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Generativity is a Core Value of the ESJ: A Decade of Growth

Erik Erikson (1902-1994) was one of the great psychologists of the 20th century¹. He explored the nature of personal human identity. Originally named Erik Homberger after his adoptive father, Dr. Theodore Homberger, he re-imagined his identity and re-named himself Erik Erikson (literally Erik son of Erik). Ironically, he rejected his adoptive father's wish to become a physician, never obtained a college degree, pursued independent studies under Anna Freud, and then taught at Harvard Medical School after emigrating from Germany to the United States. Erickson visualized human psychosocial development as eight successive life-cycle challenges. Each challenge was framed as a struggle between two outcomes, one desirable and one undesirable. The first two early development challenges were 'trust' versus 'mistrust' followed by 'autonomy' versus 'shame.' Importantly, he held that we face the challenge of **generativity** versus **stagnation in middle life**. This challenge concerns the desire to give back to society and leave a mark on the world. It is about the transition from acquiring and accumulating to providing and mentoring.

Founded in 2010, the European Scientific Journal is just reaching young adulthood. Nonetheless, **generativity** is one of our core values. As a Journal, we reject stagnation and continue to evolve to meet the needs of our contributors, our reviewers, and the academic community. We seek to innovate to meet the challenges of open-access academic publishing. For us,

¹ Hopkins, J. R. (1995). Erik Homburger Erikson (1902–1994). *American Psychologist*, 50(9), 796-797. doi:<http://dx.doi.org/10.1037/0003-066X.50.9.796>

generativity has a special meaning. We acknowledge an obligation to give back to the academic community, which has supported us over the past decade and made our initial growth possible. As part of our commitment to generativity, we are re-doubling our efforts in several key areas. First, we are committed to keeping our article processing fees as low as possible to make the ESJ affordable to scholars from all countries. Second, we remain committed to fair and agile peer review and are making further changes to shorten the time between submission and publication of worthy contributions. Third, we are looking actively at ways to eliminate the article processing charges for scholars coming from low GDP countries through a system of subsidies. Fourth, we are examining ways to create and strengthen partnerships with various academic institutions that will mutually benefit those institutions and the ESJ. Finally, through our commitment to publishing excellence, we reaffirm our membership in an open-access academic publishing community that actively contributes to the vitality of scholarship worldwide.

Sincerely,

Daniel B. Hier, MD

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Self-Sovereign Identity Architecture for National Use with Wallet Proofs Zero-Knowledge and the VWR Framework

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Abstract

National identity systems require efficient, equitable decision-making that safeguards personal data. This article proposes a Self-Sovereign Identity (SSI) architecture, supported by a Verify-Without-Reveal (VWR) framework, designed for national-scale implementation. SSI places credentials in a citizen wallet and enables selective disclosure and zero-knowledge proofs, so services can verify attributes without seeing underlying records. VWR adds the policy and accountability spine: yes/no attribute APIs for holder-absent cases, purpose-bound and zero-trust enforcement on every call, and an immutable audit layer on a permissioned ledger. The study synthesises current standards and leading implementations in Europe and worldwide and formulates a deployable blueprint with clear roles, consent and lawful-override flows, per-agency pseudonyms, and regulator and citizen visibility. The study outlines reference APIs, user experiences for wallets and verifiers, and performance metrics suited for national workloads. Privacy-preserving AI strengthens biometric liveness, fraud detection, and anomaly response without centralising sensitive data. The framework aligns with GDPR data minimisation and purpose limitation, supports the European Digital Identity Wallet, and meets high-risk AI governance requirements. Results show how SSI proofs and VWR controls reduce unconsented disclosure and cross-agency browsing, while keeping latency low and interoperability high. The contribution is both conceptual and operational: a phased migration path that turns verify-without-reveal into the default mode for government and regulated services, improving security, inclusion, and public trust.

Keywords: Self-sovereign identity; SSI; verify-without-reveal; zero-knowledge proofs; zero-trust architecture; permissioned blockchain; immutable audit; national digital identity; privacy-preserving AI

1. Introduction

National identity systems must deliver fast, fair decisions for millions of people every day. They also carry the risk of exposing personal data across agencies and sectors. Current platforms often retrieve complete records when a simple binary verification is sufficient. This behaviour erodes trust and increases legal risk under data-protection rules. It also creates technical debt, because copied records spread and are hard to control later (European Commission, 2024). This article proposes a different path. It places Self-Sovereign Identity (SSI) at the centre and reinforces it with a Verify-Without-Reveal (VWR) policy and audit spine. SSI moves credentials to a citizen wallet and enables selective disclosure and zero-knowledge proofs. VWR ensures that, even when the holder is not present, verifiers receive only a yes/no answer bound to a declared purpose, and every access is logged in an immutable audit trail. Together they turn privacy by design into routine system behaviour (Dunphy & Petitcolas, 2020; Camenisch & Lehmann, 2021; Allen & Hess, 2022). The motivation is both legal and practical. The GDPR requires purpose limitation and data minimisation. eIDAS 2.0 promotes cross-border wallets and selective disclosure. The EU AI Act treats biometric identification as high-risk and demands governance, testing, and human oversight. These instruments encourage verification without unnecessary revelation. They also require strong accountability. Logs must be trustworthy, and people must be able to see who accessed their data and why. Programmes in Estonia, the EU wallet pilots, India's Aadhaar, and municipal SSI trials show that these aims are realistic when engineering and governance align (European Commission, 2024; Dunphy & Petitcolas, 2020; UIDAI, 2025). The fundamental technical challenge is enabling verifiers to determine eligibility without accessing comprehensive personal dossiers. SSI answers part of the question with holder-present proofs. The wallet presents a cryptographic statement such as "over 18," "licence valid," or "resident in district X" that reveals no extra attributes. For holder-absent flows, VWR provides secure APIs that return binary responses, enforce zero-trust policies, and generate tamper-evident audit logs. The result is consistent behaviour across channels: minimal disclosure by default, consent for richer data, and complete accountability either way (Camenisch & Lehmann, 2021; Allen & Hess, 2022).

Contributions and significance (EU and global)

This article presents four primary contributions, beginning with the integration of SSI and VWR into a unified national architecture. It demonstrates how wallet-based selective disclosure and zero-knowledge proofs work alongside binary APIs, zero-trust policies, and immutable auditing. The framework ensures consistent operational behavior for both holder-present and holder-absent interactions. It provides concrete patterns for per-agency pseudonyms, purpose codes, consent artefacts, and regulator and citizen visibility (Camenisch & Lehmann, 2021; Allen & Hess, 2022). Second, it delivers a deployable blueprint. It defines reference APIs for verify, present, consent, and audit. It sets latency and anchoring targets. It describes policy-as-code enforcement and testing. It details wallet and verifier user experience, including delegated consent, accessibility, and recovery. It gives a phased migration plan: audit first, then yes/no by default, then SSI augmentation, then legacy retirement. It aligns these steps with real constraints of national operations (European Commission, 2024; UIDAI, 2025). Third, it maps compliance to engineering. It turns GDPR data minimization and purpose limitation into defaults. It embeds AI Act governance for high-risk biometrics. It adopts eIDAS 2.0 wallet profiles and cross-border trust services. It shows how to make legal duties measurable through immutable logs, purpose mappings, and public transparency reports (European Commission, 2024). Fourth, it grounds the design in evidence. It draws lessons from Estonia's transparency model, the EU wallet pilots, Aadhaar's at-scale yes/no authentication, and municipal SSI deployments. It explains which choices improve adoption convenience plus control and which choices fail over-collection, weak logging, and implicit internal trust (Dunphy & Petitcolas, 2020; UIDAI, 2025).

2. Background

Self-Sovereign Identity (SSI) arose from the need to restore user control in digital identity while keeping high assurance and interoperability. In SSI, trusted authorities issue verifiable credentials to the holder; the holder stores them in a wallet and presents proofs to verifiers when needed. Decentralized Identifiers (DIDs) provide resolvable identifiers and public keys without a single, central directory. Together, DIDs and VCs let a verifier check the authenticity and freshness of claims without contacting the issuer each time, which reduces linkability and improves resilience (Dunphy & Petitcolas, 2020; Sporny, Longley, & Chadwick, 2022; Sporny et al., 2022). Wallets add policy and UX: the holder can select which attributes to disclose, set consent preferences, and manage recovery. Modern wallets support mobile secure elements or trusted execution, remote revocation checks, and presentation of cryptographic proofs that are compact enough for web and in-person flows

(Preukschat & Reed, 2021; Meylan & Sabadello, 2021). National identity practice shows both progress and gaps. Estonia's model demonstrates how separated registries, strong authentication, and full-stack logging enable safe data exchange across government. Every lookup is policy-checked and time-stamped, and citizens can later see who accessed what and when. This transparency improves trust and reduces silent misuse (Dunphy & Petitcolas, 2020). Across the European Union, eIDAS 2.0 introduces the European Digital Identity Wallet, which standardises selective disclosure and cross-border verification so that residents can prove attributes abroad without sharing full records (European Commission, 2024). Outside Europe, India's Aadhaar separates yes/no authentication from consented e-KYC to limit data spread, proving that minimal answers can work at population scale when audit and consent are enforced (UIDAI, 2025). The cryptographic building blocks for minimal disclosure are mature. Selective disclosure allows a holder to reveal exactly one or a few attributes from a credential without exposing the rest. Zero-knowledge proofs (ZKPs) go further by proving predicates over attributes "over 18," "licence valid," "resident of district X" without revealing the values or the identifier. Efficient constructions, such as BBS+ signatures for unlinkable selective disclosure, and accumulator-based revocation, make verification fast enough for web and mobile at scale (Camenisch & Lehmann, 2021; Khovratovich & Law, 2020). Revocation lists and status endpoints prevent use of stale credentials, while caching keeps latency low. In parallel, domain standards such as ISO/IEC 18013-5 for mobile driving licences show how signed attributes can replace photocopies and still pass inspection, which aligns with SSI and VWR aims (ISO/IEC, 2021).

Policy enforcement in large public systems is moving from implicit trust to zero-trust. Traditional role-based access on a "trusted network" allows broad internal browsing and weak oversight. Attribute-based access control (ABAC) evaluates purpose, role, legal basis, consent state, and risk on each API call, so every access is a decision linked to declared intent. Combined with least-privilege defaults and rate limits, ABAC reduces cross-agency "surfing" and turns policy into code that auditors can test (Allen & Hess, 2022; Zhang & Li, 2020). Accountability depends on logs that cannot be silently changed. Simple database logs help, but they are editable by insiders. Permissioned blockchain or hash-chained audit systems provide append-only, time-stamped records with cryptographic integrity and multi-party control, so tampering becomes evident. Governments can record events, not data who asked what, for which purpose, and the policy outcome while keeping personal data off-chain (Juels & Oprea, 2020; Vukolić, 2021; Gencer & Basu, 2021).

3. Research Methodology

This study investigates how a self-sovereign identity (SSI) model, reinforced by a verify-without-reveal (VWR) framework, can meet national requirements for speed, legality, and trust. The central question examines deciding eligibility without exposing records. Subsidiary questions address composing DIDs and zero-knowledge proofs to return predicate answers rather than dossiers (Camenisch & Lehmann, 2021; Sporny et al., 2022); implementing policy controls and zero-trust enforcement to prevent cross-agency browsing (Allen & Hess, 2022; Zhang & Li, 2020); and enhancing assurance through privacy-preserving fraud scoring and encrypted inference (Paredes-García et al., 2023; Kaul, 2021; Ren et al., 2025). Compliance analysis assesses alignment with GDPR, eIDAS 2.0, and the EU AI Act (European Commission, 2024; NIST, 2020). The research design blends conceptual synthesis with comparative case analysis. The synthesis integrates cryptographic elements—DIDs, verifiable credentials, and permissioned ledgers—into a scalable national architecture. This is tested against active programs: Estonia’s integrity anchoring, EU wallet pilots on selective disclosure, India’s Aadhaar on population-scale authentication, and municipal pilots like Zug. These cases provide a yardstick for security, interoperability, and performance (Dunphy & Petitcolas, 2020; European Commission, 2024; UIDAI, 2025). Sources include peer-reviewed literature (2020 onwards) and official standards (eIDAS, W3C, NIST), prioritizing technical specificity over marketing materials (Sporny, Longley, & Chadwick, 2022; European Commission, 2024; NIST, 2020). Data extraction focuses on seven recurring elements, including binding, revocation, verification paths, and policy layers. Architectural choices and governance controls are coded under minimal disclosure, zero-trust enforcement, and privacy-preserving AI to expose trade-offs in the proposed design (Dunphy & Petitcolas, 2020; Camenisch & Lehmann, 2021; Allen & Hess, 2022). Evaluation uses five criteria: Security (resistance to abuse), Privacy (selective disclosure and unlinking), Interoperability (cross-border proofing), Governance (audit visibility), and Scalability (latency and load reliability) (European Commission, 2024; UIDAI, 2025). Validity relies on triangulation between standards and program documentation, prioritizing empirical statistics where available. Reliability is ensured by a consistent coding framework. Bias is managed by weighing biometric claims against dataset diversity and treating auditability as essential for detecting misuse (European Commission, 2024; Paredes-García et al., 2023). Ethical considerations are integral, mapping recommendations to GDPR and AI Act duties. The design prioritizes user control and inclusion, favouring holder-present proofs on commodity devices while proposing low-tech alternatives for equal access (Dunphy & Petitcolas, 2020; European Commission, 2024). Ultimately, this methodology positions SSI-VWR as the

enforcement spine for all interactions, evaluating success by data minimization and audit transparency (European Commission, 2024; Camenisch & Lehmann, 2021; Dunphy & Petitcolas, 2020; UIDAI, 2025).

4. Problem Analysis

National identity systems face a cluster of reinforcing problems: unnecessary disclosure, cross-agency “surfing,” linkability, and biometric risk. These issues stem from defaults that favour dossiers over decisions and trust networks rather than purposes. An SSI-centred design, reinforced by a verify-without-reveal (VWR) spine, must therefore change the control plane so that minimal disclosure, purpose enforcement, and immutable accountability become routine (Dunphy & Petitcolas, 2020; Allen & Hess, 2022; European Commission, 2024). Unconsented disclosure and cross-agency “surfing” Legacy platforms often fetch full records for simple checks, creating legal risk and enabling insider surfing where staff browse records without friction. GDPR purpose limitation is honoured in policy but not in code (Zhang & Li, 2020; Campbell & Weitzner, 2022). SSI-VWR changes this posture by making minimal answers the norm. A purpose-bound API returns predicates (e.g., “licenceValid = true”) rather than dossiers (European Commission, 2024; UIDAI, 2025). An Attribute-Based Access Control (ABAC) engine ties each call to a legal basis, while immutable audits make surfing costly by leaving a tamper-evident trail visible to regulators and citizens (Allen & Hess, 2022; Juels & Oprea, 2020; Vukolić, 2021). Linkability, metadata leakage, and dossier creep Linkability undermines privacy when global identifiers or metadata fingerprints allow tracking across domains (Troncoso et al., 2020; Camenisch & Lehmann, 2021; Wagner & Eckhoff, 2020). The proposed design mitigates this by replacing global IDs with per-agency pseudonyms derived from the national identifier and an agency salt. The verification layer strips non-essential metadata and rotates short-lived tokens. This prevents dossier creep, as verifiers cannot justify keeping more data than received for a narrow, logged purpose (Camenisch & Lehmann, 2021; Gencer & Basu, 2021; European Commission, 2024; Sporny et al., 2022; Dunphy & Petitcolas, 2020). Biometric risks, bias, and model governance Biometrics introduce risks of replay attacks, deepfakes, and algorithmic bias (Paredes-García et al., 2023; European Commission, 2024). A robust approach separates usage: capture occurs in controlled conditions, while routine liveness checks run on-device or in secure enclaves (NIST, 2020; Allen & Hess, 2022). Assurance is enhanced via federated learning and encrypted inference, which detect misuse without pooling sensitive data (Kaul, 2021; Ren et al., 2025; Zhou et al., 2021). Continuous governance monitors error rates across demographics and mandates human appeal routes,

turning AI Act compliance into daily practice (European Commission, 2024; Paredes-García et al., 2023).

Comparison of Traditional Identity Systems vs. SSI–VWR Framework

Feature	Traditional Identity Systems	Proposed SSI–VWR Framework
Data Disclosure	Defaults to retrieving complete personal dossiers for simple verification.	Provides "decisions over dossiers" through yes/no APIs and zero-knowledge predicates.
Trust Model	Relies on implicit trust within internal agency networks.	Enforces a zero-trust architecture where every request is independently verified.
Access Control	Uses broad Role-Based Access Control (RBAC), often allowing internal "surfing".	Implements Attribute-Based Access Control (ABAC) tied to a mandatory purpose catalogue.
Accountability	Logs are often mutable, editable by insiders, or inaccessible to citizens.	Features immutable, append-only audit trails anchored to a permissioned ledger.
User Privacy	High traceability due to the reuse of stable, global identifiers across domains.	Suppresses traceability using per-agency pseudonyms and metadata hygiene.
User Visibility	Citizens have little to no visibility into who accessed their records and why.	Offers full transparency via a citizen portal showing every access event in plain language.
Biometrics	Often involves centralized storage of sensitive biometric templates.	Prioritizes on-device template storage and privacy-preserving liveness checks.

5. Proposed SSI–VWR Framework

This section specifies a deployable framework that puts Self-Sovereign Identity (SSI) at the centre and uses Verify-Without-Reveal (VWR) as the control spine. SSI provides holder-controlled, cryptographic proofs. VWR guarantees that verifiers receive only what is necessary, that every request is tied to a declared purpose, and that each access is immutably auditable. The result is high assurance with minimal disclosure at national scale (Dunphy & Petitcolas, 2020; Camenisch & Lehmann, 2021; Allen & Hess, 2022; European Commission, 2024).

