizations begin to dismantle entrenched corruption systems.

2.3.5. Types of Corruption

Corruption can be categorized into three primary types: political, corporate, and law enforcement corruption. Each type has distinct characteristics and implications for society (See Table 3). Note: common forms of corruption include bribery, embezzlement, fraud, extortion, nepotism and cronyism, and influence peddling (See figure 3).

Table 3 Types of Corruption and Their Impact

Type of Corruption	**Description**	**Citation**
Political Corruption	Abuse of power by government officials for personal gain or to maintain power.	("Understanding corruption", 2022) (Barrington et al., 2022)
Corporate Corruption	Unethical or illegal practices within businesses, such as bribery and fraud.	(Wabar, 2024)
Law Enforcement Corruption	Misconduct by police or other law enforcement agencies, including bribery.	(Barrington, 2022)

Based on the above literature, it is clear that tackling corruption is a priority and a first step most organizations aiming for sustainable growth and development have to take. A strong transparency system is a key feature to efficiently reduce or eliminate corruption.

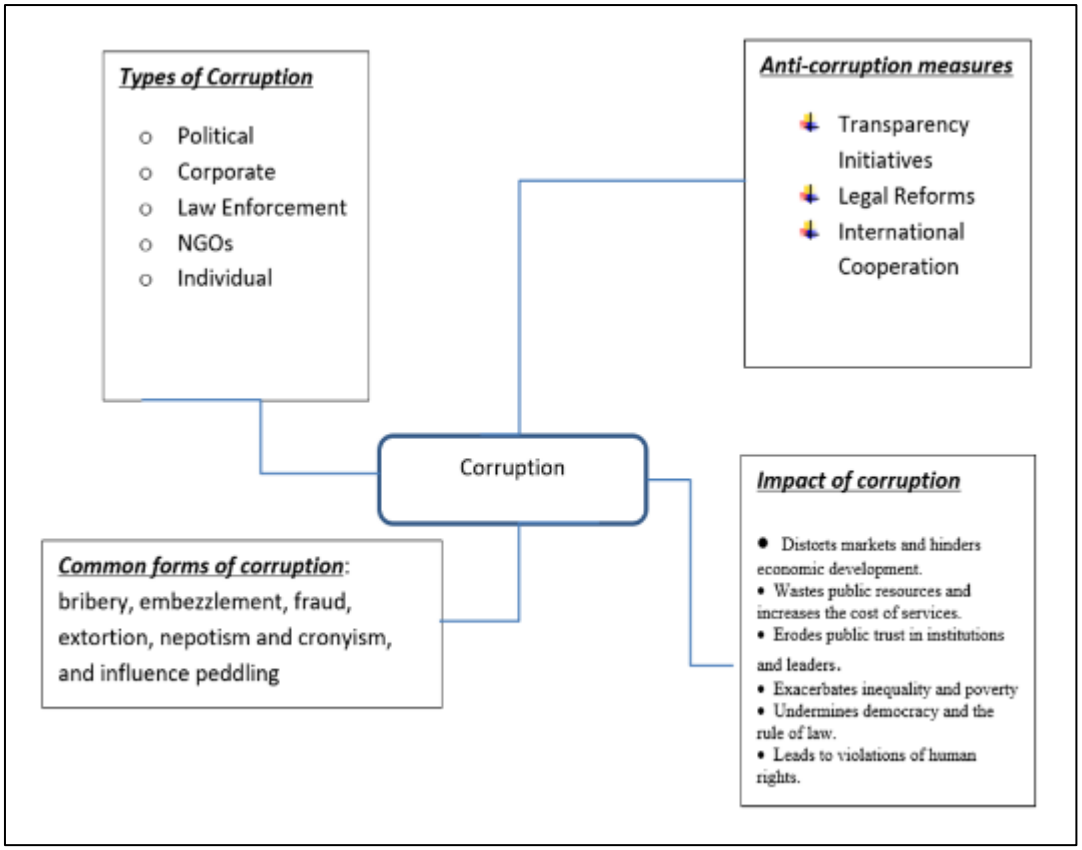

Figure 3 Panoramic View of Corruption

2.4. Centralized Control System

A centralized control system is a framework in which a single central authority or controller manages and regulates the operations of an entire system or organization. In this setup, the central controller collects data from various subsystems or departments, processes this information, and issues directives to coordinate and optimize overall performance. This approach is commonly used in engineering, computing, and organizational management to ensure consistency, efficiency, and adherence to overarching objectives. Centralized control systems can effectively manage complex operations by providing a unified strategy and reducing the risk of conflicting actions among subsystems. However, they also present challenges, such as potential bottlenecks, single points of failure, and reduced responsiveness to localized issues. In organizational contexts, centralized control can lead to efficient decision-making and resource allocation but may also limit the autonomy and initiative of individual departments or units. To mitigate these drawbacks, centralized control systems often incorporate feedback mechanisms and data analytics to inform decision-making and adapt to changing conditions. Balancing centralized oversight with localized flexibility is crucial to ensure that centralized control systems remain effective and responsive to the needs of the entire organization.

2.5. Decentralized Controlled System

2.5.1. Decentralization

Decentralization refers to the systematic transfer of authority, responsibility, and resources from central government to lower levels of government, regional bodies, or local institutions. It is a governance strategy aimed at enhancing public service delivery, local participation, and responsiveness by dispersing power across various levels of authority (Rondinelli et al., 1989; Faguet, 2014). Decentralization manifests in various forms, including political, administrative, and fiscal decentralization. Political decentralization involves the devolution of decision-making authority to elected local governments. Administrative decentralization distributes implementation and management authority to regional units, while fiscal decentralization empowers subnational units to raise and spend public funds.

The World Bank (2020) emphasizes that decentralization is a pathway to good governance when supported by legal frameworks, institutional capacity, and accountability mechanisms. It allows local governments to tailor public policies to local needs, enhancing efficiency and inclusiveness. However, its success largely depends on the strength of local

institutions and the clarity of roles and responsibilities between different government levels. Critics argue that without proper checks and balances, decentralization may lead to local elite capture or exacerbate regional inequalities (Smoke, 2015).

In contemporary governance discourse, decentralization is also discussed in relation to democratization and empowerment. By facilitating local elections and enabling citizen involvement, decentralization strengthens democratic governance and fosters civic engagement. It has been increasingly adopted in post-conflict and developing contexts as a tool for state-building and service delivery reform. Nevertheless, the process is complex, context-dependent, and requires coordinated reform efforts, sustained political will, and adequate financial support.

2.5.2. Decentralized System

A decentralized system is an organizational structure in which decision-making, authority, and operational responsibilities are distributed among various semi-autonomous units or levels rather than being concentrated at a single central point. Such systems are designed to improve flexibility, responsiveness, and accountability by bringing governance closer to the people or stakeholders affected by decisions (Agrawal & Ribot, 1999). In governance, a decentralized system refers to the dispersion of governmental functions to regional, municipal, or community-based authorities. In corporate or technological contexts, it denotes distributed networks or subsidiaries with autonomy to make certain decisions.

Decentralized systems are often praised for enhancing public service delivery and promoting innovation by tailoring decisions to local realities. According to OECD (2022), well-functioning decentralized systems can boost efficiency, increase citizen trust, and support economic development. They also facilitate experimentation with policies that may later be scaled up at national levels. For example, education and healthcare delivery in countries like Brazil and India have benefited from decentralization by adapting services to regional cultural and linguistic diversity.

However, decentralized systems also face challenges such as coordination complexity, disparity in local capacity, and inconsistent service standards. Without strong regulatory frameworks and institutional coherence, decentralization may lead to fragmented governance and accountability gaps. Therefore, it is vital to ensure vertical and horizontal coordination, adequate resource allocation, and technical support to local units to realize the benefits of decentralized systems fully.