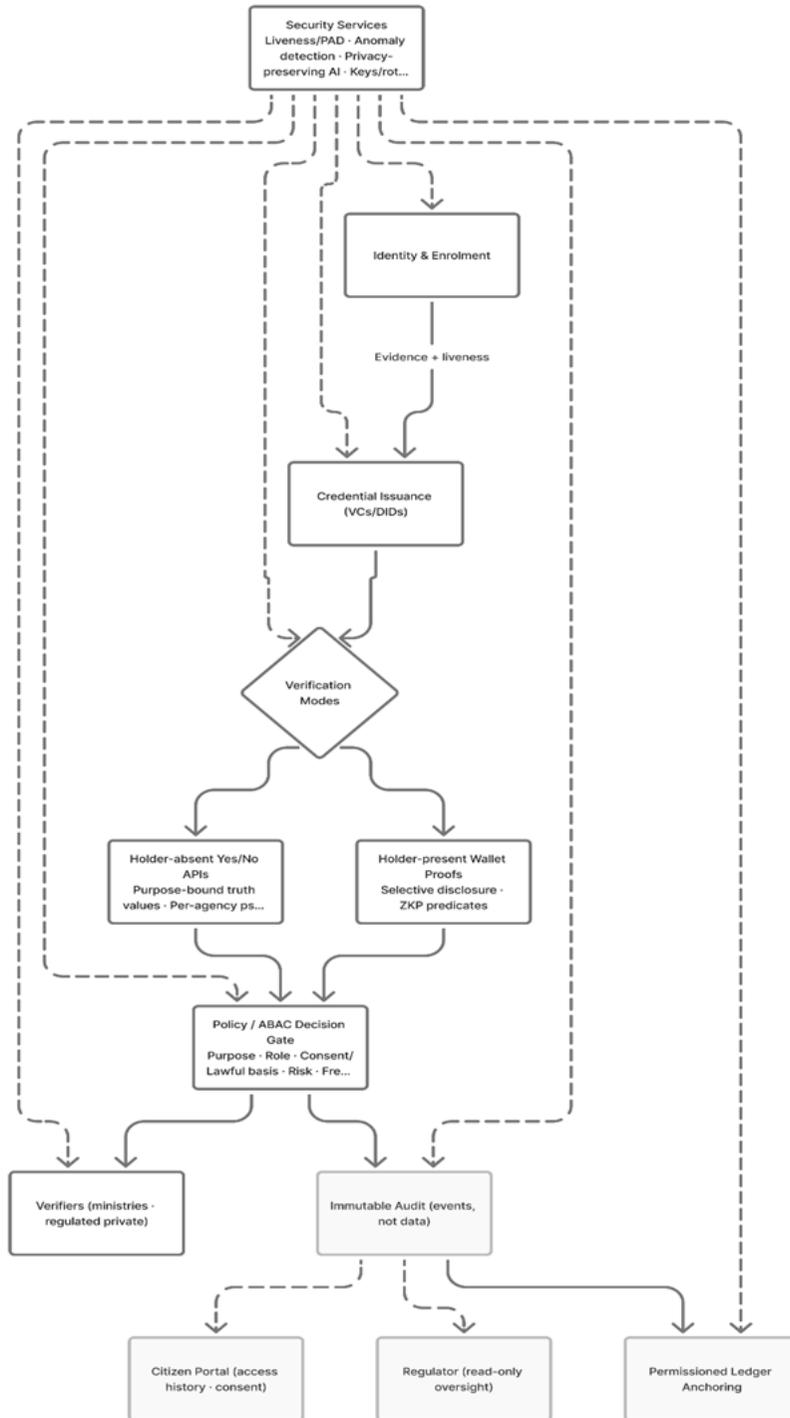


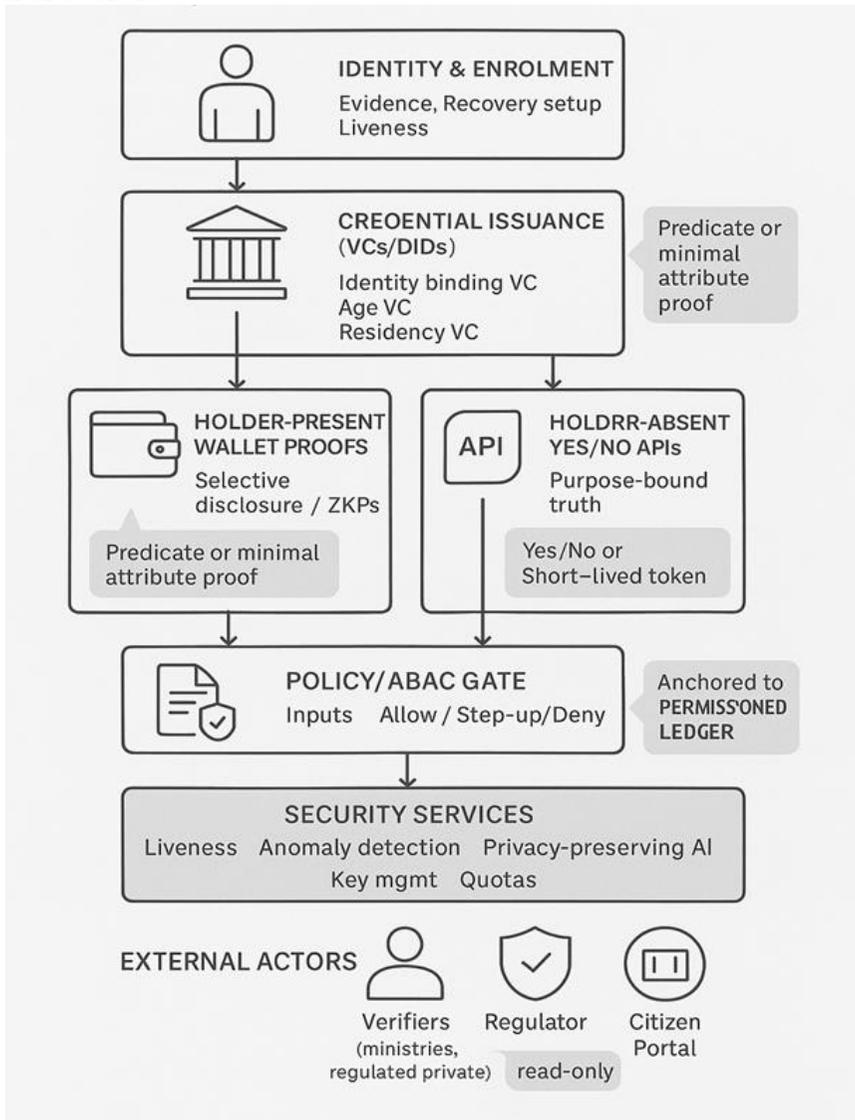
Figure: SSI-VWR Architecture Overview

A left-to-right layered view of the SSI–VWR stack showing issuance once, two verification modes (holder-present wallet predicates and holder-absent yes/no APIs), a single Policy/ABAC decision gate, immutable audit events anchored to a permissioned ledger, and security services overlaying all layers; with external read-only views for the regulator and citizen portal

Design principles

- i. Control and clarity: The person decides when to disclose; prompts explain who is asking, what will be disclosed, why, and for how long. The person can later see every access in a portal and revoke standing consents.
- ii. Inclusion and recovery: Recovery is safe and simple (guardian/assisted recovery, in-person options). Delegated authority supports carers and parents. Alternative channels (smartcards, assisted counters) ensure people without smartphones are not excluded (Dunphy & Petitcolas, 2020).
- iii. Consistency across borders: Wallet proofs interoperate across the EU through eIDAS 2.0 profiles, so users carry one experience at home and abroad (European Commission, 2024).
- iv. Minimal outputs. The routine result of a check is a yes/no or a predicate proof (e.g., “over 18” without date of birth). Rich data move only when strictly necessary.
- v. Low linkability: Per-agency pseudonyms, selective disclosure, short-lived tokens, and metadata hygiene reduce cross-domain correlation (Camenisch & Lehmann, 2021; Troncoso et al., 2020).
- vi. Measurable targets: Programmes track a minimal-disclosure ratio (share of transactions resolved with minimal outputs). A realistic target at maturity is $\geq 85\%$ (UIDAI, 2025).
- vii. Purpose limitation in code: Every request carries a purpose from a public catalogue. A policy engine maps that purpose to the smallest allowable attributes. Requests outside the map are blocked or require step-up approval with audit evidence (Campbell & Weitzner, 2022).
- viii. Data minimisation: Default minimal responses operationalise GDPR’s minimisation duty. Rich disclosures require consent or a documented legal basis, both tied to specific events in the audit (European Commission, 2024).
- ix. High-risk AI governance: Biometric uses follow EU AI Act obligations: documented risk files, testing, bias monitoring, human oversight, incident reporting (European Commission, 2024).

General overview



- a) Identity & enrolment: A person is enrolled once with strong evidence and liveness. They receive a non-meaningful national identifier, recovery options (guardian/assisted), and if they choose a regulated wallet. This prevents meaningful sequence IDs and sets up safe recovery/delegation.
- b) Credential issuance (VCs/DIDs): Authoritative bodies issue verifiable credentials to the holder's wallet: Identity Binding, Age, Residency, Licence Status. Issuers publish keys via DIDs/trust lists and attach status/revocation references so freshness can be checked without central lookups every time.

- c) Verification mode selection: Each service chooses the minimal path based on context:
 - i. Holder-present (SSI) when the person is on site or online with their wallet.
 - ii. Holder-absent (VWR) for back-office or cross-agency checks.
- d) Holder-present flow (wallet predicates / selective disclosure): The verifier sends a purpose-bound request (e.g., “age \geq 18”, “licence valid today”, “resident of M”). The wallet authenticates the requester and displays a plain-language prompt (who/what/why/how long). On approval, it produces either a predicate proof (ZKP) or the single attribute requested not a dossier. Proofs are audience-bound and time-limited; the verifier checks issuer trust, revocation freshness, audience and time, then acts on the minimal decision.
- e) Holder-absent flow (yes/no APIs): A system calls a purpose-declared yes/no endpoint: “is residency current?”, “is licence valid today?”. The call is evaluated by a zero-trust ABAC gate (purpose, role, consent or lawful basis, contextual risk, freshness policy). The registry returns only true/false or a short-lived token. No raw attributes leave the source. Subjects are represented with per-agency pseudonyms to suppress cross-domain linkability; quotas/rate limits deter scraping.
- f) Policy/ABAC decision gate (single control point): Both modes pass a common gate that outputs Allow / Step-up / Deny. Step-up can require stronger auth, supervisory co-sign, or an explicit consent artefact if richer data are requested. Requests outside the purpose catalogue are blocked or rewritten to minimal predicates.
- g) Consent and lawful overrides: Rich attributes flow only with specific, time-limited consent captured as a signed artefact and bound to the event. Rare lawful overrides (e.g., court order) are narrow in scope, time-boxed, require two-person approval, and trigger regulator alerts; where lawful and safe, the citizen is notified afterwards.
- h) Immutable audit and ledger anchoring: Every access produces an event (who, purpose, method, outcome, consent/override reference, freshness) in an append-only log. Batches are anchored to a permissioned ledger for tamper-evidence. Citizens see their own access history in a portal; regulators have full oversight dashboards. The audit stores events, not personal data.
- i) Security services overlay: Cross-cutting controls harden the fabric: biometric liveness/PAD for high-risk actions, anomaly detection on access patterns, privacy-preserving AI (federated/enclave) for fraud without centralising raw logs, strong key/crypto management, mutual auth, quotas, rate-limits, and rapid key rotation.

- j) Interoperability and performance: Wallet proofs follow W3C VC/DID and EUDI profiles; status uses cacheable lists with risk-based freshness (real-time for safety-critical, day-level for static claims). Minimal payloads keep p95 latencies in the hundreds of milliseconds; clear degradation policies (deny/retry/queue by risk) sustain national-scale operations. Programmes track a minimal-disclosure ratio KPI to prove privacy-by-default is working.

Architecture overview: SSI holder-present proofs + VWR policy/audit spine

- a) Conceptual layers
- Identity & binding: A non-meaningful national identifier is bound to the person at enrolment with strong authentication and liveness checks. Recovery and re-binding procedures are defined for loss or compromise (NIST, 2020).
 - Credential issuance: Authoritative bodies issue Verifiable Credentials (VCs) for core attributes (age, residency, licence status). Decentralised Identifiers (DIDs) and recognised trust lists make issuers discoverable and revocation verifiable (Sporny, Longley, & Chadwick, 2022).
- b) Verification modes.
- Holder-present (SSI-native): wallet-based selective disclosure and zero-knowledge proofs; no routine registry lookups.
- Holder-absent (VWR): narrow, purpose-bound yes/no checks and time-boxed tokens; dossiers are not returned (Camenisch & Lehmann, 2021; UIDAI, 2025)
- c) Policy & trust: A zero-trust control plane evaluates each request: authentication, authorisation, purpose mapping, consent/legal basis, and contextual risk. Least privilege, quotas, and step-up are normal (Allen & Hess, 2022).
- d) Integrity & audit: Every access becomes an event with who/when/why and the policy outcome. Events are chained and anchored to a permissioned ledger operated by multiple state entities and the regulator. Personal data never go on-chain (Juels & Oprea, 2020; Vukolić, 2021).
- e) Security services: End-to-end encryption, key management, liveness and behavioural assurance, anomaly detection, and privacy-preserving AI provide defence-in-depth without centralising sensitive data (Paredes-García et al., 2023; Kaul, 2021; Ren et al., 2025).

Lifecycle view

Enrolment: strong evidence capture, liveness, issuance of initial credentials, and setup of recovery paths.

Routine use: predicates and yes/no checks by default; consent prompts for richer cases; step-up for risk.

Oversight: immutable audit, regulator analytics, transparency reports; citizen visibility through a portal.

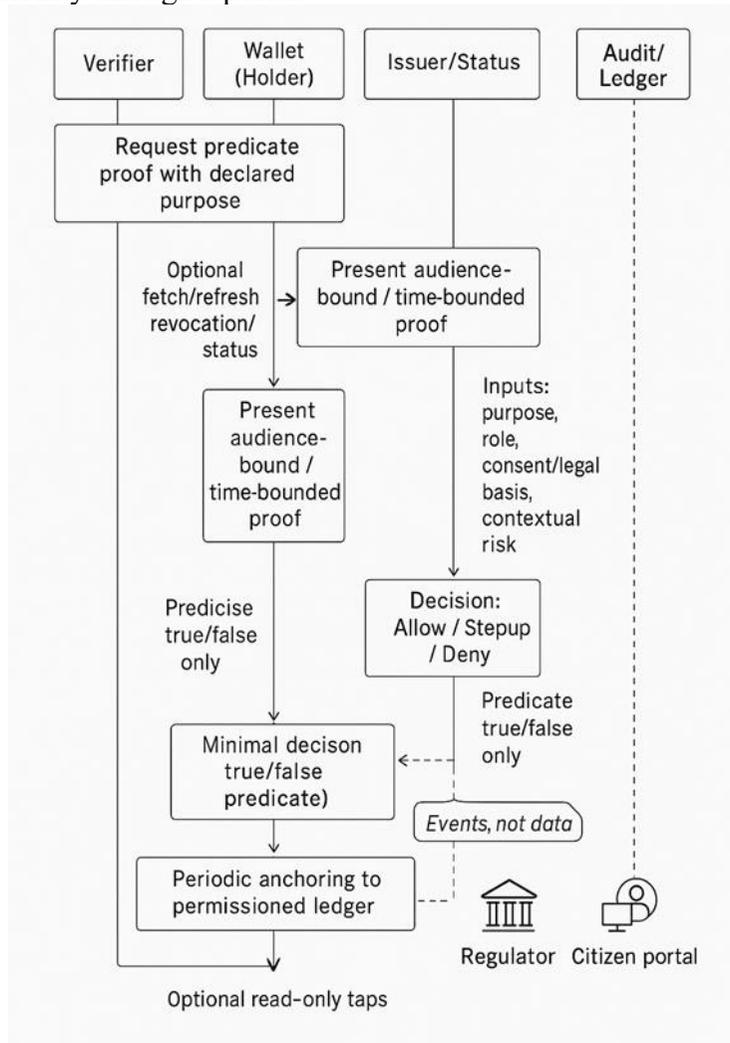


Figure: Holder-Present Selective Disclosure Flow (portrait)

The figure is a vertical swimlane diagram with five lanes Verifier, Wallet (Holder), Issuer/Status Service, Policy/ABAC Gate, and Audit/Ledger Anchor laid out top-to-bottom for A4 portrait. It depicts a complete wallet-based interaction where a person proves a fact without revealing a dossier.

From the Verifier lane, the flow begins with a predicate request carrying the declared purpose. In the Wallet lane, the holder sees a clear prompt (who is asking, what will be disclosed, purpose, and duration) and approves. The wallet refreshes revocation/status from the Issuer/Status lane if needed, then returns a presentation marked “selective disclosure / ZKP predicate.” The Verifier performs trust checks (issuer keys, status freshness, audience and time bounds) and forwards the context to the Policy/ABAC Gate, which evaluates purpose, role, consent or lawful basis, risk, and freshness policy. The gate returns Allow / Step-up / Deny. On Allow, the verifier acts on a minimal decision (true/false), not on raw attributes. The Audit/Ledger lane records an event who, purpose code, method (selective disclosure or ZKP), outcome, and any consent/override reference then shows periodic anchoring to a permissioned ledger. Visual callouts emphasise “events, not data,” “predicate truth only,” and “audience-bound, time-bound proofs.”

Holder-absent flow: APIs with consent and purpose controls

Many national processes run in the background: eligibility checks, reconciliations, cross-agency verifications. Holder-present SSI cannot cover every case. The alternative is not bulk data; it is narrow, purpose-bound questions that return minimal answers.

- a) Request discipline
 - Purpose declaration is mandatory. The request states the purpose code and method (e.g., “licence validity check for traffic enforcement”).
 - Per-agency pseudonym represents the subject so that cross-domain linking by traffic analysis is difficult.
 - Contextual risk (channel, device posture, time, location, request velocity) is part of the decision (Allen & Hess, 2022).
- b) Decision logic
 - Allow when the method is permitted for the purpose, role is appropriate, risk is low, and consent or legal basis is satisfied.
 - Step-up when risk is moderate (manager co-sign, second factor, or deferred consent).
 - Deny when purpose mapping does not allow the method, quotas are exceeded, consent is missing, or legal basis is absent.
- c) Response discipline
 - Truth value or short-lived token only. No dossiers, no long-lived identifiers.
 - Tight expiry prevents replay; single-use semantics are preferred for high-risk checks.

- No superfluous metadata (no precise device hints or unnecessary timestamps) to avoid new tracking surfaces (Wagner & Eckhoff, 2020).
- d) Consent and lawful basis: If richer data are needed, the process references a consent artefact captured earlier or a lawful basis (statutory duty, court order). Both are narrow and time-boxed, with a visible reference in the audit (European Commission, 2024).
- e) Controls against misuse
 - Quotas and rate limits per purpose and per caller prevent scraping.
 - Anomaly detection flags burst patterns, unusual geography, and method–purpose mismatches.
 - Separation of duties prevents a single insider from both elevating access and clearing logs.
- f) Interoperability and legacy: Legacy registries integrate behind the minimal interface. They answer a small set of standard questions rather than exposing raw tables. This reduces integration cost and keeps policy review tractable.

Consent, lawful overrides, and citizen visibility

- a) Consent (the default for rich disclosures)
 - Specific, informed, time-limited. The person approves a request naming the requester, purpose, field(s), and duration.
 - Bound to events. Each approval produces a verifiable reference tied to subsequent disclosures.
 - Revocable. The person can revoke standing consents; future requests must fail fast or re-prompt.
 - Accessibility. Assisted capture at counters; translated prompts; alternatives to biometrics when needed.
- b) Lawful overrides (the exception)
 - Defined in law and narrow by scope. Examples include imminent threats or court-mandated investigations.
 - Two-person rule and time-boxing. An override requires multi-party approval and automatic expiry.
 - Automatic regulator alerting. Overrides are copied to regulator dashboards; post-hoc review is mandatory.
 - Citizen notice. Where lawful and safe, affected citizens are notified after the risk window (European Commission, 2024).
- c) Citizen visibility
 - A portal shows who accessed what, when, why, and how (proof vs. yes/no), and whether consent or an override was used.
 - Exportable histories support complaints and appeals.

- Visibility shifts incentives: silent browsing becomes costly because it is seen by the citizen, the regulator, and supervisors (Dunphy & Petitcolas, 2020).

Immutable audit on permissioned ledger (events, not data)

- a) What is logged
 - Caller identity and role: Which agency, which service, which officer or system.
 - Declared purpose: The exact purpose code that justified the request.
 - Subject linkage: A per-agency pseudonym, not a global identifier.
 - Method and outcome: Predicate proof vs. yes/no; allow/deny/step-up; result of the minimal check.
 - Consent or override reference: A verifiable reference to the artefact or legal basis.
 - Risk context: Coarse signals used in the decision (e.g., “unusual time,” “quota near limit”).
- b) How integrity is protected
 - Events are written to an append-only log and hash-chained so local tampering is detectable.
 - Batches of events are periodically anchored to a permissioned ledger run by multiple state bodies and the regulator. This provides tamper-evidence and multi-party control without putting personal data on-chain (Juels & Oprea, 2020; Vukolić, 2021).
 - Independent verification. Regulator nodes verify anchors and reconcile event counts; periodic public digests strengthen accountability.
- c) Privacy of the audit
 - Events, not data. Logs contain decision metadata, not raw personal attributes.
 - Access views. Citizens see their own histories. Agencies see only their own calls. Regulators have full oversight.
 - Retention. Logs are kept for legally defined periods, then archived with integrity proofs.

Security services: liveness, anomaly detection, privacy-preserving AI

- a) Biometric liveness and presentation-attack detection
 - Where used: Enrolment, high-risk actions, recovery, and delegated authority.

- How used: Challenge–response liveness for face or voice; behaviour-based checks after login for continuity.
- Data handling: Templates held on device where possible; if server-side, they are processed in secure environments and not retained as raw media (Paredes-García et al., 2023; NIST, 2020).
- b) Anomaly detection on the access fabric
 - Signals monitored: Request velocity, unusual times or geographies, purpose–method mismatches, repeated denials followed by sudden approval, and clustering of overrides.
 - Actions taken: Step-up for medium risk, temporary blocks for high risk, and alerts to supervisors and regulators for investigation.
- c) Privacy-preserving AI for fraud and misuse
 - Federated learning: Agencies train models locally on their logs; an aggregator computes robust updates without centralising raw data (Ren et al., 2025).
 - Encrypted or enclave-based inference: For sensitive features, scoring happens without exposing inputs.
 - Bias governance: Error-rate gaps are tested before deployment and monitored in production; there are human appeal routes and rollback paths for problematic models (European Commission, 2024).
- d) Zero-trust hardening around everything
 - Mutual authentication between agencies; strong request signing; replay protection.
 - Least privilege enforced by purpose maps; quotas and rate limits per purpose and per caller.
 - Separation of duties so no single person can both change policy and consume data.
 - Rapid key rotation and revocation to contain compromise (Allen & Hess, 2022).
- e) Performance and reliability expectations
 - Latency budgets: ≤ 300 ms p95 for domestic minimal checks; ≤ 600 ms cross-border.
 - Audit completeness: 100% of accesses recorded; anchoring within a few minutes.
 - Availability: Degradation modes prefer deny-by-default for high-risk requests and retry for lower-risk ones with operator guidance (UIDAI, 2025).

- f) Threats and corresponding mitigations
 - Insider “surfing”: ABAC on every call, immutable audit, quotas, anomaly alerts, sanctions.
 - Deepfakes and replay: Liveness, challenge-response, multi-factor step-up, regular model refresh.
 - Linkability creep: Per-agency pseudonyms, rotating tokens, minimal metadata, predicate proofs.
 - Ledger tampering: Multi-party consensus, independent regulator nodes, periodic public digests.
 - Model poisoning: Update validation and rollback in federated training; provenance tracking for model artefacts (Vukolić, 2021; Ren et al., 2025).

How the SSI–VWR Framework Works

- A. Core mechanics problem solved, step by step
 - i. Identity & binding without surveillance creep: A non-meaningful national identifier is issued and bound to the person at enrolment with strong evidence and liveness checks. This avoids meaningful, sequential numbers that leak demographics, and sets up safe recovery so people are not locked out (NIST, 2020).
 - ii. Authoritative credentials held by the person (SSI): Government authorities issue verifiable credentials (VCs) for identity binding, age, residency, licence status, etc. The person holds them in a regulated wallet and decides when to disclose turning “check my data” into “prove a fact” (Sporny, Longley, & Chadwick, 2022; Preukschat & Reed, 2021).
 - iii. Minimal disclosure by default two complementary paths:
 - Holder-present: the wallet presents selective disclosure or zero-knowledge proofs so the verifier learns only the predicate (e.g., “over 18,” “licence valid today”) and not a dossier (Camenisch & Lehmann, 2021).
 - Holder-absent: back-office systems call yes/no attribute endpoints (e.g., “is residency current in municipality X?”), returning a truth value or short-lived token never full records (UIDAI, 2025).
 - iv. Purpose limitation implemented in code (zero-trust): Every request carries a purpose code from a public catalogue. An ABAC policy engine evaluates purpose, role, consent or legal basis, and contextual risk (time, location, velocity) before allowing or denying the call (Allen & Hess, 2022; Campbell & Weitzner, 2022).
 - v. Linkability suppressed at the root: The same person appears as different per-agency pseudonyms derived from the national identifier and an agency salt. Responses strip non-essential metadata and use

- short-lived tokens, so cross-domain correlation is hard even for insiders (Troncoso et al., 2020; Camenisch & Lehmann, 2021).
- vi. Consent for rich data; narrow lawful overrides for emergencies: Routine checks proceed with minimal outputs. Rich fields (e.g., address string) need explicit, time-limited consent captured as a verifiable artefact; lawful overrides are rare, time-boxed, co-approved, and auto-notified to the regulator (European Commission, 2024).
 - vii. Immutable accountability without exposing personal data: Every access becomes an event who, when, declared purpose, method (proof vs yes/no), policy outcome anchored to a permissioned ledger operated by multiple state entities and the regulator. Logs store events, not raw attributes; citizens can see their own history; regulators can investigate anomalies (Juels & Oprea, 2020; Vukolić, 2021; Dunphy & Petitcolas, 2020).
 - viii. Security and AI with restraint: Biometric liveness is used for enrolment, recovery, and high-risk actions; templates stay on-device where possible. Access-pattern anomaly detection runs with privacy-preserving methods (federated learning, encrypted inference), and high-risk AI follows EU AI Act governance with bias monitoring and human appeal routes (Paredes-García et al., 2023; European Commission, 2024; Ren et al., 2025).
 - ix. Performance & migration that work at national scale: Predicate proofs and yes/no checks are compact, cacheable, and meet tight latency SLOs (p95 hundreds of ms). Migration is phased: add immutable audit to legacy interfaces, switch high-volume use cases to minimal endpoints, roll out wallet proofs, retire bulk exports keeping services running while privacy improves (UIDAI, 2025; European Commission, 2024).

B. Case verifying a person's identity and residency in the framework

A resident applies for a welfare benefit at a municipal office. The authority must confirm (i) the person is the rightful holder of the national identity, and (ii) the person currently resides in the municipality. Surveillance risks to avoid: revealing full birth date and address to front-line staff, cross-agency “surfing,” and silent dossier copies.

- i. At the counter (holder-present, SSI): The officer's screen shows purpose = WELFARE_ENROLMENT and requests two wallet proofs: identity binding and municipal residency. The holder approves. The wallet returns a cryptographic presentation that proves binding to the state-issued identity and a residency predicate (“residentOf = Municipality M”) no birth date, no full address. The verifier checks issuer authenticity, revocation, time bounds, and audience binding.

Both proofs verify, so the case proceeds without looking up back-end registries (Camenisch & Lehmann, 2021; Sporny, Longley, & Chadwick, 2022).

- ii. That night (holder-absent, VWR yes/no): The case system performs a batch yes/no re-check: “Is residency still within Municipality M for purpose WELFARE_PAYMENT?” ABAC evaluates role, purpose, existing consent artefact from enrolment (or statutory basis), and contextual risk. The civil registry returns true with a short-lived token. No address string is exposed; the token suffices to authorise payment routing (Allen & Hess, 2022).
- iii. Rare exception (rich data with consent): If a delivery vendor needs the address line to drop equipment at home, the agency triggers a clear consent prompt naming the requester, field, purpose, and retention period. On approval, only the address field is released as a signed attribute bundle; retention is short and enforced. If consent is refused or expires, access stops. This keeps rich data exceptional and traceable (European Commission, 2024).
- iv. Emergency edge case (lawful override): If a court later mandates an urgent address disclosure for a criminal investigation, an override is registered with scope and timebox, co-approved by two officers, and auto-alerted to the regulator. The disclosure is narrow and expires quickly. Where lawful and safe, the resident is notified after the risk window. Overrides are visible, not backdoors (European Commission, 2024; Dunphy & Petitcolas, 2020).
- v. Accountability and deterrence throughout: Each action above two wallet proofs, one yes/no re-check, and any consented or overridden disclosure is logged as a separate audit event with purpose, method, and decision. Events are anchored to the permissioned ledger. The resident later opens their portal and sees the exact sequence in plain language; the regulator sees population-level patterns and anomalies. This visibility deters “surfing” and enables sanctions where needed (Juels & Oprea, 2020; Vukolić, 2021).

6. Implementation Blueprint

This blueprint turns the SSI–VWR theory into an operational plan that ministries and regulated verifiers can deploy without halting existing services. It focuses on small, stable interfaces, policy baked into runtime, immutable accountability, and measurable gates that prove privacy-by-default is working at national scale (Allen & Hess, 2022; European Commission, 2024; Dunphy & Petitcolas, 2020).

Reference interfaces for minimal verification

The platform exposes a compact set of canonical questions that cover most government and regulated use. These questions are intentionally narrow and map one-to-one to legal purposes.

- Predicate checks: over-18, over-65, licence-valid-today, residency-in-municipality, identity-binding-valid, name-matches-for-bank-account. Each call returns a truth value or a short-lived transaction token. The token exists only to let a downstream step confirm that the check was done; it expires rapidly and cannot be used for tracking (UIDAI, 2025; Allen & Hess, 2022).
- Selective disclosure presentations: for holder-present cases, verifiers ask the wallet to prove a predicate or reveal a single attribute, never an entire dossier. The verifier validates issuer trust, revocation status, time bounds, and audience binding before acting (Camenisch & Lehmann, 2021; Sporny, Longley, & Chadwick, 2022).
- Richer attributes by exception: when a specific field (for example, an address line) is unavoidable, the platform requires a verifiable consent artefact or a documented lawful basis tied to the event and visible in audit (European Commission, 2024).

These interfaces are documented with plain-language semantics (what question is being asked, which purpose allows it, what the possible outcomes are), error-handling rules aligned to risk (deny, retry, or queue), and freshness targets per attribute (for example, licence status must be real-time; age-over can be day-old) (Allen & Hess, 2022).

Data models and identity hygiene

The blueprint assumes a non-meaningful national identifier bound to the person at enrolment through strong evidence and liveness. No birth date, region code, or sequence leaks from the identifier. For holder-absent checks, the platform derives a per-agency pseudonym so that the same person appears differently to different agencies; this is deterministic within an agency and rotates on policy schedule to suppress linkability (Camenisch & Lehmann, 2021; Troncoso et al., 2020). Credentials are issued as Verifiable Credentials (VC 2.0) with thin, well-scoped schemas: AgeCredential, Residency Credential, License Status Credential, and Identity Binding Credential. Each schema includes a status or revocation reference, an issuance timestamp, and assurance notes that explain how identity was established and what liveness was used at enrolment, without exposing raw biometrics. Schemas are versioned and deprecation is coordinated through a public change calendar so wallets and verifiers stay in lockstep (Sporny, Longley, & Chadwick, 2022; European Commission, 2024). The purpose catalogue is a first-class artefact.

Each purpose has a human-readable description, the minimal attributes or predicates it permits, the lawful bases that can justify a request, retention limits, and escalation paths for overrides. The catalogue is published and versioned; every change is reviewed by policy, security, and the regulator to avoid purpose creep (Campbell & Weitzner, 2022).

Policy-as-code and zero-trust enforcement

Every request wallet proof or yes/no check passes through a decision point that evaluates: declared purpose; caller identity and role; consent or lawful basis state; contextual risk (time, location, device posture, request velocity); and freshness of status information. Outcomes are allow, deny, or step-up (extra authentication or supervisory co-approval). This is zero-trust in practice: no implicit internal trust, and least privilege by default (Allen & Hess, 2022).

- Purpose–method matrix that blocks any method not mapped to the purpose; requests for dossiers are refused or automatically rewritten into predicates where feasible.
- Quotas and rate limits per purpose, per caller, and per organisational unit to deter scraping and catch automation gone wrong.
- Contextual risk scoring that raises friction in suspicious contexts (e.g., sudden bursts at night from an unusual location), with clear operator guidance and appeal paths.
- Separation of duties so no one actor can both change policy and consume data; administrative actions are logged and independently reviewed.

Policy is stored in a repository with peer review, automated tests for regressions, and a canary rollout path, so changes are traceable and reversible (Campbell & Weitzner, 2022).

Wallet and verifier experience

Wallet UX is the instrument that makes minimisation normal. Prompts must tell the user who is asking, what will be disclosed (predicate or attribute), for what stated purpose, and for how long approval lasts. Approvals are time-limited and revocable; a single tap shows past approvals and lets the user withdraw standing consent. Delegation is built in for carers and parents, with time-boxed authority and easy revocation (Dunphy & Petitcolas, 2020). Verifier UX is designed to make the minimal path the easiest path. For holder-present flows, the default is to ask the wallet for a predicate or a single attribute; for back-office flows, the default is a yes/no check tied to a purpose. UI and SDKs warn when a request exceeds what the purpose allows and explain lawful alternatives (for example, “request licence-valid predicate

instead of full licence record”). Staff training uses realistic scenarios and emphasises that requesting more creates legal risk and slows the case (Allen & Hess, 2022; European Commission, 2024). Citizen portal turns accountability into something people can see. Each access appears in plain language with who/when/why/how, including whether consent or an override was used. Exports support complaints and discovery. Accessibility requirements are applied to both wallet and portal so that disability, language, and bandwidth do not exclude users (Dunphy & Petitcolas, 2020).

Immutable audit and regulator visibility

All accesses are written as events that include the caller identity and role, the declared purpose, the subject’s per-agency pseudonym, the method used (wallet predicate, wallet attribute, yes/no check), the policy outcome (allow/deny/step-up), and references to any consent artefact or lawful override. Events are hash-chained locally for order and integrity, then anchored periodically to a permissioned ledger operated by multiple state entities and the regulator. The ledger contains only integrity metadata, not personal data, which preserves privacy while making tampering evident (Juels & Oprea, 2020; Vukolić, 2021). The regulator runs independent nodes, receives automatic alerts on overrides, quota breaches, and anomaly clusters, and publishes quarterly transparency reports: minimal-disclosure ratio; override counts and justifications; fairness and error metrics for any high-risk AI; and corrective actions taken. Agencies receive their own dashboards for internal supervision. Citizens can verify inclusion of their own events via the portal without needing to understand the underlying cryptography (European Commission, 2024; Dunphy & Petitcolas, 2020).

Security services, assurance, and performance targets

Key and channel security rely on mutual authentication between agencies, strong request signing, replay protection, rapid key rotation, and strict logging of administrative actions. Biometric liveness is used at enrolment, recovery, and high-risk actions; templates are kept on device where possible, with server-side processing isolated and non-retentive when necessary (NIST, 2020; Paredes-García et al., 2023). Anomaly detection watches the access fabric for burst patterns, time–location anomalies, method–purpose mismatches, and suspicious sequences (e.g., repeated denials followed by a sudden approval). To protect privacy, models are trained with federated learning or use encrypted/enclave inference where sensitivity warrants it; models are governed under the EU AI Act with risk files, bias testing, human oversight, and rollback procedures (European Commission, 2024; Ren et al., 2025; Kaul, 2021). SLOs keep the system usable at scale: p95 latency of ≤ 300 ms for domestic yes/no checks and ≤ 600 ms cross-border;

100% audit coverage with anchoring within minutes; transparent error handling that prefers deny-by-default for high-risk requests and safe retries for low-risk ones. Caching of revocation and issuer trust data, idempotent request semantics, and circuit breakers on registries maintain service during spikes. Minimal-disclosure ratio is tracked as a primary KPI with a maturity target of $\geq 85\%$ of transactions resolved via predicates or yes/no responses (UIDAI, 2025; Allen & Hess, 2022).