2.6. Decentralized-Centralized Controlled System (DCCS)

2.6.1. Definition

A decentralized-centralized controlled system, also referred to as a hybrid or semi-centralized governance model, combines the features of both centralization and decentralization. In such systems, certain core functions such as national defense, monetary policy, and regulatory oversight are retained by the central authority, while operational and administrative responsibilities are delegated to subnational units (Rodden, 2004). This model is increasingly seen as a pragmatic approach to governance, allowing for flexibility, local innovation, and citizen engagement, while maintaining uniform standards, strategic coherence, and control over macro-level policy.

The balance between centralization and decentralization is usually delineated by legal frameworks such as constitutions, federal statutes, or intergovernmental agreements. For example, in Germany's federal system, education and policing are largely decentralized, but macroeconomic policies are centrally governed under the auspices of the Bundestag and Bundesbank. Similarly, China practices administrative decentralization while retaining strong political centralization through the Communist Party apparatus. In corporate governance, this hybrid model is also visible in multinational corporations where headquarters retain strategic control while subsidiaries manage local operations (Prahalad & Doz, 1987).

This duality addresses the key limitations of both centralized and decentralized systems. Centralized systems may lack responsiveness and flexibility, while fully decentralized systems may suffer from fragmentation, inefficiency, or local capture. A decentralized-centralized control system offers a "best of both worlds" approach by leveraging local knowledge and autonomy while ensuring coordination and standardization through centralized oversight. However, such systems can be complex to manage and require high levels of institutional maturity, clear legal mandates, and well-functioning intergovernmental relations. The success of such hybrid systems depends on how well the roles and responsibilities are defined and how effectively coordination and accountability mechanisms function across levels of governance.

2.6.2. How to Achieve Transparency in a Decentralized-Centralized Control System

Ensuring transparency in a decentralized-centralized control system involves creating well-defined governance structures that foster both top-down oversight and bottom-up participation. A key starting point is the clarification of roles and responsibilities between the central and subnational authorities. Legal instruments such as intergovernmental agreements, administrative codes, and transparency charters must specify who is accountable for what, and under which circumstances (OECD, 2018). Clear mandates prevent overlaps and reduce opportunities for corruption and blame-shifting between different levels of governance.

Integrated information systems are vital for enabling real-time transparency across the system. Governments should adopt shared digital platforms that standardize data formats, automate disclosures, and allow public access to information across ministries and jurisdictions. Interoperability between central and local data systems enhances consistency and improves public trust. For example, Estonia's e-Governance model offers a unified digital infrastructure that connects decentralized services while maintaining central policy control, thereby facilitating seamless transparency.

Regular auditing and performance evaluation mechanisms are also necessary. Supreme audit institutions and local audit bodies must coordinate to ensure a holistic assessment of public resource management. Multilevel audit trails, citizen engagement in oversight, and third-party evaluations strengthen accountability and deter malfeasance. According to Transparency International (2021), hybrid systems benefit from "dual vigilance," where both local and central actors monitor each other's conduct.

Finally, stakeholder engagement through participatory governance tools—such as consultations, advisory boards, and citizen platforms—ensures transparency is not only procedural but also relational. Public trust can be enhanced through inclusive policy-making processes that respect both local autonomy and national coherence. International initiatives like the Extractive Industries Transparency Initiative (EITI) demonstrate how hybrid models can successfully integrate local context with international reporting standards. Ultimately, transparency in a decentralized-centralized control system is achieved through legal clarity, digital innovation, institutional capacity, and participatory governance that spans all levels of authority.

In conclusion, the literature on transparency is vast and diverse, with significant contributions from various disciplines including education, leadership, management, government, business, and digital technologies. Despite its broad acceptance as an ideal, the application and impact of transparency are far from straightforward. The effectiveness of transparency depends on its context, implementation, and the various stakeholder dynamics involved. Further research is needed to refine the theoretical frameworks surrounding transparency and to better understand its multifaceted implications in different sectors of society. In the next section, we will describe our research methodology, present the results of our experiment, conduct an analysis of the findings, and design a final version of our Decentralized-Centralized Controlled System (DCCS).

3. Methodology

The objective of our research is to define transparency and develop a system to achieve it in any given organization. To achieve this, we use a multidisciplinary experimental mixed research method based on the theory of complexity, and the experimental game approaches or simulation approaches, inspired by prior similar studies (see Brunswicker et al., 2019; Dethier et al., 2021; Auger, 2014; Gardner et al., 2018; Parra et al., 2021). The method is divided into three parts. In the first part we conducted a literature review of previous research (see section 2); In the second part we conducted a blind experiment of a group of students (n=38) using our first version of a decentralized-centralized controlled system, and; In the la last part we conducted an adapted SWOT analysis on the research experiment to identify the strength and weaknesses of our system and then, designed a final version of a DCCS that can be used as a model in any organizations on a small scale in order to test and design a Personalized Transparency System for a specific goal. Figure 4 shows the chronological framework of the methodology.