7. Case Studies and Mapping to SSI-VWR

Estonia: transparency, separated registries, and integrity anchoring

Estonia shows that digital government can be fast without becoming a surveillance system. The state connects many sector registries through a secure exchange layer, but it does not expose a single super-database to every clerk. Each query is authenticated, checked against policy, and written to an audit trail that citizens and supervisors can read. People can log in and see which agency looked up which record and when. Log integrity is protected with cryptographic anchoring so that neither an insider nor an attacker can silently edit the past (Dunphy & Petitcolas, 2020). This design maps closely to the SSI-VWR framework. The holder-present path is visible in services that accept signed attributes and avoid fresh database pulls when a credential suffices. The holder-absent path appears in narrow back-office checks that return only what a legal purpose allows. The purpose catalogue is implicit in Estonia's service-by-service access rules, and immutable audit aligns with the framework's ledger-based tamper evidence. The remaining gap is selective disclosure at scale across all sectors. SSI adds that capability with wallet-based predicate proofs, reducing the need for staff to view full records even when the citizen is present. The lesson for other states is simple. Separate the registries, make every access visible, and move routine interactions to minimal proofs; trust grows because accountability is a daily experience, not a promise (Dunphy & Petitcolas, 2020).

European Union wallet pilots: selective disclosure and cross-border scale

The European Digital Identity Wallet turns the privacy rule of data minimisation into a user routine. A person proves a fact age over a threshold, licence valid, university status without handing over a dossier. Verifiers check cryptographic proofs against recognised issuers and revocation sources that are shared across borders. Early pilots show that the same wallet flow can work in another member state with no bespoke integration, which is essential for labour mobility, study, and travel (European Commission, 2024). This is the holder-present pillar of SSI-VWR. The mapping is direct. Wallet prompts explain purpose in plain language. Predicate proofs reveal only the truth needed. Revocation freshness is tuned to risk so verifiers do not stall. The

framework extends the pilots by adding two elements. First, a back-office yes/no path for holder-absent checks that mirrors the same minimal logic under zero-trust policy. Second, a public purpose catalogue and policy-as-code that make minimisation enforceable for developers. Together they prevent drift back to dossier pulls as services expand, and they give regulators a way to test compliance across many agencies. The grand outcome is interoperability with restraint: proofs travel, but dossiers do not, and every exceptional access is tied to consent or a specific lawful basis that appears in the audit (European Commission, 2024).

Zug, Switzerland: municipal SSI and citizen control

Zug's municipal pilot proved that government-issued credentials can live in a citizen wallet and still deliver assurance. The city attested to residency; people used a wallet to prove that fact for local services without a fresh registry lookup each time. The pilot was modest in scale, but it showed two important things. First, selective disclosure can handle routine administration without exposing extra fields. Second, citizens accept digital flows when prompts are clear and recovery is practical (Dunphy & Petitcolas, 2020). In SSI-VWR terms this is the holder-present path working as intended. The missing pieces for national scale policy enforcement, ledger-anchored audit, and yes/no back-office checks are what VWR supplies. The mapping therefore suggests a path for municipalities and agencies: start with wallet-based proofs for the person-facing parts of a service, wrap legacy access with immutable audit, and convert background checks to narrow yes/no calls bound to a published purpose. The result is consistent behaviour across channels and levels of government, with one access history that a citizen can read.

Comparative lessons and the framework's fit

Across these contexts a pattern emerges. Adoption rises when convenience and control move together. Estonia's access history portal is as important as its cryptography. EU wallet prompts make selective disclosure normal. Aadhaar's yes/no checks keep lines short while consented e-KYC handles exceptions. Zug's wallet gives people visible control over disclosure. The SSI-VWR framework collects these elements into one deployable plan. It adds per-agency pseudonyms to suppress linkability, policy-as-code to turn purpose limitation into runtime behaviour, and permissioned-ledger anchoring so audit trails are tamper-evident and reviewable by regulators and citizens (Dunphy & Petitcolas, 2020; European Commission, 2024; UIDAI, 2025). It also addresses the pitfalls seen in practice. Over-centralised designs invite silent browsing; the framework answers with zero-trust decisions on every call and quotas that deter scraping. Weak logging allows disputes to devolve into opinion; the framework answers with immutable events and public

transparency reports. Centralised biometrics create high stakes breaches; the framework keeps templates on device where possible and uses liveness and privacy-preserving AI with bias governance to maintain assurance without building new data pools (Paredes-García et al., 2023). Finally, the framework offers a phased migration that matches institutional capacity: audit first, minimal yes/no checks next, wallet proofs at the edge, and retirement of bulk interfaces last. In short, these case studies do not just inspire the design; they validate that its parts work in the real world and show how to combine them to reduce unconsented disclosure, stop cross-agency surfing, and keep national services fast, lawful, and trusted.

8. Evaluation and Risk

Implementation Limitations While the SSI-VWR framework provides a robust technical blueprint, its successful deployment is subject to several practical constraints. Institutional readiness poses a primary challenge, as transitioning from legacy "dossier-based" systems to a "policy-as-code" environment requires significant upgrades to administrative capacity and the recruitment of specialized personnel, such as policy engineers, to manage the purpose catalogue. User adoption also remains contingent on digital literacy; the framework must ensure that recovery paths and delegated consent models are intuitive enough for those without high-end smartphones or technical expertise. The SSI-VWR design measurably reduces attack surface by removing routine dossier pulls and replacing them with predicate proofs or yes/no checks. Security gains appear in three places. First, data minimisation lowers breach impact because fewer attributes traverse networks or sit in verifier systems. Second, zero-trust evaluation on every call collapses the old perimeter model; abuse now requires defeating a decision point that binds purpose, role, consent/legal basis, and contextual risk (Allen & Hess, 2022). Third, immutable audit raises the cost of insider misuse because every access is verifiably recorded and regulator-visible (Juels & Oprea, 2020; Vukolić, 2021). Programmes should track (i) the rate of blocked requests due to purpose mismatch, (ii) time to detect and contain insider anomalies, and (iii) blast-radius metrics average number of attributes exposed per incident expecting steady decline as minimal responses dominate (European Commission, 2024). **Privacy.** Privacy outcomes hinge on two measurable effects. The first is the Minimal-Disclosure Ratio (MDR) the share of all identity transactions resolved with a predicate proof or yes/no answer. The target in national steady state is $\geq 85\%$, with critical sectors (licensing, border, welfare eligibility) exceeding 90% (UIDAI, 2025). The second is cross-domain linkability. SSI-VWR suppresses it through holder-present proofs that avoid stable identifiers and holder-absent per-agency pseudonyms derived from a non-meaningful national identifier; responses strip non-essential metadata and use short-lived

tokens, which reduces long-term correlation (Camenisch & Lehmann, 2021; Troncoso et al., 2020). Insider “surfing.” The classic risk is broad staff browsing under vague role permissions. Mitigation is structural: every access is purpose-bound and ABAC-evaluated; quotas and rate limits apply per purpose and per caller; events are ledger-anchored and regulator-visible. Sanctions and public transparency reports sustain deterrence (Allen & Hess, 2022; Juels & Oprea, 2020). Linkability through metadata. Even minimal proofs can leak patterns if stable identifiers or rich metadata persist. Mitigation is per-agency pseudonyms, rotating tokens, coarse timing in non-critical responses, and periodic privacy reviews that test real-world linkability using audit telemetry (Camenisch & Lehmann, 2021; Troncoso et al., 2020). Biometric spoofing and capture risk. Presentation attacks (photos, replays, deepfakes) and poor capture conditions can defeat naive systems or exclude users. Mitigations are challenge–response liveness, device-side templates where feasible, secure execution for server-side matching, documented fallback paths (e.g., possession + knowledge or assisted in-person recovery), and ongoing model refresh with red-team drills (NIST, 2020; Paredes-García et al., 2023). Model bias and drift. Liveness and anomaly models can underperform for some groups or decay over time. Mitigations include curation of diverse training data, pre-deployment fairness tests, runtime drift alarms, and human oversight for contested decisions, as codified by the AI Act (European Commission, 2024).

Conclusion

This article has argued that national identity can be both fast and private when Self-Sovereign Identity (SSI) is reinforced by a Verify-Without-Reveal (VWR) enforcement spine. The core shift is from dossiers to decisions. Holder-present interactions rely on wallet-based selective disclosure and zero-knowledge proofs, so verifiers learn only what is necessary to act typically a predicate such as “over 18” or “licence valid” without exposing birth dates, addresses, or static identifiers (Camenisch & Lehmann, 2021; Sporny, Longley, & Chadwick, 2022). Holder-absent interactions replace broad queries with purpose-bound yes/no checks that return truth values or short-lived tokens and nothing more. Every access, in both modes, is evaluated by zero-trust policy encoded in a public purpose catalogue and recorded as an immutable event whose integrity is anchored by a permissioned ledger, giving regulators and citizens verifiable visibility without placing personal data on chain (Allen & Hess, 2022; Juels & Oprea, 2020; Vukolić, 2021). Together, these elements suppress unconsented disclosure, deter cross-agency “surfing,” reduce linkability through per-agency pseudonyms and metadata hygiene, and keep latency low enough for national workloads. They also transform legal duties into default behaviour: data minimisation and purpose limitation

become the ordinary outputs of interfaces; consent and lawful overrides become auditable artefacts; and high-risk AI in biometrics and anomaly detection is governed through testing, documentation, drift monitoring, and human oversight in line with the EU AI Act (European Commission, 2024; Paredes-García et al., 2023). SSI provides the means to prove facts without revealing dossiers; VWR supplies the discipline that makes minimal disclosure, purpose checks, and immutable accountability routine also when the person is not present. When combined with transparent governance and inclusion by design, the result is a national identity fabric that people can use with confidence, regulators can supervise with evidence, and engineers can operate at scale. The practical task ahead is straightforward: implement the phased plan, measure the right things, publish what you learn, and iterate. Done well, verify-without-reveal becomes the normal way identity is used in government and regulated markets stronger assurance with less exposure, backed by proofs the public can see (European Commission, 2024; Allen & Hess, 2022; Dunphy & Petitcolas, 2020).

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Values Versus Constraints: Unpacking the Sustainable Consumption Paradox in Modest Fashion Among Gen Z in Bangladesh

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Abstract

Background: With the increasing environmental and ethical challenges that the fashion industry faces, sustainable consumption has become a defining point of concern. This paper is a research into the mismatch between the increased awareness and real-world sustainable buying activities among Generation Z and how modest fashion, sustainability, and consumer attitudes of young customers are influenced.

Methods: Mixed-method research was conducted on modest fashion among Generation Z students in Bangladesh. The researchers used a combination of quantitative surveys and qualitative open-ended responses, using a framework on which awareness, attitudes, and practices were measured at a single time point. Convenience Sampling was used to select the participants as university students of Bangladesh, where Gen Z, aged 18 -29, who purchase or even consider modest apparel, so as to include a wide range of gender, socioeconomic, and academic backgrounds, 48 students answered the questionnaire. The questionnaire contained Likert questions about demographics, purchasing frequency, knowledge, motivations, barriers, and social -media influence, as well as open-ended questions on the expectations of the brand and sustainability incentives. Descriptive statistics and correlation were created by SPSS and thematic analysis was used to identify trends in values, constraints and aspirations in the background of consumption behaviour.

Results: Results indicate that 77.1% of the participants were familiar with the concept of sustainable fashion, but there was a strong attitudinal-behaviour gap. In particular, 64.6% of the participants mentioned personal style as the main motivation of modest fashion, with only a small proportion of those who always performed sustainable purchases. The correlation analysis demonstrates that there is a moderate positive correlation between the awareness of sustainable fashion and the actual sustainable behaviour among the Gen Z modest fashion consumers ($r = 0.384$, $p = 0.007$). It implies that sustainability-aware individuals will more likely make sustainable decisions, including making purchases of environmentally friendly products, purchasing second-hand, or mending clothes. The information thus highlights a serious gap between knowledge and action that must be closed through concerted action among the stakeholders, increased consumer education, facilitation, and innovation of the industry to close the gap.

Conclusion: The study provides practical information and can be used to promote a change towards ethical behavior in the modest fashion industry and the wider market by explaining the major drivers, obstacles, and anticipations of Gen Z buyers in their purchasing patterns. These findings imply the incorporation of digital platforms, open supply stores, and peer-driven campaigns to enhance the influence of Gen Z on sustainable consumption in all world markets.

Keywords: Modest fashion, Sustainability, Generation Z, Awareness and Practice

Introduction

Over the past few years, the fashion sector has undergone increasing criticism of its environmental impact and social obligations and is increasingly moving toward sustainability among consumers, brands, and policymakers. The sector is generally perceived to be the second-largest source of environmental pollution across the globe, and its effect continues to increase along with the industry (Jia et al., 2020). Statistics published in 2015 showed that the fashion sector produced an unbelievable amount of textile waste, amounting to 92 million tonnes, with the number expected to rise by 60 % by 2030 (UNECE, 2018). Besides, UNECE (2018) also noted that 85 % textiles are disposed of annually, with most of them going to landfills or being burned (Zhang et al., 2023). Such negative implications have forced the industry to reconsider the approach to its business and find alternatives to the fast-fashion paradigm (Alfauzy & Nita, 2021a). Burdens on the environment become substantial at all levels of the apparel life cycle, the cultivation of fibres, the processing of textiles, dyeing and printing, distribution, and the end-of-life disposal (Liu, 2022; Hill & Lee, 2012). The supply chain of moving clothes

between the factory and the retail store turns out to create a significant carbon footprint, and the consumer behaviour of younger groups of consumers, including shifting trends, constant newness, and garment life cycles, has been associated with short clothes (Escourido-Calvo et al., 2025a). To most young people, clothing serves as a source of self-identification as well as social identification and identification, which social support and supports the need to constantly update their wardrobes (Barnes-Lea-Greenwood, 2010). Generation Z, which was born around the middle of the 1990s up to the beginning of the 2010s, reflects this transition with an extreme inclination towards environmentally responsible behavior, social awareness, and technological mastery. Recent e-commerce studies have recorded their shift in traditional clothes to modest fashion, which complies with the religious, cultural, or individual modesty standards (Evaluating Fashion E-Commerce Website Effectiveness for Relationship Marketing, 2024). Modest fashion has become a trend of the global scale, which combines inclusivity, sustainability, and self-expression, finding its reflection among Muslim consumers as well as growing in different cultural settings. As a result, the modest-fashion market can be viewed as a cultural identity as well as a symbol of the wider values that prompt consumers of the modern age to become more responsible and ethically oriented in their buying decisions. This type of consumer activity has led stakeholders in the industry to invest in circular business practices, such as garment recycling and up-cycling projects which seek to minimize waste and emissions. Clear supply-chain monitoring, where customers can confirm ethical statements, and create confidence in sustainable brands towards long-term sustainability. Brands are further encouraged to incorporate environmental metrics in planning as a result of policy interventions, including the extended-producer-responsibility laws and sustainability reporting policies.

Naturally, the modest fashion market is a relatively small market in the global fashion sector, which has a comparatively large number of consumers, which in turn persistently grow throughout the 21st century, though recent research shows that the percentage of Muslims in the world fashion consumption is merely around 11 of the total spending on fashion worldwide, a figure that presents the inherent economic seriousness of the given segment, though despite the observed commercial dynamism, the academic literature that deals with the intersection of modest fashion and sustainability is relatively thin, especially in relation to consumer behaviour, even as the application of sustainable fashion in In this conceptual framework, Gálvez-Sanchez et al. (2024) argue that it is urgent to understand how socially conscious practices affect current and potential consumers during times of uncertainty because this knowledge can trigger a change in the fashion industry to be more responsive to rapidly changing social, economic, and

environmental environments, and it is also necessary to question how such practices are reflected in actual purchasing behaviour an exercise that has remained largely ignored in the existing body of literature on modest fashion. The fashion aspect of culture that can be used to express who one is is especially relevant in the context of modest fashion, where clothing is not only expected to keep the wearer decent but also provide an expression of a reserved image that tends to be socially appropriate (religiously and culturally) (Indarti and Peng, 2017) (Hassan and Harun, 2016).

This dual role of social signalling through fashion codes and self-disclosure has been emphasised by Cardoso et al. (2010) who believe that clothing acts as a symbol A blend of the modern fashion movements and religious beliefs has led to the rapid growth of modest wear among the young women, especially in Asia and e-commerce has played a key role in the expansion of the market size, especially in the countries of Southeast Asia like Bangladesh, Malaysia, and Indonesia which have seen unprecedented growth of the market size and consumption rate accelerated by online mediums (Hanzaee and Chitsaz, 2011). Against this backdrop, the small fashion industry is not only a niche business, but an expansive space that draws substantial investment as well as strategic interest by multinational corporations, a trend that is being increasingly shortlisted by special collections catering to the Islamic market by the fashion houses of H&M, Zara, Uniqlo, Tommy Hilfiger, and Dolce & Gabbana; a trend that is growing inclusive of the larger interests of corporate sustainability (Gauthier & Martikainen, 2020). The combination of such dynamics: the importance of global markets, consumer behavioural ambivalence, cultural identity politics, and corporate engagement, makes it an interesting research imperative to examine to what extent sustainable consumption behaviours are expressed in the Muslim fashion setting as part of Generation Z, a generation that is both an aspirational exercise in environmental stewardship and a symbol of conspicuous consumption.

Additionally, the increased focus on the sustainability issues of the fashion industry makes the subtle analysis of how the knowledge about sustainable practices is converted into consumer behavior essential, especially in the segment where the concepts of modesty, religious following, and modernity are merged. This gap must be filled using methodological rigor that combines quantitative and qualitative data on the evaluation of purchasing patterns and qualitative information on the motivational force, which will provide a comprehensive view of the processes that lead to the overlap of sustainable and modest fashion. Finally, scholarship in this field will not only shed light on the socio-economic and environmental consequences of modest fashion but also influence policy and industry practice to help the stakeholders develop interventions that balance consumer desire with sustainable

manufacturing, as well as to create a more culturally and ecologically sustainable fashion ecosystem.