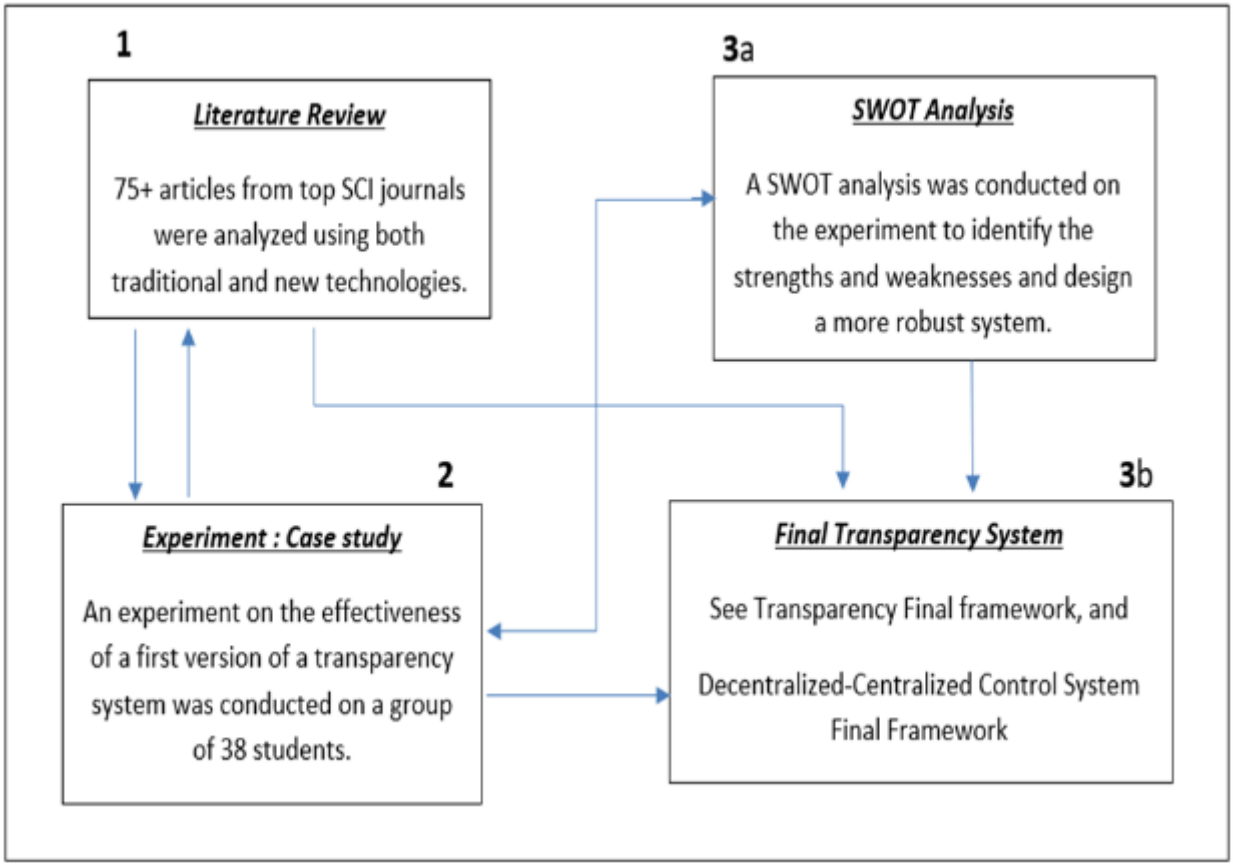

Figure 4 Methodology Chronological Framework

3.1. Data collection

The data was collected on The Web of Science (WoS) database and ScienceDirect (Scopus) database for the systematic literature review via Elsevier official website, Scispace, Google scholar, Paper connect, Litmaps, and Research rabbit; Tencent Online Survey App and Wechat were used as the main tool for the experiment; and a SWOT analysis adapted to fit our research objective was conducted on the experiment to identify its weaknesses and strengths in order to designed an effective final framework of a Decentralized-Centralized Control System (see figure 10 & 12).

3.2. Data Analysis

Qualitative and quantitative data were collected and analyzed during each part of our research including primary and secondary data, collected using online platforms (survey App and Wechat). We First conducted a qualitative analysis of 76 articles published on SCI top journals between 1993 to 2025, then we proceed with a blind experiment on a group of 38 students, the experiment was based on our understanding of transparency, a first version of a transparency system, and the research questions we developed using critical thinking. we conclude by conducting a SWOT analysis on the experiment and transparency system; and based on the results and the reviewed literature we designed a final version of a Decentralized-Centralized Control System that can be used as a practical model to achieve transparency in any types of organizations in a small scale. The data collected was analyzed using both traditional method (full and partial articles reading, critical thinking) and new technologies (Scispace, Google Notebook LM, and other academic tools).

3.3. Results

3.3.1. Part I: Literature Review Method

We use a semantic method to select papers we judged relevant to this study using a combination of keywords included in the title. Figure 5, Table 4, & Table 5 show a summary of the Literature review method.

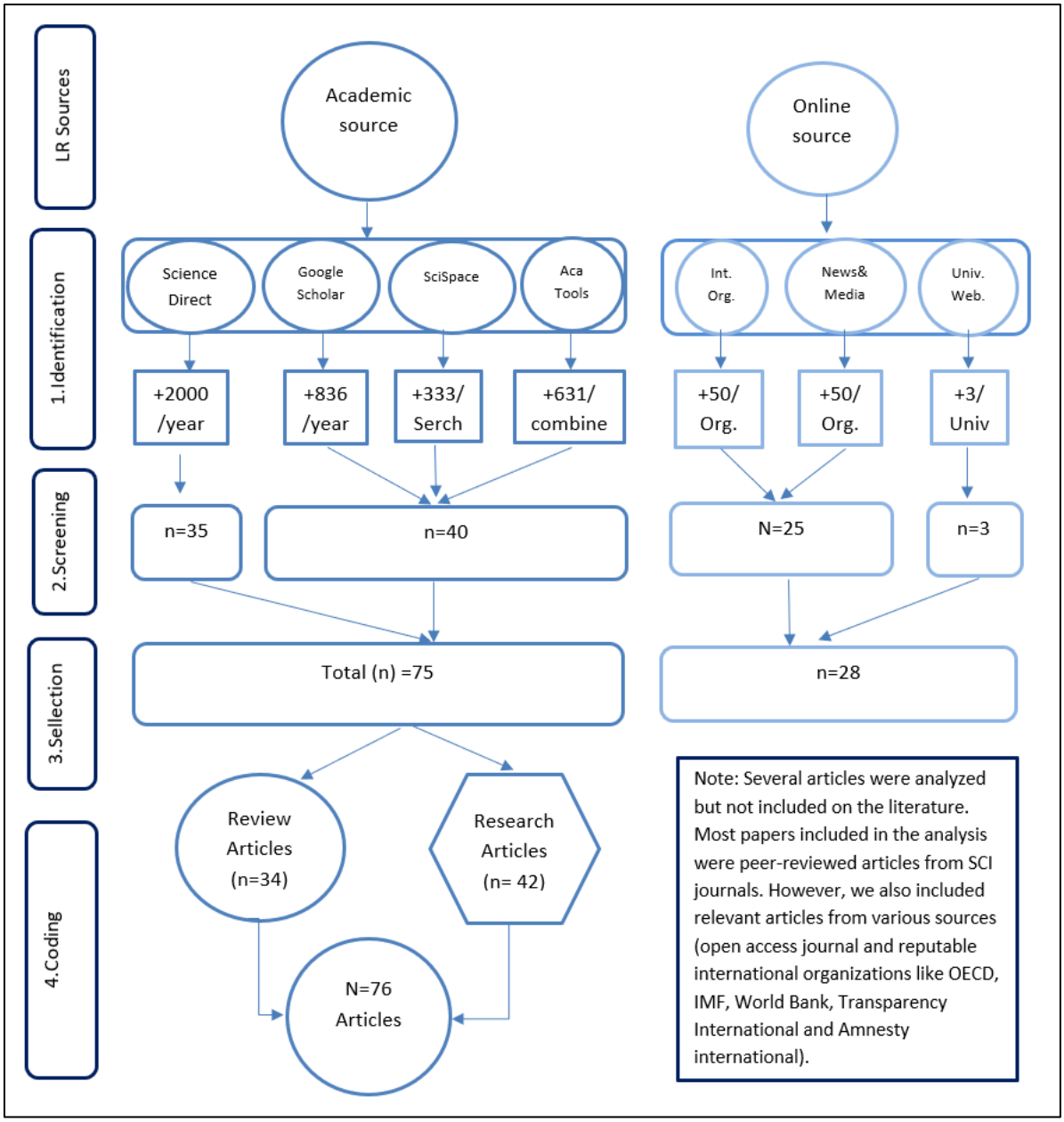

Figure 5 Literature Review Data Sampling

This table list journals and articles we focus on for data collections

Table 4 List of seed Journals

Source	Type	Journals	Publisher	Discipline/Fields/Focus /Subject	Total Number
Academic Source	Literature Review	PharmacoEconomics (Sampson et al., 2019)	Springer Nature	Governance/ Transparency/ Decision modelling/ Information Disclosure/ Corruption/ Economic Growth/	18
		Sustainability (Ortega-Rodríguez, 2020)	MDPI		
		Business and Society (Albu, 2016)	Sage		

		European Journal of Social Theory (Christensen, 2015)		Sustainability /Policy making/ Decentralization	
		Journal of Management (Schnackenberg, 2014)			
		Journal of Economic Surveys (Jain, 2001)	Blackwell Publisher		
		Public integrity (Ball, 2009)	ASPA		
		Journal of Comparative Policy Analysis: Research and Practice (Serritzlew, 2012)	Taylor & Francis		
		Wiley (Dethier, 2021)	Wiley		
		Journal of Business Research (Higgins, 2019)	Elsevier		
		Methods in Psychology (Auch, 2020)			
		Government Information Quarterly (Brunswicker, 2019)			
		World Development (Nelson, 2001; Michener, 2015; Gardner et al., 2018; Fox, 2015; Arkedis et al., 2021; Faguet, 2014)			
	Research	World Development Williams, 2011; Kinda, 2024; Lujala, 2018; Wehner, 2013; Sovacool et al., 2016; Hübler, 2021; Kolstad, 2009; Hamelin, 2020; Burger, 2010; VanDerKamp, 2017)	Elsevier	Transparency/Economic Growth/ EITI/Corruption/Decentralization/ Public Administration/ Government/ Accounting practice and Corruption/ Financial Transparency / Web 2.0/ Product and process complexities/ Digital Service/ Web disclosure/ Digital technologies/	23
		Government Information Quarterly (Pernagallo, 2020)			
		International Studies Quarterly (Alexandru, 2003)			
		The British Accounting Review (Changwony, 2019)			
		SPANISH ACCOUNTING REVIEW (Royo, 2020)			
		Industrial Marketing Management (paulraj et al.,2025)			