The increasing interest in sustainable consumption in the fashion sector has become one of the critical subjects of research in the scholarly community and industry practice in particular, particularly in the context of Generation Z, a generation characterized by progressive values and a high level of mastery of digital technologies (McNeill and Moore, 2015). Empirical research has continuously reported the increased attention to environmental and ethical aspects of clothes in Gen Z, which perceives the growing interest in eco-friendly and ethically manufactured products (McNeill and Moore, 2015). As a strategic solution to the growing societal and environmental pressures intensified by the influence of fast-fashion dynamics, sustainable fashion provides consumers with an ethically sound option of purchasing a product, which at the same time fulfils the cultural role of fashion as an identity marker (Johnstone & Tan, 2015). However, there is always an existing attitudinal-behaviour gap that adversely affects the transformation of environmental awareness into tangible consumer behaviour (Johnstone & Tan, 2015). Although the literature outlines large-scale consumer tendencies, it omnipresently overlooks the small fashion industry, a fast-growing world market that is informed by religious, cultural, and personal identity demands.

Application of sustainability practices in the modest apparel industry is a topic that has not been studied enough, and yet it is evident that the people who are following the modest fashion can have strong ethical beliefs that overlap with the foundations of sustainability. The contemporary conversation on modest fashion often overlooks such crucial aspects of the product as its availability, affordability, and inclusive design and makes it a peripheral topic in the larger conversation of sustainability. Besides, the overlapping points of the cultural regiment of modesty with sustainability models have not been adequately examined; these constructs have tended to be viewed as opposing variables in earlier research but they might intersect or contradict each other in their impact on Gen Z purchasing behaviour. The role of digital phenomena, namely social media, influencer marketing, and online identity creation, in the context of sustainable consumption in small fashion circles is also scarcely covered by scholars. The aim of the study, then, is to address these gaps by questioning the nexus of sustainability, modest fashion, and Generation Z, with the help of a culturally sensitive and behaviourally oriented analysis framework. The study will seek to clarify the unique factors and challenges that drive the sustainable consumption behaviours of Gen Z consumers of modest fashion by examining the knowledge and real consumption behaviour of such clientele, which will help build an even more inclusive and thorough model of ethical fashion consumption.

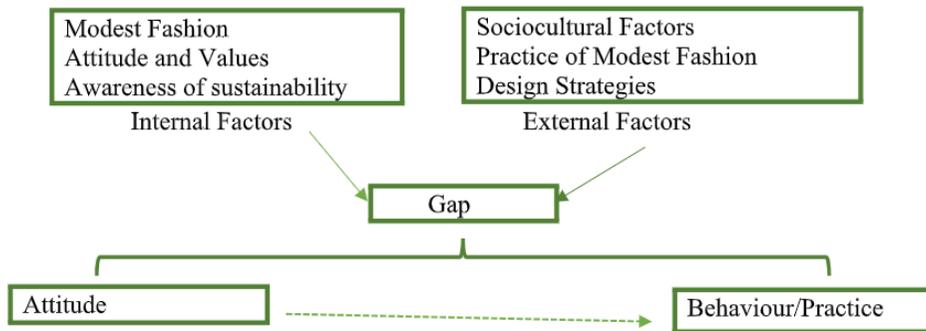


Figure 1: Factors that forecast the attitude of the behavior

The objectives are:

- To evaluate how well-informed and understanding Generation Z consumers influenced by modest fashion are about sustainable fashion.
- To examine the actual purchasing behaviours and fashion adoption of Gen Z individuals who prefer modest apparel.
- To explore how cultural, religious, and personal values influence the intersection of modest fashion and sustainability.
- To identify the barriers, such as economic, social, psychological, and market-driven factors, that deter Gen Z consumers from engaging in sustainable consumption despite their awareness.
- To examine how Gen Z's sustainable consumption is affected by social media, influencers and fashion marketing within the context of modest fashion.
- To provide strategic recommendations for modest fashion brands, educators and policymakers to promote a stronger alignment between awareness and sustainable practices.

This research holds importance for several reasons. Firstly, it discovers a neglected intersection of two noteworthy fashion movements: modest clothing and sustainability. Secondly, it captures the perspective of a group set to shape future purchasing habits and steer the sustainability goals of the fashion industry by focusing on Generation Z. Thirdly, understanding the distinction between awareness and practice can help brands, educators and policymakers create more effective strategies for sustained consumer engagement, particularly in culturally diverse markets. Finally, this study aligns with the broader Sustainable Development Goals (SDGs), particularly the objective of responsible consumption and production (SDG 12), by promoting ethical fashion choices among young consumers.

Methods

Research Design

The research design employed a mixed-methods approach, combining quantitative survey data with qualitative open-ended responses to investigate levels of awareness, attitudes, and practices regarding sustainable modest fashion among Generation Z in Bangladesh. The justification for the mixed-method approach is that it offers a comprehensive understanding of consumer behaviour, incorporating numerical patterns alongside descriptive information (Battista & Torre, 2023). Thus, a cross-sectional design was used, in which participants' behaviours and perceptions were assessed at a single point in time to facilitate the examination of interactions among values, constraints, and aspirations regarding sustainable modest fashion (Xueying et al., 2025).

Target Population and Sampling

The student target population was set as Gen Z students in Bangladesh aged 18-29 years at universities who are already modest fashion consumers or may consider it. The specific population was identified due to their dominance in digital culture, their ease of social contagion, and, therefore, their potential to establish trends sustainably within the country (Branca et al., 2025). Using a convenience sampling technique, the sample's diversity in terms of gender, socioeconomic status, and educational backgrounds was taken into account to ensure it was representative of different perspectives. Forty-eight respondents were recruited online through social media, university networks and student forums. The convenience sampling technique has allowed the researcher to include units in more accessible ways.

Data Collection

The data collection involved an online structured questionnaire comprising a closed-ended Likert scale and an open-ended qualitative question. The quantitative part assessed demographic traits, the number of clothing purchases, knowledge of sustainable fashion, reasons for being in sustainable modest fashion, obstacles, and the impact of social media. Open-ended questions were also introduced in the qualitative section on the expectations of humble fashion brand representatives, recommendations for increasing sustainable consumption, and personal incentives in choosing sustainable alternatives. The questionnaire was designed based on a comprehensive literature review of sustainable fashion, consumer behaviour, modest fashion, and the consumption patterns of Generation Z. Subsequently, to ensure data triangulation, both qualitative and quantitative questions were incorporated to strengthen the interpretation of the findings. Data collection was conducted online to ensure maximum access and participation, particularly given the contact university students have with online platforms.

Data Analysis

SPSS was utilised for quantitative data analyses. Frequencies and percentages were used as descriptive statistics to summarise key variables of interest, including motivations, barriers, awareness, and purchasing behaviours. These displayed tendencies in affordability issues, social impact, and the uptake of eco-friendly modest fashion. Thematic analysis was done in a six-step process developed by Braun & Clarke (2006) on qualitative data. Responses in open-ended questions were inductively coded, and similar patterns were classified into larger themes and sub-themes that represent values, constraints, and desire to change (Naeem et al., 2023). The thematic analysis, in conjunction with quantitative trends, enabled a rich mixed-methods interpretation and, therefore, highlighted the prevalence of the issues and the rationales behind the behaviours of Gen Z consumers (Battista & Torre, 2023).

Ethical Considerations

Ethical principles were followed stringently. Participation was strictly voluntary, and informed consent was obtained electronically before questionnaire completion. Assurance of anonymity and confidentiality was provided to all respondents, and data were stored on password-protected systems (Whicher & Wu, 2015). Participants had the right to withdraw at any stage without penalty. In addition, leading questions or other coercive prompts were avoided to ensure participants' autonomy and privacy were not violated (Roberts & Allen, 2015). Ethical approval was gained from the university research ethics committee before data collection.

Results

Quantitative analysis

Frequency analysis

The distribution of respondents in Table 1 shows a majority of younger Gen-Z respondents aged 21-26 years, accounting for 47.9% and 45.8% of the sample, respectively. The 27-29 and 30-32 age groups make up only 4.2% and 2.1%, respectively, and 6.3% of the participants. Such a bias towards early adulthood highlights the applicability of fashion trends in this generation. Still, it restricts external generalisation to older Gen Z members and their environmental values, limiting their guidance for purchasing choices and sustainability studies for instructors.

Table 1: What is your age range?

		Frequency	%	Valid %	Cumulative %
Valid	21–23	23	47.9	47.9	47.9
	24–26	22	45.8	45.8	93.8
	27–29	2	4.2	4.2	97.9
	30-32	1	2.1	2.1	100.0
	Total	48	100.0	100.0	

Table 2 shows that of the 48 Gen Z respondents surveyed on modest fashion and sustainable consumption in Bangladesh, 15 (31.3%) were male, and 33 (68.8%) were female. The gender disproportion, whereby it has almost a two-to-one female majority, is the representation of the general demographic in the participation of the youth in gender sensitive research in Bangladesh. Such an asymmetry can affect perceptions of constraints and values in sustainable consumption behaviour, and generalisations should be made carefully across the whole Gen Z generation. This provides insights into future research implications and interventions.

Table 2: What is your gender?

		Frequency	%	Valid %	Cumulative %
Valid	Male	15	31.3	31.3	31.3
	Female	33	68.8	68.8	100.0
	Total	48	100.0	100.0	

Table 3 indicates that the descriptive analysis shows that 48 respondents (93.8 %) identify themselves as modest fashion consumers, and only 6.3% disapprove. This extremely large majority highlights a strong normative bias toward modest clothing among the sampled Gen Z group in Bangladesh. The distorted distribution may be due to cultural or market saturation effects. Still, it also raises doubts about the representativeness of the sample and the power of the social desirability effect in self-reports in the modern world.

Table 3: Do you consider yourself a modest fashion consumer?

		Frequency	%	Valid %	Cumulative %
Valid	Yes	45	93.8	93.8	93.8
	No	3	6.3	6.3	100.0
	Total	48	100.0	100.0	

Table 4 below shows that the entire sample of 48 respondents is composed of students, resulting in a 100% valid sample. This homogeneous profession speaks to a homogeneous demographic: Gen-Z members pursuing higher education in Bangladesh. The findings on sustainable consumption in small fashion will be based on students' attitudes, which may limit their applicability to other socioeconomic levels. This limitation has to be

considered by the researchers in interpreting the values-versus-constraints paradox in this regard to compare the research through analysis.

Table 4: What is your profession?

		Frequency	%	Valid %	Cumulative %
Valid	Student	48	100.0	100.0	100.0

The median response in Table 5 to monthly fashion spending among Gen Z respondents shows a high concentration at the lower end: 52.1% (n=25) spend less than 20,000, with only 16.7% (n=8) spend 27,000.00 or higher. The 21000-23000 group accounts for 18.8% (n=9), and the 24000-26000 segment accounts for 12.5% (n=6). The proportion of 70.8% who have spent less than or equal to 23000 is cumulative, highlighting constraints on value-oriented fashion purchasing and questioning the possibility of practising eco-oriented consumption without jeopardising daily financial security.

Table 5: Please mention your one expenditure

		Frequency	%	Valid %	Cumulative %
Valid	Below 20,000	25	52.1	52.1	52.1
	21,000-23,000	9	18.8	18.8	70.8
	24,000-26000	6	12.5	12.5	83.3
	27000 and above	8	16.7	16.7	100.0
	Total	48	100.0	100.0	

The correlation of motivations in Table 6 shows that personal values are the most common (48 respondents, 47.9%), while religious and cultural beliefs, although important, are relatively less common (33.3% and 18.8%, respectively). This implies that considerations of Gen Z consumers in Bangladesh are actively taken into account when participating modestly, and that there is a subtle shift in the previous drivers. Sustainable consumption measures must therefore adopt a personal value alignment approach rather than rely on religious or cultural frames.

Table 6: What motivates your choice to wear modest fashion?

		Frequency	%	Valid %	Cumulative %
Valid	Religious beliefs	16	33.3	33.3	33.3
	Cultural values	9	18.8	18.8	52.1
	Personal values	23	47.9	47.9	100.0
	Total	48	100.0	100.0	

Table 7 shows that 33.3 % of the respondents buy clothing once a month, 41.7 % once every three months, 10.4 % once every six months, and 14.6 % infrequently. Accordingly, most of them (about 75%) buy at least once every 3 months, indicating a fairly high rate of apparel acquisition. This trend highlights a conflict between aspirational sustainable values and economic or cultural limitations that shape consumption patterns, and seeks to raise

responsible purchasing practices worldwide, particularly in the context of Gen Z modest fashion in Bangladesh.

Table 7: How do you shop for clothing

		Frequency	%	Valid %	Cumulative %
Valid	Monthly	16	33.3	33.3	33.3
	Every 3 months	20	41.7	41.7	75.0
	Every 6 months	5	10.4	10.4	85.4
	Rarely	7	14.6	14.6	100.0
	Total	48	100.0	100.0	

The survey responses in Table 8 demonstrate that 18.8 % of people always choose to wear sustainable clothes, 25.0 % choose it most of the time, and 45.8 % choose it occasionally. Therefore, most of them depict intermittent participation, which is a paradox of values being recognised, but limited due to practical or cultural considerations. This trend highlights the conflict between eco-friendly ideals and daily consumption decisions by simple garment-wearing Gen Z in Bangladesh.

Table 8: How do you intentionally choose sustainable fashion items?

		Frequency	%	Valid %	Cumulative %
Valid	Always	9	18.8	18.8	18.8
	Often	12	25.0	25.0	43.8
	Sometimes	22	45.8	45.8	89.6
	Rarely	3	6.3	6.3	95.8
	Never	2	4.2	4.2	100.0
	Total	48	100.0	100.0	

Table 9 shows that 77.1% of the 48 respondents knew about sustainable fashion, indicating high knowledge of the basics. The level of environmental awareness towards the industry was below 10.4 %; only 6.3% were familiar with sustainable brands, and only 2.1% were aware of the implications of fast fashion. The knowledge of similar expressions (ethical, slow, circular) was 4.2%. These results show that there is a strong knowledge-practice divide, with conceptual awareness slightly ahead of actionable literacy in small proportions in the present consumer practices in the survey conducted in Bangladesh.

Table 9: Please rate your agreement with the following statements: with 2. (1 to 5)

		Frequency	%	Valid %	Cumulative %
Valid	I understand what sustainable fashion means	37	77.1	77.1	77.1
	I am aware of the environmental impact of the fashion industry	5	10.4	10.4	87.5
	I know how to identify sustainable fashion brands or products	3	6.3	6.3	93.8
	I am familiar with the concept of fast fashion and its consequences.	1	2.1	2.1	95.8

I have heard of terms such as ethical fashion, slow fashion, and circular fashion.	2	4.2	4.2	100.0
Total	48	100.0	100.0	

In Table 10, the trend is strongly reflected in the table showing that respondents of Gen Z in Bangladesh's origin have a strong tendency toward sporadic buying of new modest fashion: 50% buy new modest fashion sometimes, 22.9% always, and 18.8% often. In the marginal category, 6.3% do not buy often, and 2.1% do not buy at all. These trends highlight a conservative, low-involvement in low-key fashion, indicating that sustainable consumption is moderated by financial, cultural, or access limitations within this group.

Table 10: How do you buy new modest fashion items ?

		Frequency	%	Valid %	Cumulative %
Valid	Always	11	22.9	22.9	22.9
	Often	9	18.8	18.8	41.7
	Sometimes	24	50.0	50.0	91.7
	Rarely	3	6.3	6.3	97.9
	Never	1	2.1	2.1	100.0
	Total	48	100.0	100.0	

The survey responses in Table 11 show that 37.5 % of respondents never buy second-hand modest clothing, while only 6.3 % buy it always, suggesting that they mostly wear new clothes. The others are occasional purchasers, sometimes (18.8%) and rarely (22.9%) taking 1/3 of the respondents. In this allocation, a low but substantial receptiveness to sustainability, but it emphasises the primacy of limitations, such as price, availability and culture, compared to values. The makers should confront these constraints.

Table 11: How do you buy second-hand or thrifted modest clothing?

		Frequency	%	Valid %	Cumulative %
Valid	Always	3	6.3	6.3	6.3
	Often	7	14.6	14.6	20.8
	Sometimes	9	18.8	18.8	39.6
	Rarely	11	22.9	22.9	62.5
	Never	18	37.5	37.5	100.0
	Total	48	100.0	100.0	

Table 12 indicates that 1 out of 3 respondents will stop consuming brands because of their unethical practices, whereas close to 40 % will stop using them only occasionally, and 4 % will hardly or not stop using at all. The combined 54% who never or frequently abstain is an indicator of ethical conscience among Gen Z consumers in Bangladesh. However, the 39-100 %

who occasionally do so highlight the conflict between ambitions and financial or fashion limitations, a paradox of sustainable consumption of a modest fashion.

Table 12: Have you ever avoided buying from a brand due to its unethical practices?

		Frequency	%	Valid %	Cumulative %
Valid	Always	16	33.3	33.3	33.3
	Often	10	20.8	20.8	54.2
	Sometimes	19	39.6	39.6	93.8
	Rarely	2	4.2	4.2	97.9
	Never	1	2.1	2.1	100.0
Total		48	100.0	100.0	

Table 13 indicates that 72.9% of respondents said they would not buy from brands with unethical practices, suggesting that Gen Z is highly sensitive to ethics. The 27.1% who did not avoid may have been due to perceived constraints or the absence of alternatives. The cumulative percentage confirms the preponderance of ethical avoidance. The findings indicate that there is evidence of market segments and consumer behaviour in the new economy, in general, within this small fashion supply chain.

Table 13: Have you ever avoided buying from a brand due to its unethical practices?

		Frequency	%	Valid %	Cumulative %
Valid	Yes	35	72.9	72.9	72.9
	No	13	27.1	27.1	100.0
Total		48	100.0	100.0	

Table 14 shows that almost half of Gen Z respondents (47.9%) are concerned with modest fashion trends regardless of sustainability, which is a rather dominant value-based behaviour. A significant minority (35.4%) prioritises modesty and sustainability, and only 6.3% prefer modesty. The other 10.4% do not care about either dimension, and a paradox arises between aspiration values and material limitations in the small-scale Bangladesh fashion market. This distribution highlights the need for the government to be context-sensitive in sustainability interventions.

Table 14: Which of the following best describes your modest fashion shopping behaviour?

		Frequency	%	Valid %	Cumulative %
Valid	I follow modest fashion trends regardless of sustainability.	23	47.9	47.9	47.9
	I look for both modesty and sustainability in fashion.	17	35.4	35.4	83.3
	I prioritise modesty even if sustainability is lacking.	3	6.3	6.3	89.6
	I am not concerned about either modesty or sustainability	5	10.4	10.4	100.0
Total		48	100.0	100.0	

Table 15 indicates that the sample shows a significant tendency towards donation and resale, with 29.2% of participants reporting habitual involvement. A total of 45.8% of them participate at least regularly, indicating increased adherence to circular practices. However, 22.9% of respondents also demonstrate occasional to no involvement, which reflects the conflict between available sustainable values and performance limitations. These results shed more light on the contradiction of aspirational values but poor adoption among Gen Z Bangladeshi modest fashion followers.