		Technovation (Trabucchi et al., 2023)			
		Computers in Human Behavior (Lee, 2013)			
		Environmental Sustainability (Kos, 2019)			
		Journal of Public Relations Research (Auger, 2014)	Taylor & Francis	Organizational Transparency / Governance/ Life Science	
		Journal of Public Administration Research and Theory (Grimmelikhuijsen, 2012)	Oxford University Press		
		Cell Press (Menke et al., 2020)	iScience		
		The Quarterly Journal of Economics (Shleifer, 1993)	N/A	Corruption/ Central Bank Transparency / Decentralization	
		Research in International Business and Finance (Andries, 2018)			
		Studies in Comparative International Development (Schneider 2003)			
Online source	Articles (Blog/Post)	University of Southern California (Cooper, 2004)	Big Questions/Big Issues	Ethics/Public Administration	3
		Environment and Planning C: Government and Policy (Gupta, 2010)	N/A	Governance	
		(Mauro, 1997)		Corruption and Organized Crime	
	International Organizations (Blog/Post)	Transparency International	TI	Transparency and Corruption	5
		Amnesty International	AI	Transparency Index	
		United Nations	UN	SDGs/Transparency	
		Open Data Portals	(data.gov, EU Open Data)	Government datasets	
		Open Government Partnership (OGP)	OPG	Transparency/Governance	
Total					49

Note: Seed journals represent articles we focused on to build our study. It includes articles we judged relevant to study transparency within the context of this research (see appendix A.2 for full table).

Table 5 Summary of the literatures

Categories	**Term/Concept**		
Discipline /Field (Author/Source)	**Organization**	**Transparency**	**Decentralized -Centralized Control System (DCCS)**
General view (Our initial Def.)	a group of two or more individuals or organizations living and working dependently or independently (together or separately) for a common or different goal in a define or undefine framework. e.g. Countries, business, family, etc.	a state of a system; a quality an individual, an organization, and / or a society need to have, respect, and implement in order to have a fair, equal, efficient, and effective sustainable society or system. It's a key feature towards sustainable growth and development.	a combination of both a centralized and a decentralized system. In a DCCS, control is the focus point, as such more action is put on check and balance over power and decision-making. A DCCS seeks to solve the weaknesses of both a centralized and decentralized system, and also amplify its strengths.
Education (Cardinaal 2021) (Sanfilippo, 2009) (Columbus State University) (knowledgehub.transparency.org/ (Index 35))	Integration of teaching, research, and community engagement	Transparency in education involves clear communication of learning objectives, assessment criteria, and institutional policies.	National curriculum standards with local autonomy in implementation and pedagogy; promotes uniformity and contextual relevance (Bray & Varghese, 2013).
Political Science (Wu, 2018) (Hooper & Jaeggi, 2024) (Michener, 2013). (Pancrazi , 2020).	Structures for power dynamics and governance, influence on public policy	Transparency "depends on two necessary and jointly sufficient conditions: the visibility of information, and its inferability - the ability to draw accurate conclusions from it"	Federal or quasi-federal systems with centralized constitutional authority and decentralized legislative or administrative powers (Rodden, 2004).
Economy (Coeurderoy, 2006) (Parra, 2021) (Pancrazi, 2020) (Shleifer, 1993) (Mauro, 1995)	Resource management and allocation, focus on efficiency and market transactions	-Transparency is related to factors like corruption that impact economic health. -Transparency influences how organizations manage resources within the economy.	Economic systems with centralized fiscal control (e.g., monetary policy) and decentralized economic activities at regional or sectoral levels (Oates, 1999). (Tsyganov & Bushuev, 2013)
Accounting&Finance (Jensen, 2015) (Xue & Niu, 2019, as cited in Dethier et al., 2021).	Financial management, compliance, and risk management	Transparency is a quality of an organization's accounting practices.	Central headquarters enforce standardized reporting formats, while branches/departments manage their own budgets and operational decisions (Zimmerman, 2002).

Society (Hammarfelt, 2024) (Coyle, 2018) (Parra et al., 2021). (Mauro, 1995).	Social structures shaping norms and values, influence on cultural dynamics	Transparency can mitigate the negative social effects of issues like corruption.	Institutionalized norms from central authorities (e.g., national law) alongside local community-based governance or traditions (Putnam, 1993; Ostrom, 2005). (Harrison & Johnson, 2018)

Figure 6 below shows the preliminary design of our Decentralized-Centralized controlled System/Transparency system with a focus on oversight.

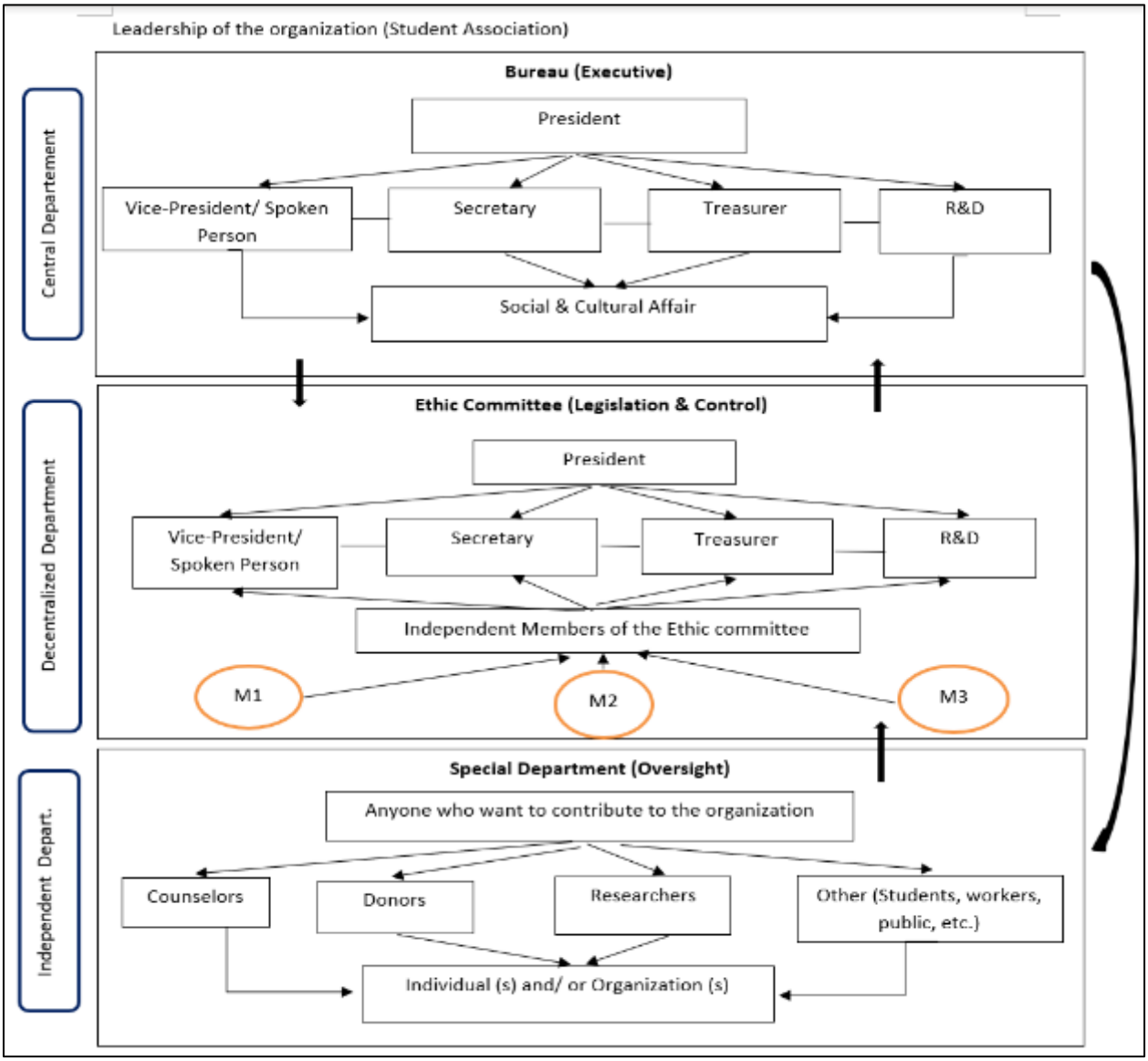

Figure 6 Decentralized-Centralized Controlled System Preliminary Design

3.3.2. Part II: Experiment approaches

Our experiment focuses on the voting of new leadership in a group of students (n=38). We conducted a blind experiment with the objective to identify factors affecting a transparency system, and identify the weakness in the preliminary designed DCCS. The experiment involves a real-life case study, not a simulation, in order to avoid bias from participants and get a real-life situation and results that could be useful to design an effective and efficient transparency system that can be used as a model for future research, and a framework for organizations. The participants were informed of the

research at the end of the blind experiment. We used Tencent Online Survey App and WeChat to collect and analyze the data. Figures 7 and 8 show the chronological phase of the experiment and the results of the voting.

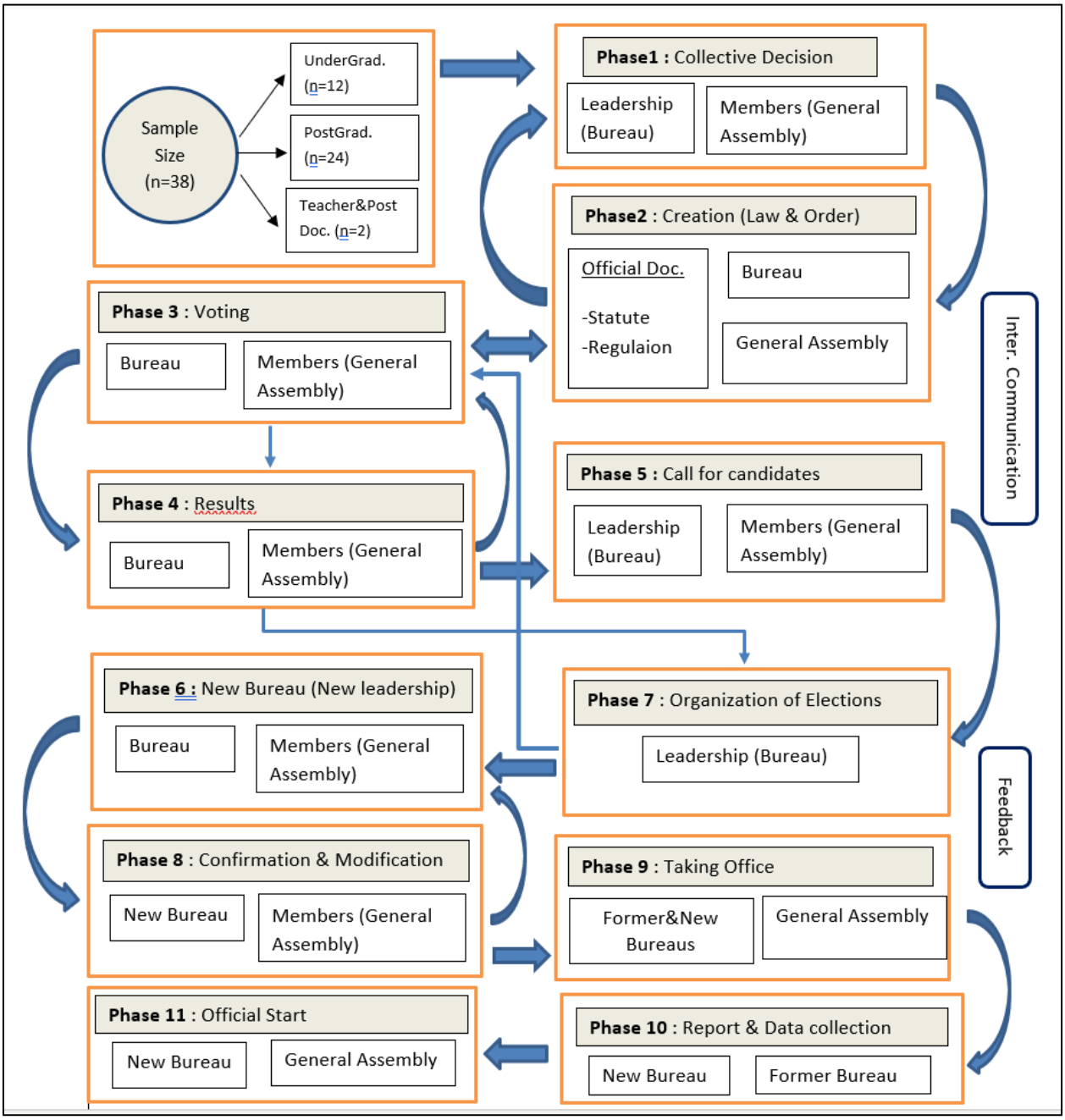

Figure 7 Chronological Framework of the Experiment

Experimental Transparency system and Decentralized-centralized controlled system

We designed an experimental transparency system before conducting a literature review to be able to conduct a comparative analysis of our system with those of the prior review, but most importantly, to avoid being influenced by existing ideas and models. We did so by focusing on the main objective of our study, which is to build a DCCS system to achieve transparency in any organization. The design was drafted based on our critical thinking and preliminary understanding of transparency (see Figure 6, Figure 9 &Table 5), and using a not-for-profit organization statute, rule, and regulations. The experiment of our study focuses on a real-life practical case of the establishment of an official leadership for the group and by the group of international students. We call it a blind experiment because the participants were not aware of the experiment until it ended, to avoid biases from the participants (members of the group). The important phases of the experiment include the collective decision phase, the establishment of the statute,

rule, and regulations phase, the voting phase, the elections phase, and the interview phase. Seven people were blindly interviewed during a normal conversation with the author; however, because the interviews were unguided, we decided not to include the results in the research. Regardless, the interviews allow us to confirm three things: 1) Most people want transparency; 2) people will act or contribute with enough insistence (persistence); and 3) People won't do what they said or promised they will. The collective decision was taken by 26 (68.42%) members; the official documents were established by one member and confirmed by 10 (26.31%) members with small suggestions and no opposition from other members. In the first voting phase: voting for the date of the next elections; on a final list of 32 voters, 17 (53.12%) voted for the first date, 4 (12.50%) voted for the second date, nobody voted for the last date, and 11 (34.35%) did not vote. For the last voting phase: vote for the new leadership (new bureau) because of conflict of interest by the unique candidate, weakness in policy (statute, rule and regulation), and the leadership in charge of the election the voting for the next bureau was reported to the date of the next general assembly. This last decision concluded our experiment by highlighting the major weakness of our transparency system. Figures 7 and 8 show the chronological framework of the experiment and the result of the first voting phase, respectively.