Table 15: How do you donate or resell used clothing?

		Frequency	%	Valid %	Cumulative %
Valid	Always	14	29.2	29.2	29.2
	Often	8	16.7	16.7	45.8
	Sometimes	15	31.3	31.3	77.1
	Rarely	7	14.6	14.6	91.7
	Never	4	8.3	8.3	100.0
	Total	48	100.0	100.0	

Table 16 shows that 50 % of the respondents (50%) confirm that their religious values influence their fashion preferences, but only 14.6 % use cultural values and 29.2 % use personal values as the motivators. Only a low percentage (6.3% above) sees modest fashion as an instrument of sustainability. In this way, spiritual inspirations are on the centre stage. In contrast, ethical and cultural aspects are in the background, revealing a strong hierarchy of values that shapes Gen Z's modest fashion spending in Bangladesh within the regional context.

Table 16: Please rate the extent to which you agree with the following with 2. (1 to 5)

		Frequency	%	Valid %	Cumulative %
Valid	My religious beliefs influence my fashion choices.	24	50.0	50.0	50.0
	My cultural values align with the principles of modest fashion.	7	14.6	14.6	64.6
	My personal values motivate me to choose sustainable fashion	14	29.2	29.2	93.8
	Modest fashion can contribute to sustainable living.	3	6.3	6.3	100.0
	Total	48	100.0	100.0	

The distribution represents 27.1% (in Table 17) of the respondents who repair or reuse clothes always, and 22.9% of the respondents who repair or reuse clothes frequently. Combined, 49.9 % of them practice legal activities frequently, and another 39.6 % practice this occasionally. Only 8.3% often and 2.1% never, which suggests that the tendency toward sustainable consumption is rather strong. However, the remaining 10% indicates limitations on active

use, highlighting the paradox of modest fashion consumption in the dynamic city market, which reflects broader socio-economic changes.

Table 17: How often do you repair or reuse old clothing?

		Frequency	%	Valid %	Cumulative %
Valid	Always	13	27.1	27.1	27.1
	Often	11	22.9	22.9	50.0
	Sometimes	19	39.6	39.6	89.6
	Rarely	4	8.3	8.3	97.9
	Never	1	2.1	2.1	100.0
	Total	48	100.0	100.0	

Table 18 results demonstrate that 58.3 % of participants mention high price as a major obstacle, and that the lack of availability (22.9 %) and limited modest options (8.3 %) are also factors that prevent purchasing the products. Very few (2.1%) complain of inadequate information, and another 8.3% report a mismatch in trend or style. The combination of these results highlights a cost-driven limitation that prevails over informational or aesthetic considerations in sustainable modest fashion purchases of Gen Z Bangladeshi consumers in the prevailing market environment.

Table 18: What prevents you from buying more sustainable modest fashion?
(Select all that apply)

		Frequency	%	Valid %	Cumulative %
Valid	High price	28	58.3	58.3	58.3
	Lack of Information	1	2.1	2.1	60.4
	Lack of availability	11	22.9	22.9	83.3
	Limited modest options	4	8.3	8.3	91.7
	Trend/style mismatch	4	8.3	8.3	100.0
	Total	48	100.0	100.0	

Table 19 indicates conflict among aspirational values and material limitations among Gen 0 Bangladeshi students. 86 % perceive sustainable fashion as too expensive, and 29 % indicate they are struggling to find modest sustainable brands, for a combined total of 87 % of respondents. 10.4% would purchase given the choice, and 2% would blame affordability as the only reason. These results highlight the cost-access paradox that prevents sustainable consumption in the fashion industry. The determinants are price and product availability, whose ethical aspirations align with purchasing.

Table 19: Please rate the extent to which you agree with the following with 2. (1 to 4)

		Frequency	%	Valid %	Cumulative %
Valid	Sustainable fashion is too expensive for students like me	28	58.3	58.3	58.3
	Sustainable modest brands are difficult to find	14	29.2	29.2	87.5

I would buy sustainable fashion if more modest options were available	5	10.4	10.4	97.9
I want to buy sustainably, but cannot afford to.	1	2.1	2.1	100.0
Total	48	100.0	100.0	

The tabular data indicate that 54.2% of the people surveyed follow modest fashion influencers, and only 6.3% of respondents acknowledge following influencers to inform their fashion choices. Nevertheless, only 4.2 % would purchase a product based on an influencer's recommendation. Still, 20.8% found sustainable brands through social media, indicating that there is a medium for environmentally friendly exposure. Lastly, 14.6% feel social media pressure as a trigger for fast-fashion purchases, highlighting the conflict between aspirational effects and green motives.

Table 20: How much do you agree with the following statements? (2. from 1 to 5)

		Frequency	%	Valid %	Cumulative %
Valid	I follow modest fashion influencers on social media	26	54.2	54.2	54.2
	Influencers shape my fashion preferences	3	6.3	6.3	60.4
	I am more likely to buy a product if an influencer promotes it.	2	4.2	4.2	64.6
	I have discovered sustainable brands through social media.	10	20.8	20.8	85.4
	Social media creates pressure to follow fast fashion trends.	7	14.6	14.6	100.0
	Total	48	100.0	100.0	

Correlation Analysis

The correlation analysis demonstrates that there is a moderate positive correlation between the awareness of sustainable fashion and the actual sustainable behaviour among the Gen Z modest fashion consumers ($r = 0.384$, $p = 0.007$). It implies that sustainability-aware individuals will more likely make sustainable decisions, including making purchases of environmentally friendly products, purchasing second-hand, or mending clothes. But the correlation is not strong, but moderate, so that being aware does not translate to behaviour fully, which helps to prove that there exists an awareness-behaviour gap. The barriers to adopting sustainable behaviour may be other (e.g. price, availability, cultural norms) factors, even after being aware.

Correlations

		Awareness	Behaviour
Awareness	Pearson Correlation	1	.384**
	Sig. (2-tailed)		.007
	N	48	48
Behaviour	Pearson Correlation	.384**	1
	Sig. (2-tailed)	.007	
	N	48	48

** . Correlation is significant at the 0.01 level (2-tailed).

Qualitative Analysis

Theme 1: Value-Driven Motivation for Sustainability

Gen Z respondents consistently discussed sustainability as a value decision rather than an economic or aesthetic one. The motivations demonstrate a multifaceted relationship among environmental responsibility, ethical demands, aesthetic value, and self-identity expression, as a tendency to unite moral principles and personal style.

Sub-Theme 1: Environmental Responsibility, Ethical Awareness and Trust in Sustainable Practice.

One prevailing response based on the information is that Gen Z is highly environmentally conscious. Some of the respondents made direct associations between their fashion preferences and environmental conservation, stating that “Because it’s environment friendly” and “Rivers are polluted with dyeing water that hurts me”. These statements show that environmental degradation, particularly water pollution through dyeing of the textiles, is not an abstract phenomenon but a reality that is being experienced. This agrees with a study conducted by Šimek & Sadikek (2024), who also revealed that the habits of the Gen Z generation in consumption are deeply connected with anxiety about the environment and awareness of the ecological impact of fast fashion. Nevertheless, this environmental consciousness is not an individual one, yet it is intertwined with ethical requirements that are related to production. The participants reinforced the theme of brand integrity several times, mentioning “Greater transparency about how clothes are made, and Fair labour practices”. This can be compared to the data given by Vassalo et al. (2024), who suggest that the idea of transparency and anti-greenwashing initiatives is becoming a major concern regarding gaining Gen Z loyalty to the brand associated with sustainability. On the contrary, for other age cohorts, affordability might be more important than ethics. Gen Z seems to consider sustainability to be an unfinished process without ethical working environments.

Respondent # 17, 22 said, respectively

"From modest fashion brands, I expect a genuine commitment to sustainability that goes beyond marketing. This includes using eco-friendly and ethically sourced materials, ensuring fair labor practices, reducing waste through mindful production processes, and offering transparency about their supply chains. Additionally, I appreciate when brands create timeless and versatile pieces that align with the values of modest fashion, encouraging long-term use rather than fast fashion consumption." (Respondent # 17).

"More sustainable products that won't damage the environment and trendy style" (Respondent # 22).

Similarly, Liu et al. (2023) demonstrate that the perception of authenticity plays a huge role in determining the continued involvement of Gen Z in the sustainable fashion markets. This is similar to the scepticism that participants hold about superficial claims of sustainability, and this supports the notion that trust and transparency are driving forces as opposed to the secondary ones. However, not every participant was that ethically convinced; some of them merely gave the answer of Nothing, which implies that not everyone shares the value-driven motivation, which is also an opposition that suggests the intra-generational diversity.

Sub-Theme 2: Aesthetics, Social Impact and Identity in the form of modest fashion.

Though the environment and the ethical issues were factors, a lot of the respondents insisted that sustainability should correspond to fashion as well. Statements such as "Fashionable," "Trending style but sustainable," and "Comfortness and presentable outlook" illustrate how style, comfort, and trend relevance remain central. This upholds the position made by Wang & Jiang (2024), citing that Gen Z values a seamless combination of aesthetics and functionality in their interactions with new fashion technologies or tendencies. Correspondingly, Mullick et al. (2025) point out that the cultural modesty preference of South Asian consumers is frequently counterbalanced by the wish to be fashionable, as shown by the participants who mention the role of the "Hijab" and the necessity of sustainable fashion, which has to be modest and fashionable at the same time.

Furthermore, participants referenced social media as a key influence, noting that "Social media create" and "Influencers, friends motivate me." This aligns with the study of Razzaq et al. (2018), which discovered that Islamic identity and peer pressure are influential in determining sustainable consumption in small-scale fashion settings. Nevertheless, in contrast to

previous generations, when modest fashion was presented as a more religious idea, Gen Z presents it as an identity, style, and social approval blend.

Theme 2: Structural & Market Constraints Limiting Sustainable Consumption in Bangladesh

Gen Z has a great interest in sustainable modest fashion, but they consume less due to more generalised economic, market, and informational constraints. This theme examines how these limitations overwhelm their sustainability hopes.

Sub-Theme 1: Cost Obstacles and Low Market Diversity.

The main limitation that is keeping Gen Z in Bangladesh out of the full-scale commitment to sustainable modest fashion is the overlap of expensive price tags and the lack of attractive models. Participants repeatedly stressed the need for “affordable price,” “budget-friendly”, and “less expensive” options, while others noted that “expensive sustainable options limit access.” These remarks show that affordability is not merely a choice but a structural constraint- a constraint that limits access of students who generally have less disposable income. This is similar to Yang et al. (2024), who maintain that despite having high pro-environmental values, financial trade-offs undermine the willingness of Gen Z to act sustainably.

The problem is, however, that affordability in Bangladesh is compounded by a market that is not diverse and accessible. Participants insisted on the need for “more options and availability,” “more modest alternatives,” and greater “design variety,” meaning that the market of sustainable modest fashion in Bangladesh is not yet fully developed. Consumers may be prepared to trade off price at times, but they cannot trade off choice because the products are just not available. In the same regard, Bhandari et al. (2022) established that supply-side barriers such as material scarcity, small scale, and design constraints inhibit the adoption of sustainable apparel across the world. Instead, large product lines available in the fast fashion sector overshadow sustainable brands, which leave the consumer with fewer modest and varied options in the sustainable category.

Moreover, the participants were worried about “more comfortable products, showing that modest sustainable fashion also faces the issue of tactile and functional demands. This matches the explanation given by Branca et al. (2025), who describe that Gen Z appreciates both style and comfort, and when sustainable products do not satisfy either, intention-behaviour gaps increase. Hence, affordability and lack of diversity in Bangladesh do not act independently but as mutually supportive structural restraints that cumulatively inhibit the capacity of Gen Z to turn values into practice.

Sub-Theme 2: Rapid Fashion, Social Forces, and Knowledge Inefficiencies.

In addition to structural limitations, behavioural and perceptual barriers also decrease the possibility of shifting towards sustainable modest fashion in Bangladesh. Participants acknowledged that “fast fashion is growing high” and admitted feeling conflicted when stating “don’t go for fast fashion,” and that they are under pressure from the attractiveness of trend-driven, cheap and socially approved consumption. Cesar & Ødegard (2025) also state that Gen Z tends to compromise between individual principles and social norms, and that branded and trendy dressing can signify identity and belonging. Quite the contrary, sustainable modest fashion does not have such a symbolic power now, and it is less socially rewarding.

In the same way, social media accelerates this attraction. Although the participants complained about trend following, Instagram-like platforms contribute to impulse buying, according to Djafarova and Bowes (2021). Fast fashion is thus not only affordable but also instantly socio-culturally relevant, which Bangladeshi sustainable fashion cannot maintain.

In addition, there are significant knowledge gaps. Participants repeatedly stated “I don’t know,” “they need me to know more about them,” and urged stakeholders to “spread more information through media, varsity, so that people know more about modest fashion.” This uncertainty is a symptom of mistrust and lack of knowledge about sustainability claims, and this is consistent with Dominguez et al. (2023), who found that Gen Z returns to fast-fashion avenues that they know well due to ignorance. Similarly, Fabiana et al. (2024) observe that when no information is available, sustainability will be a mere abstraction and not a practical buying parameter. Thus, as much as Gen Z cares about the concept of sustainability, the dominance of fast fashion, peer influence and a lack of information may become traps of behaviour that cannot be escaped without making a great shift in the industry towards the modesty of sustainable fashion.

Theme 3: Aspirations for Change- What Gen Z Wants from Brands & the System in Bangladesh

Although appreciative of sustainable modest fashion, multiple obstacles eventually limit the involvement of the Bangladeshi Gen Z consumers and have them imagine a fashion ecosystem where brands are the ones facilitating the process of making sustainable decisions pragmatic and meaningful, in a well-rounded and inclusive manner.

Sub-Theme 1: Ethics, Eco-Responsibility, and Sustainability Education

Responses obtained by the participants included being honest, environmentally friendly, and ethical in the brand practice and answers like while responses such as “Don’t greenwash” and “Transparency about supply

chain” show a lack of trust in the cosmetic appearance of being sustainable. The problems of materials and labour standards were also mentioned by many, and they mentioned “organic cotton, recycled fabrics” and the need to follow “fair labour practice”. These are very strong indicators that the Bangladeshi Gen Z cannot have a conceptualisation of sustainability without ethical responsibility- perhaps as an expression of concern about the environment as well as social consciousness. Nevertheless, the participants did not note only the existence of production ethics; knowledge and enlightenment are required. Answers like “Spread more information via media,” “Use influencers,” and “Educate through campaigns, QR codes, videos” imply that there is a desire to have knowledge on sustainability that is accessible and interactive. In line with this, as stated by Branca et al. (2025), the capacity of product attributes to facilitate engagement with Generation Z will rely on the perceived authenticity in the stories on sustainability. On the other hand, without proper communication, ethical work may go unnoticed or even mistrusted, and, as a result, its positive effects will not be produced, regardless of the intentions (Andrade and Vieites, 2025).

Moreover, the sub-theme is also applicable to the Bangladeshi environment, which indicates the scattered knowledge of eco-friendly fashion as scattered. Some of these participants are educated and motivated, and some participants identify knowledge gaps, which are associated with the finding of Bhandari et al. (2022) that a lack of consumer education is one of the barriers to sustainable sourcing and adoption in emerging markets. Therefore, Gen Z wants brands to combine open and responsible production with new educational efforts to create knowledgeable consumption.

Subtheme 2: Affordable, Trend-Driven, Accessible Sustainable Fashion and Circularity Options

Sustainable choices were driven by essential consideration in the form of cost, availability and style. According to the participants, the key features of a sustainable modest fashion included “Affordable and trendy,” “Reasonable prices,” “More availability,” and “Stylish, versatile, durable pieces,” which, in turn, indicated that the range of sustainable modest fashion should provide both budget consideration and address the aesthetic appeal. It is reflected in Cascavilla et al. (2025), who discovered that the intention to pay a higher price to sustainability fashion grows only when affordability and the perceived style and utility are balanced. Participants noted the interest in such initiatives such as “Upcycling & DIY,” “Swaps and renting,” and “Secondhand markets.” These reactions indicate that the Bangladeshi Gen Z is intrigued by the alternative forms of consumption that minimise wastage and fit the modest fashion. My one respondent similarly said (#21),

“More availability and reasonable for the price”.
(Respondent # 21).

Armstrong et al. (2015) also cite that circular strategies in the form of upcycling and swapping lead to consumer engagement since the consumers can sustain their style preferences. Nevertheless, obstacles still exist. The existing market patterns and set-ups in Bangladesh do not satisfy the preferences of Gen Z, which are shaped towards access and circularity; thus, such projects are a far-off aspiration, and they are not quite mainstream. Djafarova and Bowes (2021) also indicate that social media can be effective in highly focusing on such practices through the facilitation of visibility and social validation- a tactic that key participants support in the application of influencer-led campaigns.

Therefore, the theme is the inconsistent aspiration that Generation Z desires fashion to be fashionable and affordable, affordable, accessible, recyclable, yet systemic constraints are organisational change in price and distribution and consumption theories to achieve all these aims.

Discussion

Gen Z is redefining modest fashion as a vehicle for self-expression, rather than merely following social pressure. The dual effect of self-monitoring and self-concept, which contributes to an increased sense of individuality and agency in clothing decisions, can be the primary reason why fashion awareness among contemporary consumers has increased (Niinimaki et al., 2020). Recent empirical results mean that Generation Z is focused on uniqueness, authenticity, and inclusiveness, therefore, leading to a transition towards more modest fashion that crosses the boundaries of the traditional culture or religion (Niinimaki et al., 2020). The high percentage of 64.6 percent on personal style preference highlights the increasing popularity of fashionable modest clothing, even by non-identifiers to a particular cultural or religious group, thus allowing consumers to incorporate modesty into their daily fashion. The initial attempts were made by Leung et. al (2015), in which the authors identified the psychological and social variables that influence fashion consumption, and more recently, a study by Jeong and Kim (2024) showed that the anthropomorphic attributions to nature and the consequential psychological connection with nature mediate the tendency towards sustainable fashion in Gen. Z and positively affect wellbeing. This is supported by Palomo-Dominguez et al (2023) which show that values are the main motivators of purchasing intentions on the part of this generation but there is still a gap between the intentions and actual behaviour. The found obstacles, including high cost, low availability, and incompatible small styles with the current trends, are reflected in the literature, such as Ronda (2024),

who considers structural barriers to be the inhibitor to moving environmental motivation to action purchasing.