工作表1

	A	B	C	D
1	Choix de la Date des prochaines Élections (1= 30 Avril, 2= 30 Mai, 3= 15 Aout)			
2	ID	Name	Vote	
3	1		1. 30 Avril	
4	2		1. 30 Avril	
5	3			
6	4		1. 30 Avril	
7	5		2. 30 Mai	
8	6		1. 30 Avril	
9	7			
10	8			
11	9			
12	10		1. 30 Avril	
13	11		1. 30 Avril	
14	12			
15	13		1. 30 Avril	
16	14		1. 30 Avril	
17	15		1. 30 Avril	
18	16			
19	17		2. 30 Mai	
20	18			
21	19		1. 30 Avril	
22	20		1. 30 Avril	
23	21		1. 30 Avril	
24	22		2. 30 Mai	
25	23			
26	24		1. 30 Avril	
27	25		1. 30 Avril	
28	26		1. 30 Avril	
29	27			
30	28		1. 30 Avril	
31	29			
32	30			
33	31		2. 30 Mai	
34	32		1. 30 Avril	
35				

Figure 8 Voting Phase one results

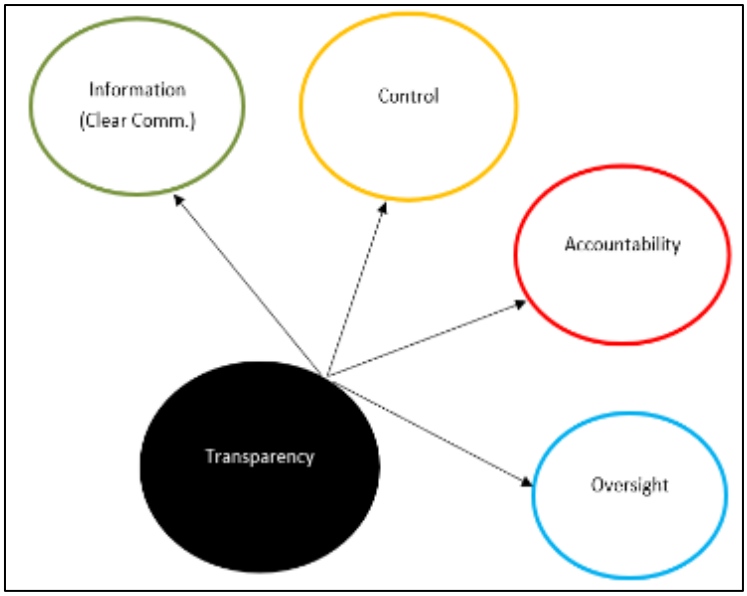

Figure 9 Preliminary view of Transparency Framework

3.3.3. Part III: SWOT analysis and DCCS

SWOT Analysis

We conducted a SWOT analysis on our transparency system and experiment using the following height (8) steps (See Figure 10), and found that our preliminary system did not cover all aspects of transparency when compared with previous literature and experimental research (see Figure 1 and Table 2). Table 6 shows the result of the adapted SWOT analysis with emphasis on weaknesses and strengths of the preliminary transparency system and experiment.

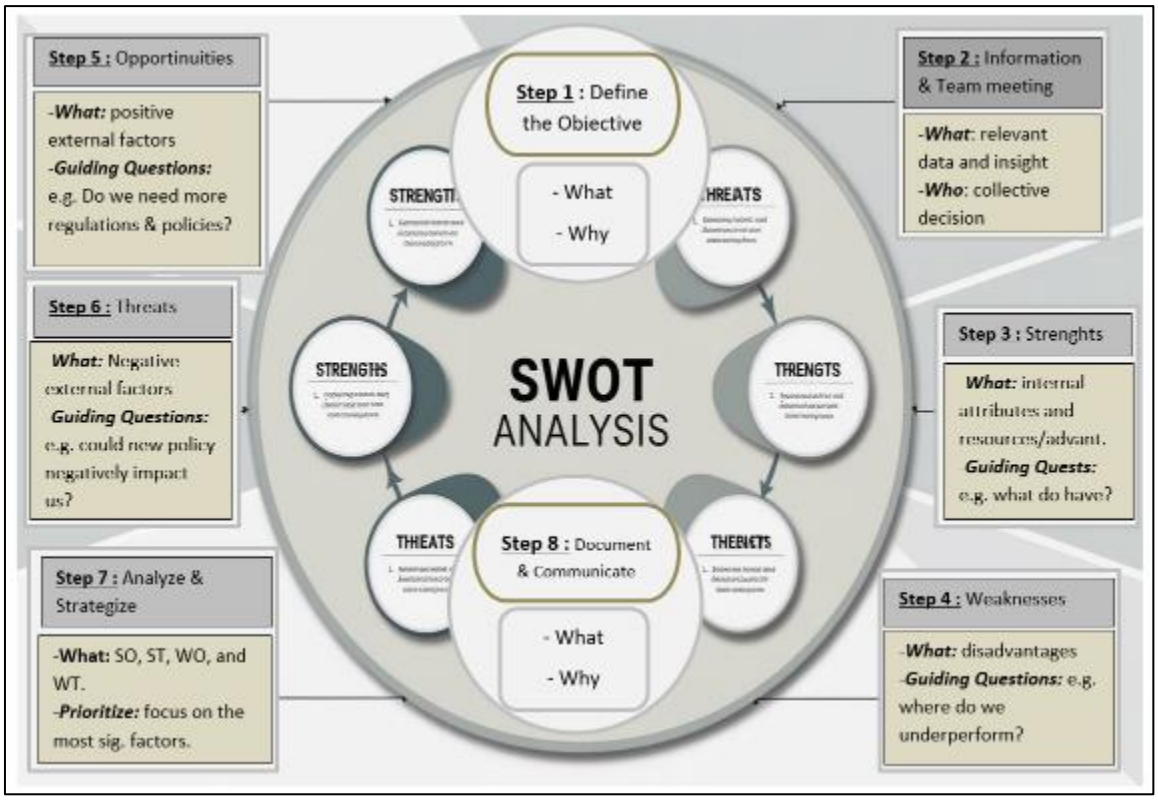

Figure 10 SWOT Analysis Framework

Table 6 SWOT analysis results

Results		
Focus /Items	**Transparency System**	**Experiment method**
Strengths	- focus only on Information, control, accountability, and oversight aspect of transparency (see figure 9 & figure 2) - designed based on established Statute, rule and regulations - focus on define objectives and purpose (see supplementary files)	-Real life case study -Mini interview -Use of New technologies -Define objective -Cooperation - Blind test -critical analysis
Weaknesses	-Developed based on the authors critical thinking and perspective of accounting - Opacity in the establishment of statute, rule and regulations -Design without prior analysis of previous literature	-Small sample size (n=38) -Blind experiment -unguided survey -Focus mainly on qualitative analysis -No statistical analysis
Opportunities	-Possibility to upgrade the system after the literature review and experiment -Can be use as a model by any organizations to design and implement a transparency system Have a clear understanding of factors influence a transparency system	-Can be use as a model for future researches on transparency -Allow us to identify the weaknesses and strength of the experiment -Have a clear understanding of factors that affect and impact an experiment.
Threats	-Did not consider all the aspect of transparency -May not be suitable or appropriate for all types of organizations	-Online data security especially regarding voting phase -Author Biases -Focus mainly on the participants as a group without taking into account the individual characteristic of each participant.

Decentralized-centralized controlled system: final version

The literature review, experiment, and SWOT analysis allow us to have a clear answer to the following questions: "what is transparency?"; Why do organizations need transparency?"; "what is a decentralized-centralized control system?"; and "how to use it to achieve transparency in an organization?". Answering these questions, we came up with two recommendations necessary to design a personalized DCCS in order to achieve or established an effective transparency system: 1) what types of transparency an individual or organization want to achieve (see Figure 11); and 2) Check and Balance through accountability and a rotation in oversight and control (see figure 12). Note that transparency is a continuous process and, as such, a constant upgrade of the system is necessary in order to have an effective and efficient transparency system. Furthermore, transparency depends on a strong, clear, and personalized legal system (policy, rule, and regulation).

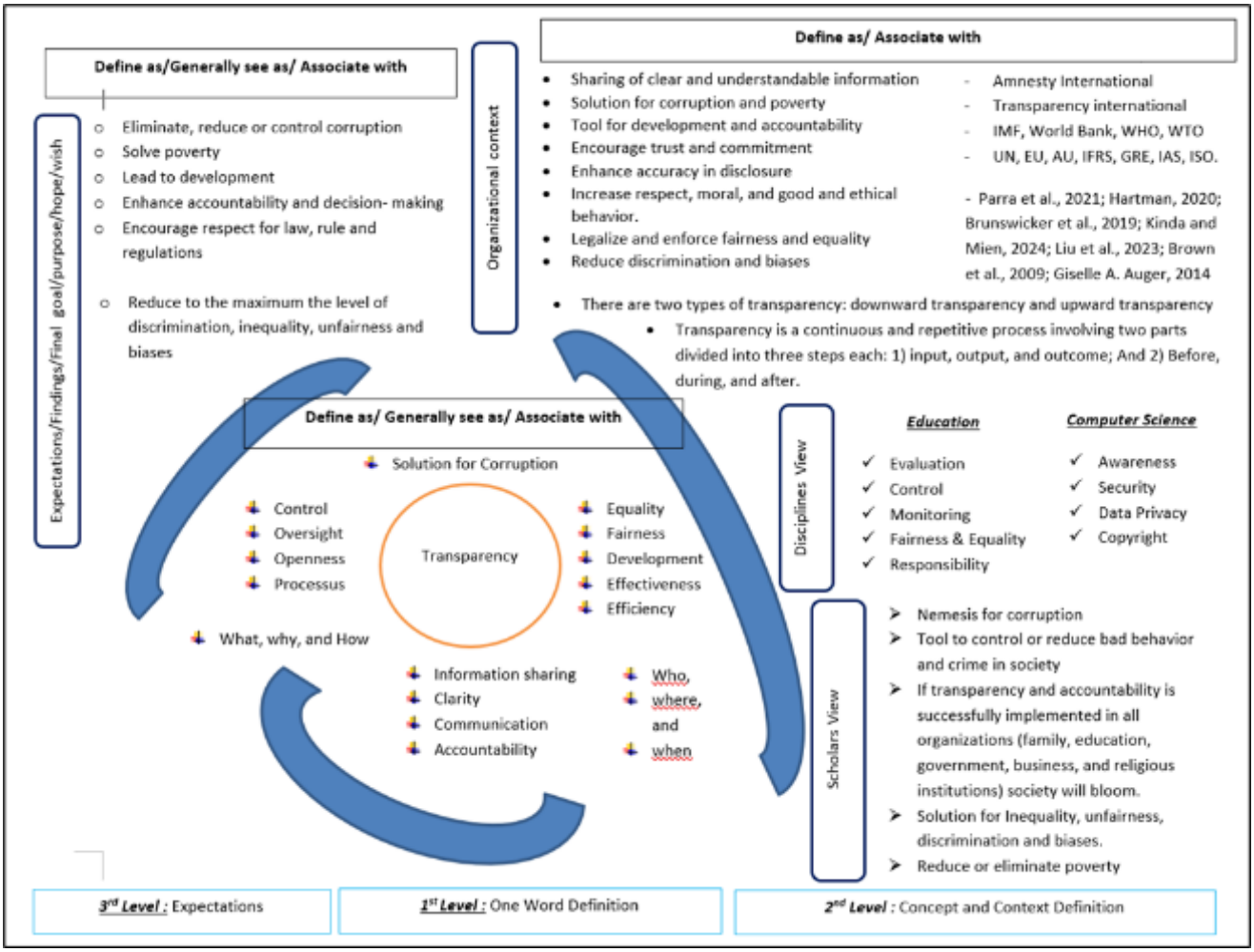

Figure 11 Transparency Final Framework

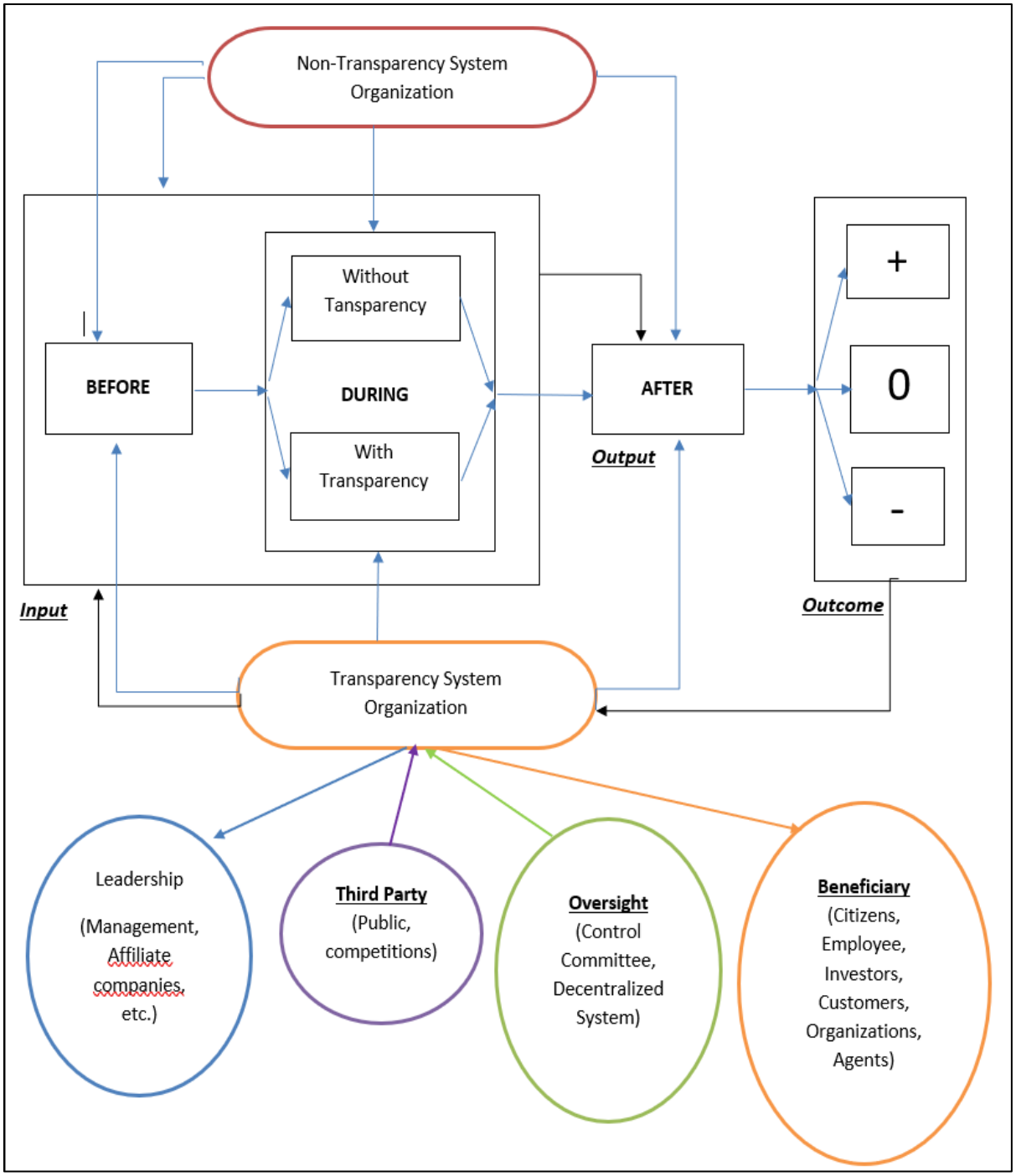

Figure 12 Decentralized-Centralized Control System Final Framework

4. Discussion

This study aimed to conceptualize transparency and explore its achievement through a novel Decentralized-Centralized Control System (DCCS), employing a multidisciplinary methodology encompassing a literature review, an experimental case study, and a SWOT analysis. The findings provide valuable insights into the multifaceted nature of transparency and the potential applicability, as well as limitations, of the proposed DCCS framework.