The examination of Gen Z-related ideas in the international research environment repeatedly confirms that costliness and the lack of these products are the main factors preventing the overall usage of sustainable clothing (Escourido-Calvo et al., 2025b). In a similar effect, the design, supply-chain, and cost concerns among young consumers reported by Alfauzy and Nita (2021) are an indication that brands have the opportunity to re-engineer messages to fit more sustainable, creative, and style-focused designs that appeals to the inherent creativity and authenticity of Gen Z. The widespread popularity and a wide range of brands offered by modest fashion testify to its ubiquity throughout the industry (Zainudin et al., 2019). The way it has been adapted into street, leisure, and casual wear proves the ability of the sector to transform on a sustainable basis without losing its trendiness, thus broadening its use beyond the ethical or religious incentives and establishing modest apparel as an element of the modern personal style.

The consumer environment is shifting and the brands and designers must take advantage and implement the principles of zero-waste design, sourcing materials, and slow-fashion that meet the dual needs of style and sustainability of Gen Z (Naderi and Van Beenburg, 2018). Religious stewardship stories, the ecological responsibility read as a moral obligation, have the potential to appeal to religious listeners, thus broadening the reach of eco-friendly clothes. Making simple fashion items attractive, ethical, and environmentally responsible, they best turn awareness into habitual consumption.

The use of digital storytelling, official educational content, and collaboration with influencers only intensifies the interest of GenZ, transforming awareness into the regularity of sustainably buying products. In addition, data analytics can identify specific tastes, and tailored eco-solutions will be offered to them, which also contributes to brand loyalty and involvement of the consumers. These conclusions are supported by the previous literature that has recognized GenZ as a socially aware generation that is driven by the concerns of excess consumption, socially responsible production, and global warming (Naderi and VanSteenburg, 2018). The capacity to convert this awareness into knowledgeable and effective consumer decisions seems somewhat limited, although there is general awareness. This aligns with the "attitude-behavior gap" often highlighted in sustainability literature, wherein consumers express positive attitudes regarding sustainability but do not consistently engage in sustainable buying practices (Joy et al., 2012). Sustainable modest fashion can also become aspirational and trend-focused by connecting sustainability with the personal style choices of Gen Z. The conduct of the research provides more choices for suitable

modest fashion products; besides that, the modest fashion industry can reduce the contribution of fashion waste. Self-concept, reference group, brand attitude, and brand status have a significant impact on the women's modest fashion consumption decisions (Nurani & Adinugraha, 2022).

The findings suggest that members of Generation Z prioritise authenticity and transparency, but for sustainable modest fashion to be a feasible selection, it must be affordable. The research goal of putting forward tactics that can help to close the gap between the awareness and practice of sustainable consumption of modest fashion of members of Generation Z is directly substantiated by this observation. In the realm of Muslim fashion, this implies not only the consideration of aesthetic preferences but also the assurance that products comply with modesty standards (Nurhidayat et al., 2022). The sustainability path of modest fashion goes beyond ecological responsibility; it corresponds to the general principles of modesty, simplicity, and conscious consumption. This shift in paradigm transforms the small industry at the same time, strengthening a global trend of a more sustainable, conscious future of the entire fashion industry, including designers, consumers, policymakers, and supply chains.

Limitations

The data analysis and conclusions of this study have one of the primary limitations, with a relatively small sample of students working at the university, which is limited to a convenience group. Nevertheless, the study subject needs to be thoroughly assessed in terms of how Generation Z is interacting with modest fashion in Bangladesh, an audience that stretches way beyond higher institutions of learning. This is due to the limited sample, which affects the external validity and lowers statistical power to pick up subtle relationships. Increasing the sample size would make generalization more valid and allow for more connections between variables. Moreover, the items on the Gen Z sustainable consumption detailing the instrument might be insufficient to capture the construct in question, which will result in measurement bias. In spite of the fact that cultural sensitivity was pursued in the study, modest fashion is influenced by a pyramid of religious, cultural, and individual standards; slight differences in the understanding and application of modesty are probably underrepresented, which emphasizes the difficulty of naming such diversity within a single study. The scope of the methodology used in the future study needs to be expanded to consider the reality of this demographic.

Future Research Directions

The current research provides a baseline of the sustainable consumption habits in the small fashion industry among Generation Z, where

a strong perception of the environmental and ethical demands is combined with a certain negligently low degree of their corresponding transformation into purchasing behaviors. This contradiction highlights the importance of specific future research on the complexity of the interplay between modesty, cultural identity, and sustainability. To explain the role of religious and traditional values in mediating the uptake of sustainable modest apparel, scholars must thus focus on particular faith-based or culturally diverse populations to develop a holistic model that will explain the mutual impact of such values on the processes of ethical decision-making. Furthermore, the use of state-of-the-art strategies of sustainability design, including zero-waste patterns, recyclable fabrics, and multifunctional clothes, is a good prospect of matching the functionality of products with simple aesthetic requirements, which could possibly create new design paradigms to fit modesty, beauty, and ecology in the workplace. At the same time, the ubiquity of digital communication shared by Generation Z will require empirical studies on how online activities, influencer marketing, virtual communities, and immersive platforms affect the development of sustainable perceptions and consumption patterns towards modest fashion; this analysis can shed light on effective digital interventions that would stimulate responsible spending.

Also, researching how modest fashion brands and retailers are acting in relation to the sustainability demands of Gen Z, including making their supply chains transparent and inclusive in developing their products, and listening to their customers, will help shed light on the good practices that will appeal to socially conscious consumers. The empirical results show that the presence of personal values explains the choice of sustainable modest clothing by Gen Z, about 70.8 percent, which implies that the marketing approach to sustainability is to position the concept as a natural lifestyle decision based on personal values. However, economic, cultural and market-based bottlenecks, especially cost, lack of accessibility, as well as mismatch with the current trends, continue to be obstinate conditions to the spread of green consumption. This makes designers encourage the use of zero-waste production methods, slow-fashion ideas, and seek new sustainable fabrics to create versatile, durable, and fashion-compliant clothing that would attract the attention of the GenZ consumers. Schools and media interventions should close the gap between social awareness and practice by integrating the curriculum and making efforts to target populations, and policymakers need to promote transparency and impose moral production norms to bring about change in the system. Finally, the generation of mindful consumption as an aspect of consumer advocacy, transparent brand support, and participation in community-based sustainability efforts is essential towards increasing the pivot towards a resilient, morally centered, modest fashion industry.

Conclusion

This study has explored the intersection of Generation Z, sustainability, and modest fashion and tried to fill the gap between the increased environmental consciousness and the real practices of sustainable consumption. The results have shown that, despite having a high level of awareness concerning the sustainability problem, Generation X consumers of modest fashion often have their intentions frustrated by a system of personal, social, cultural, and structural barriers that hinder the communication of awareness to action. According to quantitative data, awareness has a significant positive correlation with objective sustainable consumption; however, two main obstacles are dominant, namely high prices (56.3%) and the low availability to sustainable modest fashion (60.4%), which have critical negative impacts on purchasing behaviours. Nevertheless, these barriers notwithstanding, a significant percentage of the respondents said that they strongly wished to adopt a more sustainable approach, which they have attributed to their cultural values, identity, and belief system that support sustainable consumption. In addition, a significant group stated that they wanted to do sustainable purchases, which highlights the relationship between knowledge, awareness, and practice. Qualitative information also supports the fact that cultural awareness enhances sustainable behaviours and intentions. Taken together, the data points to the fact that although Generation Z shows a high level of sustainability awareness in the context of the small fashion industry, the barriers and obstacles on the structural and economic level still play a vital role in the impediment of the conversion of awareness to actual sustainable consumption.

Implications

These results have important implications for various stakeholder groups and, in particular, for the small fashion brands and industry players that are involved in the manufacture of affordable, sustainable modest clothing in a fast-changing market. The issue with price sensitivity and access becomes the main obstacle to this group. These limitations should be solved by increasing the stylistic variety, the scope of distribution, and the open dialogue that anticipates the cultural value, morality of origin, and environmental advantage of such clothes. Companies prioritising sustainability in cost and accessibility can more easily capitalize on GenZ increased environmental awareness by converting it into meaningful purchasing behaviors, thus balancing the profitability of a business with sustainability in consumer behaviour, enhancing social involvement, and remaining relevant.

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The Mediating Role of Organizational Culture in the Relationship Between Corporate Sustainability and Financial Performance in the Iraqi Banking Sector

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Abstract

The study aimed to examine how organizational culture mediates the effects of corporate sustainability on financial performance. The study population was managerial employees of Iraqi commercial banks. Data was gathered between March and May of 2025, a period of two months. 2,713 managers and department heads made up the entire population. A random sampling technique was used to guarantee representativeness. The minimum sample size needed for this population was 337 respondents. 337 surveys were sent out in order to accomplish this. Following a thorough review, 328 questionnaires were deemed valid and added to the analysis; the response rate was 97.33%. The study revealed that organizational culture serves as a partial mediator in the relationship between corporate sustainability and financial performance within Iraqi banks. This finding aligns with the broader literature emphasizing the role of internal organizational dynamics in shaping the effectiveness of sustainability initiatives. The study recommended expanding beyond the banking sector to include other industries. Since this research focused solely on Iraqi commercial banks, it would be valuable to investigate whether the observed relationships between corporate sustainability, organizational culture, and financial performance also apply to sectors such as manufacturing, telecommunications, or healthcare.

Keywords: Corporate Sustainability, Financial Performance, Organizational Culture, Iraqi Banking Sector

1. Introduction

A growing organizational commitment to balancing economic goals with environmental protection and social responsibility is reflected in the rise of corporate sustainability (CS) as a focal point across a variety of industries in recent years. The ability of an organization to maintain long-term financial viability while actively promoting societal welfare and minimizing ecological harm is what Dyllick and Muff (2016) define as corporate social responsibility (CS). Adopting sustainable practices is a strategic way to improve financial performance (FP) and institutional resilience in the financial services sector, especially in the banking sector (Scholtens, 2017). It also signals ethical responsibility.

According to empirical research, a thorough integration of the three facets of sustainability—social, environmental, and economic—can result in appreciable gains in stakeholder trust, risk management, operational performance, and overall financial results. (Eccles, Ioannou, & Serafeim, 2014; Elkington, 2018). Fair labor practices, community involvement, and workforce inclusivity are all components of social sustainability. Ecological preservation, waste minimization, and effective resource use are the main goals of environmental sustainability. Innovation, profitability, and sustainable growth are key components of economic sustainability. Together, these components improve organizational credibility and performance metrics when strategically incorporated.

However, the dominant organizational culture (OC), which has a significant impact on how these initiatives are viewed and carried out, frequently determines how successful sustainability initiatives are. Sustainability principles are interpreted and institutionalized through OC, which is defined as the common values, customs, and behaviors that govern behavior within an organization (Schein, 2010). According to Denison and Mishra (1995) and Hart and Milstein (2003), cultures that prioritize moral conduct, flexibility, education, and creativity can significantly aid in the internalization of sustainability objectives, enhancing financial and operational results.

The banking industry faces significant structural challenges in developing nations like Iraq, such as inadequate regulatory frameworks, limited infrastructure, and political unrest. These challenges make internal factors like organizational culture even more crucial. These difficulties call for a more thorough investigation of the ways in which cultural characteristics mediate the relationship between financial performance and sustainability practices in these kinds of settings (Al-Haidary & Al-Rikabi, 2021).

Particularly in light of post-conflict reconstruction efforts, the Iraqi banking industry is essential to the country's economic growth and recovery (Alshabebi, 2020). The industry still faces many contextual and structural obstacles, including weak regulatory frameworks, ineffective governance, and persistent political unpredictability, despite its strategic significance. CSR is becoming more and more important in this context, providing avenues to mitigate negative social and environmental effects while boosting institutional legitimacy and public trust (Ahmed & Rashid, 2022; Flayyih & Khiari, 2023). CSR programs are now commonly acknowledged as strategic tools for enhancing an organization's standing with stakeholders, strengthening stakeholder relationships, and boosting financial results. However, little research has been done on the precise mechanisms by which CSR influences financial results in Iraqi banks (Ismael & Yesiltas, 2020).

Organizations are facing increasing pressure to implement comprehensive corporate sustainability (CS) strategies that take ethical, social, and environmental factors into account as global business environments become more complex and stakeholder expectations rise. Integrating social justice, economic viability, and environmental stewardship, the Triple Bottom Line (TBL) framework has emerged as a leading model for integrating sustainability into essential business operations (Elkington, 2018). The exact nature of the connection between CS and FP is still up for debate, though, especially in developing nations like Iraq, where regulatory enforcement and institutional capacity are still developing.

More and more empirical research suggests that sustainable practices can result in quantifiable performance advantages, such as improved risk management, cost savings, and reputational enhancement (Eccles, Ioannou, & Serafeim, 2014; Khan, Serafeim, & Yoon, 2016). However, these results are not always achieved; internal organizational enablers are frequently necessary for their realization. One of the most important of these is organizational culture (OC), which affects how sustainability values are perceived, implemented, and maintained over time (Schein, 2010; Denison & Mishra, 1995).

Employee engagement with sustainability principles is influenced by organizational culture, which also shapes how deeply these values are ingrained in day-to-day operations and converted into financial gains. Sustainability initiatives are more likely to be successfully integrated into cultures that value creativity, openness, moral behavior, and long-term planning (Lozano, 2015; Busch, Schleper, & Gold, 2016). On the other hand, companies that prioritize short-term metrics or have strict hierarchies may find it difficult to prove their sustainability pledges and, in certain situations, may even suffer negative consequences.

This cultural aspect is especially important in the context of Iraqi banking, where sustainability initiatives are often implemented not because of inherent strategic alignment but rather in response to external pressures like image management or regulatory compliance. The internal cultural environment becomes a critical factor in determining whether sustainability practices are successfully institutionalized and connected to better financial outcomes in light of more general systemic issues, such as regulatory ambiguity, macroeconomic instability, and institutional fragility (Al-Rikabi & Al-Haidary, 2021).

Significant empirical gaps remain regarding the mediating role of organizational culture on the CS–FP relationship, particularly within banking institutions in emerging and transitional economies, despite the fact that sustainability has received a lot of attention in the global business discourse (Yusliza et al., 2020; Pizzi, Caputo, & Corvino, 2021). This emphasizes the need for comprehensive studies that look at both the internal cultural dynamics that influence sustainability's direct effects on performance as well as those effects themselves. By providing insights that can guide managerial practices and scholarly understanding of sustainability-led performance enhancement, this study, which focuses on the banking industry in Iraq, seeks to close this gap.

Adopting corporate sustainability practices is necessary to improve financial efficiency and competitiveness, as Iraqi banks face significant obstacles in improving their financial performance in a volatile institutional and economic environment. However, the internal organizational environment—in particular, organizational culture—influences how these practices affect financial performance, and the effects are not always direct. An important explanatory mechanism for comprehending how sustainability practices contribute to desired financial outcomes is organizational culture, which is the collection of values, principles, and behaviors that impact employee engagement with sustainability strategies like discipline, innovation, and collaboration.

In light of organizational culture's mediating function, the research problem thus focuses on the necessity of elucidating the causal relationship between corporate sustainability and the financial performance of Iraqi banks. A lack of knowledge about this mechanism makes it more difficult to determine the best ways to boost financial performance and lessens management's ability to create sustainability policies that encourage internal cultural change. The current research gap between sustainability initiatives and financial performance in this context is thus filled by examining organizational culture as a mediating variable, which offers a deeper understanding of how sustainability practices influence financial outcomes in Iraqi banks (Veenstra & Shi, 2014; Shi & Veenstra, 2021; Naveed et al., 2022).

Thus, the purpose of this study is to look into how organizational culture influences the relationship between financial performance and corporate sustainability in Iraqi banks. By doing so, it aims to contribute to academic scholarship and offer practical recommendations on leveraging sustainability as a strategic tool for achieving competitive and financial gains in emerging market environments. For the present study, the research questions that the study aims to answer are:

- 1- What is the impact of corporate sustainability dimensions (social, environmental, and economic) on the financial performance of Iraqi banks?
- 2- How do corporate sustainability dimensions (social, environmental, and economic) influence the organizational culture of Iraqi banks?
- 3- What is the effect of organizational culture on the financial performance of Iraqi banks?
- 4- To what extent does organizational culture mediate the relationship between corporate sustainability and financial performance in Iraqi banks?

Objectives of The Study

The primary objective of this study is to examine how organizational culture mediates the effects of corporate sustainability with dimensions (social, environmental, and economic) on financial performance. The specific objectives are:

- 1) To investigate the effect of corporate sustainability with dimensions (social, environmental, and economic) on financial performance.
- 2) To investigate the effect of corporate sustainability with dimensions (social, environmental, and economic) on organizational culture.
- 3) To investigate the effect of organizational culture on financial performance.
- 4) To examine how organizational culture mediates the effects of corporate sustainability on financial performance.

2. Literature Review

2.1. Corporate Sustainability and Financial Performance

A key component of modern business strategies, corporate sustainability—which encompasses social, environmental, and economic dimensions—has a significant impact on the financial performance of organizations across various sectors, including banking. By improving operational efficiency, strengthening customer loyalty, and enhancing risk management, integrating sustainability into corporate strategies aligns businesses with global trends that favor responsible practices, ultimately enhancing financial performance (Eccles et al., 2014; Awaysheh et al., 2020).

In the specific case of Iraqi banks, implementing sustainability initiatives can improve financial outcomes by creating competitive advantages, lowering operational costs, encouraging innovation, and attracting capital investment.

While corporate sustainability is a broad term that encompasses long-term strategies in environmental, economic, and social areas, the social dimension of corporate sustainability refers specifically to a company's efforts to positively influence society. These efforts include community engagement, employee well-being, customer satisfaction, and ethical business practices. By prioritizing social sustainability, banks can strengthen relationships with clients and communities through initiatives such as responsible lending, financial inclusion, and social programs. These efforts can lead to increased market share, enhanced customer loyalty, and ultimately, better financial performance (Kiron et al., 2015). Social sustainability practices are especially important in ensuring long-term profitability by fostering trust and improving the institution's reputation, both locally and regionally. This is particularly relevant for Iraqi banks, where financial inclusion and social responsibility are critical (Vázquez et al., 2018).