The literature review (Part 1) revealed that while decentralized systems often promote participatory governance, they may lack uniformity and enforcement capacity, whereas centralized systems ensure coherence but risk opacity and bureaucratic inertia (Meijer & de Jong, 2018; Grimmelikhuijsen et al., 2019). A hybrid, decentralized-centralized model, therefore, emerges as a strategic compromise capable of achieving transparency by combining the flexibility of local

decision-making with the rigor of centralized oversight (Fung et al., 2019). The conceptualization of transparency derived from the literature review aligns significantly with established academic and institutional perspectives. Defining transparency through attributes such as clarity, information sharing, accountability, control, and oversight resonates with definitions promoted by organizations like Transparency International and frameworks discussed by scholars such as Parra et al. (2021) and Auger (2014). The study reinforces the widely held view, supported by numerous international bodies (e.g., IMF, World Bank, UN), that transparency serves as a critical tool against corruption and inequality, fostering fairness, development, and enhanced decision-making. This research positions the DCCS within this context, proposing it as a structural mechanism designed to operationalize these transparency principles by integrating the strengths and mitigating the weaknesses inherent in purely centralized or decentralized systems – a dichotomy extensively debated in organizational theory and political science literature.

The experimental phase attempted to translate these concepts into practice. The multi-stage governance simulation provided a platform to observe the dynamics of the DCCS, particularly the interplay between centralized leadership (Bureau) and decentralized participation (General Assembly). The SWOT analysis yielded findings that both support and challenge existing knowledge. The system's strength in focusing on information, control, accountability, and oversight aligns with core tenets emphasized in the transparency literature. However, the analysis also highlighted significant weaknesses, such as potential opacity in rule establishment and an initial design phase seemingly detached from a deep analysis of prior literature. This latter point presents a divergence from ideal research practice, where frameworks are typically grounded in existing theory from inception, although the methodology indicates substantial literature was reviewed overall. This finding underscores the practical challenges in organically developing governance rules within experimental settings while ensuring theoretical grounding.

From a methodological perspective, the mixed-methods approach proved critical for triangulating findings and avoiding mono-disciplinary biases. The literature review anchored the study in theoretical rigor, the experimental case study provided empirical validation, and the SWOT analysis enabled strategic interpretation. Together, they allowed for a holistic understanding of how a decentralized-centralized control system can operationalize transparency across diverse organizational contexts. However, the reliance on a small sample (n=38) and primarily qualitative data limits generalizability, a common challenge acknowledged in experimental social science research exploring complex constructs like transparency. The identified threats, including data security in digital interactions and potential authors' bias, echo concerns prevalent in broader discussions on digital governance and research ethics. The finding that the system may not suit all organizational types also reflects contingency theories in organizational design, suggesting that transparency mechanisms must be adapted to specific contexts, a point often emphasized in implementation studies.

Despite these limitations, the study offers valuable implications. The DCCS framework, by attempting a structured balance of power, presents a potential advancement over simpler models, addressing the known pitfalls of unchecked centralized authority or fragmented decentralized efforts discussed in governance literature. The opportunity identified in the SWOT analysis to use the system as a model for future research and organizational design suggests its potential utility, provided the weaknesses are addressed. This aligns with calls in the literature for innovative governance mechanisms to tackle persistent issues of corruption and accountability.

Future research should directly address the limitations identified. Rigorous testing of the refined DCCS framework using larger, diverse samples and mixed-methods approaches is essential for validation, moving beyond the qualitative insights of this initial experiment. Comparative studies analyzing DCCS effectiveness across different organizational cultures and sectors would address the contextual suitability concerns and contribute to contingency theories of transparency. Further work integrating robust security protocols and exploring mitigation strategies for potential biases identified as threats is crucial for practical applicability, reflecting ongoing challenges discussed in the broader literature on digital governance and transparency implementation.

In conclusion, this study provides a qualified endorsement of the DCCS as a potentially valuable framework for enhancing transparency. It reaffirms core transparency principles identified in the literature while highlighting the practical and methodological hurdles in developing and validating new governance models. By critically evaluating the DCCS through experimentation and SWOT analysis, this research contributes to the academic conversation, offering a specific structural approach and underscoring the need for iterative refinement, contextual adaptation, and rigorous empirical validation, consistent with best practices advocated in implementation science and governance studies. While potentially beneficial (the DCCC), the complexity of achieving genuine transparency require careful design, contextual adaptation, and robust validation.

5. Conclusion, Limitations, and Future Directions

This research addressed the persistent challenge of defining and achieving organizational transparency by proposing and evaluating a novel Decentralized-Centralized Control System (DCCS) through a multidisciplinary experimental methodology. Grounded in an extensive literature review, the study synthesized a comprehensive definition of transparency, emphasizing its role in fostering accountability, fairness, equality, efficiency, and sustainable development, while acting as a countermeasure to corruption and inequality. The core contribution lies in the conceptualization and preliminary assessment of the DCCS, a hybrid governance model designed to leverage the strengths of both centralized and decentralized approaches, combining focused control with distributed checks and balances.

The methodology integrated a literature review, an experimental case study simulating organizational governance processes with 38 participants, and a subsequent SWOT analysis to critically evaluate both the developed transparency framework and the experimental method. The experiment provided practical insights into the operational dynamics of the DCCS, illustrating how elements like collective decision-making, rule creation, voting, and leadership transitions could function within such a structure. Key findings from the SWOT analysis highlighted the framework's strengths in promoting information access, accountability, and oversight, aligning with established transparency principles. However, it also underscored significant weaknesses, including potential opacity in rule generation, limitations stemming from the small, qualitative nature of the experiment, and the framework's potential lack of universal applicability across different organizational contexts.

This study contributes a structured, albeit preliminary, DCCS framework as a potential tool for organizations striving for greater transparency. It demonstrates the value of a multi-method approach in exploring complex socio-technical concepts, allowing for both theoretical grounding and practical simulation. The research underscores that while hybrid models like DCCS hold promise for overcoming the limitations of traditional governance structures, their design and implementation require careful consideration of context, potential biases, and security vulnerabilities, particularly in digitally mediated environments.

The identified limitations—notably the small sample size, qualitative focus, and potential influence of authors perspective—necessitate caution in generalizing the findings. Consequently, the primary implication is the need for further research. Future studies should focus on validating the DCCS framework through larger-scale, quantitative or mixed-methods research across diverse organizational settings and cultures. Refining the model to enhance procedural clarity, minimize potential biases, address security threats, and explicitly integrate established theoretical grounding from the outset are crucial next steps.

In essence, this research serves as a foundational exploration into the potential of hybrid governance systems like DCCS for enhancing transparency. While demonstrating feasibility and aligning with theoretical ideals, it simultaneously highlights the significant practical and methodological challenges involved. The path toward achieving robust, effective, and contextually appropriate transparency remains complex, requiring iterative refinement, critical evaluation, and rigorous empirical validation of innovative models like the DCCS.

Compliance with ethical standards

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Disclosure of conflict of interest

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

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