Research indicates that companies with strong social sustainability practices tend to outperform financially due to positive stakeholder perceptions and customer trust (Martínez-Conesa et al., 2017). Additionally, socially responsible banks often face lower regulatory and reputational risks because they are more likely to adhere to national and international labor, consumer protection, and human rights standards (Núñez-Serrano et al., 2020). For Iraqi banks, integrating social sustainability could mitigate risks related to political instability and enhance reputation, both of which are crucial in an unstable economic environment.

Moreover, studies show that the financial advantages of sustainability go beyond cost savings. These advantages include greater resilience to economic fluctuations, improved access to capital, and increased competitiveness (Bocken et al., 2014). Thus, adopting economic sustainability practices—besides being ethically responsible—also positions Iraqi banks to gain a competitive advantage, boost shareholder value, and improve long-term profitability (Hassan et al., 2020).

Corporate sustainability is a strategic tool for enhancing financial performance, particularly in the banking sector, with its social, environmental, and economic dimensions. Incorporating sustainability into operational frameworks can benefit Iraqi banks in several ways, including increasing institutional credibility, optimizing resource use, and promoting long-term customer loyalty. In the complex socioeconomic environment of Iraq, the pursuit of sustainable practices is not merely about corporate social responsibility but becomes a strategic necessity for institutional resilience and competitiveness. These practices, through operational optimization and

reputational capital, not only generate short-term financial returns but also lay the foundation for long-term organizational sustainability and financial stability. Therefore, corporate sustainability in the Iraqi banking sector should be viewed as an investment in long-term economic viability and strategic differentiation, rather than a cost center. Based on these theoretical and empirical findings, the following hypothesis is proposed:

H1: Corporate sustainability with dimensions (social, environmental, and economic) has a significant positive impact on the financial performance of Iraqi banks.

2.2. Corporate sustainability and organizational culture

An increasing number of scholars and practitioners believe that corporate sustainability, which encompasses social, environmental, and economic dimensions, plays a crucial role in shaping organizational culture in addition to being a major driver of financial performance. When sustainability initiatives align with organizational values and practices, they significantly influence the internal environment, particularly in the banking industry. For Iraqi banks, integrating sustainability into their operations can help cultivate a culture that values ethics, innovation, social responsibility, and long-term success. This alignment between organizational culture and sustainability becomes even more essential in Iraq's unstable political and economic climate, as it ultimately supports the overall performance and strategic objectives of banks (Sustainable Banking Network, 2020).

The social dimension of corporate sustainability reflects a bank's commitment to improving societal well-being through community involvement, employee engagement, and ethical business practices. By prioritizing social sustainability, banks foster core values such as honesty, fairness, and inclusivity within their organizational culture. This focus is particularly critical in Iraq, where issues such as youth unemployment, poverty, and social inequality are prevalent (Amarneh & Chamas, 2017). Banks that implement sustainable social initiatives—such as diversity and inclusion programs, employee well-being initiatives, and corporate social responsibility projects—cultivate a culture of trust, collaboration, and social responsibility among their employees.

Moreover, integrating economic sustainability into the corporate culture helps promote accountability and a sense of ownership among employees by aligning their personal goals with the bank's institutional objectives. A sustainability-driven culture encourages financial improvement, reduces waste, and enhances operational efficiency (Bocken et al., 2014). This approach aligns the bank's economic activities with sustainable development goals and leads to favorable financial outcomes (Porter & Kramer, 2011).

Such alignment can increase resilience against external economic shocks and mitigate risks associated with instability in the Iraqi banking sector.

In conclusion, the relationship between organizational culture and corporate sustainability in Iraqi banks is complex and evolving. By integrating social, environmental, and economic sustainability into their operations, banks can profoundly influence their internal culture. This shift promotes ethical behavior, fosters innovation, and reinforces long-term financial planning. As Iraqi banks continue to implement sustainable practices, they are likely to experience significant cultural transformations that will enhance employee satisfaction and engagement, while contributing to broader objectives of social and financial stability. Ultimately, this cultural shift enhances resilience and promotes sustainable growth in a challenging economic environment. In light of these insights, the following hypothesis is proposed:

H2: Corporate sustainability with dimensions (social, environmental, and economic) has a significant positive impact on the organizational culture of Iraqi banks.

2.3. Organizational Culture and Financial Performance

Enhancing operational efficiency is one of the primary ways in which organizational culture influences financial performance. In cultures that emphasize innovation, continuous improvement, and excellent customer service, processes are streamlined, costs are reduced, and productivity increases. For Iraqi banks, which often face resource constraints and administrative roadblocks, establishing a culture focused on efficiency and excellence can significantly improve financial outcomes. When banks prioritize employee empowerment, teamwork, and a shared vision for success, individual efforts are more likely to align with organizational goals, leading to enhanced operational performance (Denison, 1990).

Research has deepened our understanding of the intricate relationships between culture and financial performance. Shi and Veenstra (2015) examined how cultural values moderate the relationship between financial outcomes and corporate social performance (CSP). They found that the cultural context of a country significantly influences the financial impact of CSP, highlighting the importance of local cultural factors. This aligns with Hofstede's (2001) theory of cultural dimensions, which suggests that national culture plays a crucial role in shaping the success of corporate social responsibility (CSR) initiatives and their subsequent financial results.

Further studies have explored how organizational culture consistency affects financial performance. In their research on U.S. organizations, Kotrba et al. (2012) found that consistent cultures—especially when combined with high employee engagement, flexibility, and clear mission statements—

positively impacted metrics like sales growth and market-to-book ratios. However, they also observed that cultural consistency negatively impacted return on assets (ROA), implying that while cultural consistency can benefit certain financial metrics, it may not improve asset efficiency or overall profitability. This finding is in line with Ojo's (2010) research, which highlighted the role of organizational culture in boosting employee loyalty and performance in Nigerian commercial banks.

In the UK, Booth and Hamer (2009) examined the relationship between organizational culture and financial outcomes in businesses and concluded that, while culture is important, other factors—such as market conditions and store layout—often have a larger impact on financial success. This underscores the complexity of financial performance, showing that organizational culture is just one of many factors influencing a company's financial results.

H3: Organizational culture has a significant positive impact on the financial performance of Iraqi banks.

2.4. Organizational culture significantly mediates the relationship between corporate sustainability and the financial performance

Recent research underscores the critical role that organizational culture plays in mediating the relationship between corporate sustainability initiatives and financial performance. According to Guenster et al. (2020), a company's culture significantly influences the acceptance, implementation, and communication of sustainability initiatives. Cultures that promote creativity, adaptability, and long-term strategic thinking—such as adhocracy cultures—are particularly effective at transforming sustainability efforts into profitable outcomes. In contrast, hierarchical cultures, which prioritize stability, control, and structure, may limit the flexibility required for sustainability innovations, thus reducing the potential financial benefits of such initiatives (Globocnik et al., 2020).

The importance of aligning organizational culture with sustainability goals for the successful implementation of such initiatives is also emphasized by Yesil and Kaya (2013). They argue that cultures valuing collaboration, creativity, and long-term strategic goals are better equipped to convert sustainability efforts into measurable financial gains. Thus, organizational culture acts as a mediator, bridging the gap between sustainability practices and financial outcomes.

In research, organizational culture is often selected as a mediating variable because it clarifies the process by which the independent variable (sustainability initiatives) influences the dependent variable (financial performance). Unlike a moderating variable, which merely changes the

direction or strength of the relationship, a mediating variable explains how and why an effect occurs. The literature reviewed for this study suggests that corporate sustainability, with its social, environmental, and economic components, positively influences organizational culture by promoting values like internal discipline, teamwork, and innovation—all of which contribute to improved financial performance in banks. Therefore, organizational culture serves as a mediator that elucidates the process through which sustainability impacts financial outcomes, providing a more comprehensive understanding of the causal links between the variables.

Earlier research further supports the selection of organizational culture as a mediator by demonstrating its role in improving performance and effectiveness. Organizational culture—shaped by shared values, innovation, and operational efficiency—affects a bank’s ability to achieve its financial goals. According to recent studies, organizational culture does not merely act as a contextual or moderating factor between sustainability and financial performance but plays a crucial explanatory role in connecting sustainability practices to financial outcomes (Veenstra & Shi, 2014; Shi & Veenstra, 2021; Naveed et al., 2022).

Additionally, Zohar and Luria (2005) highlight that employee behaviors toward sustainability goals are significantly influenced by organizational culture. A strong culture that prioritizes sustainability increases employee involvement in integrating sustainable practices into daily operations. This, in turn, improves operational efficiency, customer satisfaction, and, ultimately, financial performance. On the other hand, organizations lacking such a culture may struggle to realize the financial benefits of sustainability initiatives. In light of this body of evidence, the following hypothesis is proposed:

H4: Organizational culture significantly mediates the relationship between corporate sustainability and the financial performance of Iraqi banks.

The research model is given below:

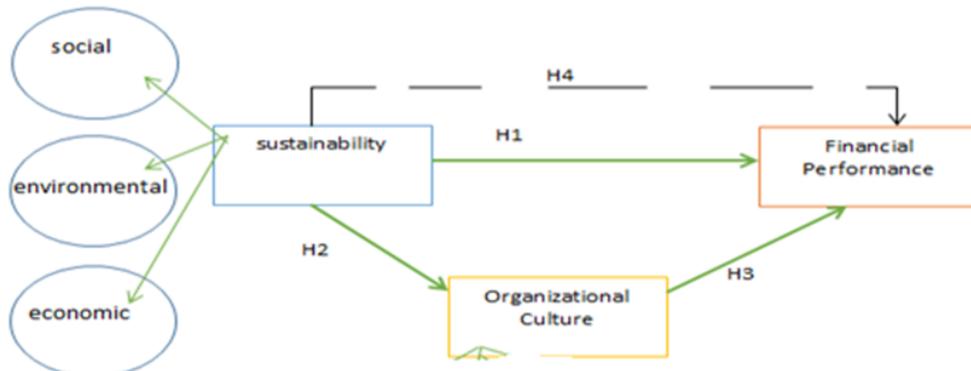


Figure 1: Research Model

3. Research Approach and Design

A variety of primary data sources are used in this study, including books, academic journals, periodicals, reports, and previous research that is relevant to the topic. Reputable online resources also help to establish a strong scientific basis. The main objective of using these diverse sources is to ensure that the study is grounded in trustworthy scientific principles and employs trustworthy research methodologies. The researcher also tries to keep up with the latest developments in the field to ensure that the findings reflect current trends and knowledge.

A specially created questionnaire was used as part of the data collection process in order to methodically collect empirical data that addressed the research questions. The purpose of this instrument was to test the hypotheses of the study. Managers from a range of Iraqi banks, representing a range of educational backgrounds, made up the sample.

3.1 Research Population and Sampling

Managers from Iraqi commercial banks are among the study's target participants. There are 24 registered commercial banks with 2,713 managers and department heads working for them, according to the Central Bank of Iraq (2024).

Because it can yield results that are generalizable to a larger population, a simple random sampling method was chosen for this study. This decision was backed by Bryman and Bell (2015) and Saunders et al. (2009). According to Krejcie and Morgan's (1970) sample size table, the ideal sample size for a population of 2,713 managers was found to be 337. This number takes into consideration possible non-response rates, which in mail surveys can amount to as much as 80% (Khan et al., 2016). This sample size was determined using the formula developed by Krejcie and Morgan (1970).

3.2 Validity Test

Experts in the study's domain evaluated the questionnaire and were asked to confirm the measurement items. Some of the items were considerably altered to better suit the particular context of this study because they were adapted from a variety of sources. The validation process involved eight experts. In order to make the measurements more in line with the context of the study, their input was carefully taken into account. Every expert's remark and recommendation was carefully considered. Together with the matching answers, the table provides a summary of the experts' comments.

Table 1: Experts participated in the validation processes

Expert	University
Hasan Ali Al-Zoubi	Amman Arab University
Hamza Mahmoud Al-Zubaidi	Al-Bayan University
Zakaria Ahmad Azzam	Zarqa University
Shafiq Ibrahim Haddad	Princess Sumaya University
Fares Abdullah Al-Janabi	Al-Mashreq University
Fadel Abbas Al-Amiri	Ibn Khaldun College
Mustafa Saad Al-Sheikh	Zarqa University
Younes Abdulaziz Muqdadi	Amman Arab University

3.3. Response Rates

The study's target population consisted of managerial employees of Iraqi commercial banks. Data collection took place over two months, from March to May of 2025. The entire population included 2,713 managers and department heads, as outlined in Chapter Three. A random sampling technique was employed to ensure representativeness, and based on Krejcie and Morgan's (1970) sampling guidelines, the minimum required sample size for this population was 337 respondents. Accordingly, 337 surveys were distributed. After a thorough review, 328 questionnaires were considered valid and included in the analysis, resulting in an effective response rate of approximately 97.33%.

However, a significant methodological concern arises from the exceptionally high response rate exceeding 97%, particularly given that the sample consisted of senior managers and department heads from Iraqi commercial banks. While this response rate is not impossible, it is unusual in survey-based research involving high-level respondents. The paper does not provide details on the conditions under which data collection occurred, such as whether participation was voluntary, institutionally supported, or personally managed. Without this information, it is difficult to assess potential sampling bias or the generalizability of the results.

Table 2: Response Rate

Response Rate	Respondents No
"Questionnaires Distributed"	337
"Returned and Unusable"	8
"Returned and Usable"	328
"Response Rate"	97.33%

3.4 Direct Effect

H1: Corporate sustainability with dimensions (social, environmental, and economic) has a significant positive impact on the financial performance of Iraqi banks.

Table 3: Coefficient “CS on FP”

Element	B	Mean	S. D	T	P	Result
CS -> FP	0.773	0.773	0.027	29.168	0.000	Accept

H1 is strongly supported empirically by the findings in Table 3, which show that Corporate Sustainability (CS) significantly improves Financial Performance (FP) in Iraqi banks. Enhancements in corporate sustainability practices, such as social responsibility, environmental stewardship, and economic initiatives, are strongly linked to improved financial outcomes, according to the path coefficient ($B = 0.773$), which shows a significant effect. There is strong evidence that sustainability initiatives are not just symbolic but actually have a significant impact on banks' financial performance, as evidenced by the high t-value (29.168) and p-value of 0.000.

These results are consistent with earlier studies showing the strategic importance of corporate sustainability in the banking industry, especially in developing nations where ethical and ecologically conscious business practices can improve stakeholder trust, operational effectiveness, and reputation. Iraqi banks seem to improve their profitability and competitiveness by incorporating social, environmental, and economic aspects into their core business operations. The findings thus highlight the significance of integrating sustainability into organizational strategy as a driver of financial performance and long-term institutional resilience for bank managers and policymakers.

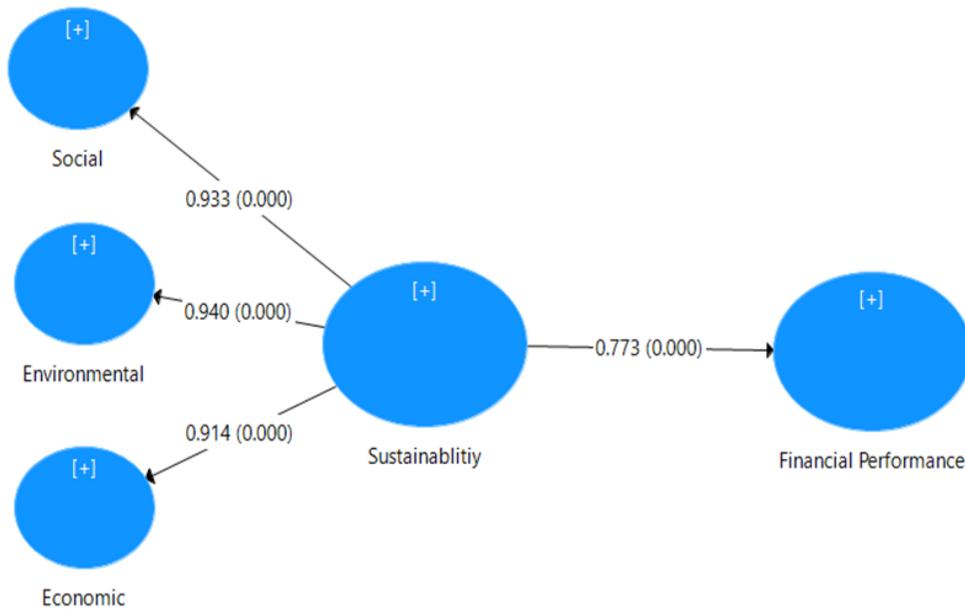


Figure 2: Path analysis test (t) for CS on CF

H2: Corporate sustainability with dimensions (social, environmental, and economic) has a significant positive impact on the organizational culture with dimensions (Clan, Hierarchy, Adhocracy, Market) of Iraqi banks.

Table 4: Coefficient " CS on OC"

Element	B	Mean	S. D	T	P	Result
CS -> OC	0.830	0.830	0.025	33.768	0.000	accept

H2 is strongly supported by the findings in Table 4, which show that Organizational Culture (OC) in Iraqi banks is significantly improved by Corporate Sustainability (CS). In terms of Clan, Hierarchy, Adhocracy, and Market, the path coefficient (B = 0.830) shows a significant effect, indicating that a more developed and successful organizational culture is linked to greater engagement in sustainability practices, including social, environmental, and economic initiatives. Strong evidence for the impact of sustainability on cultural development within banks is provided by the t-value of 33.768 and p-value of 0.000, which both confirm that this relationship is statistically significant at the 0.01 level.

These results demonstrate how important corporate sustainability is in determining organizational culture in the banking industry. Iraqi banks seem to promote cultural traits like teamwork (Clan), organized efficiency (Hierarchy), creativity (Adhocracy), and competitiveness (Market) by incorporating sustainable practices into day-to-day operations and strategic

goals. As a result, a culture that fosters long-term flexibility, innovation, and overall institutional efficacy is established. Sustainability initiatives also improve external performance by fortifying internal organizational values and behaviors.

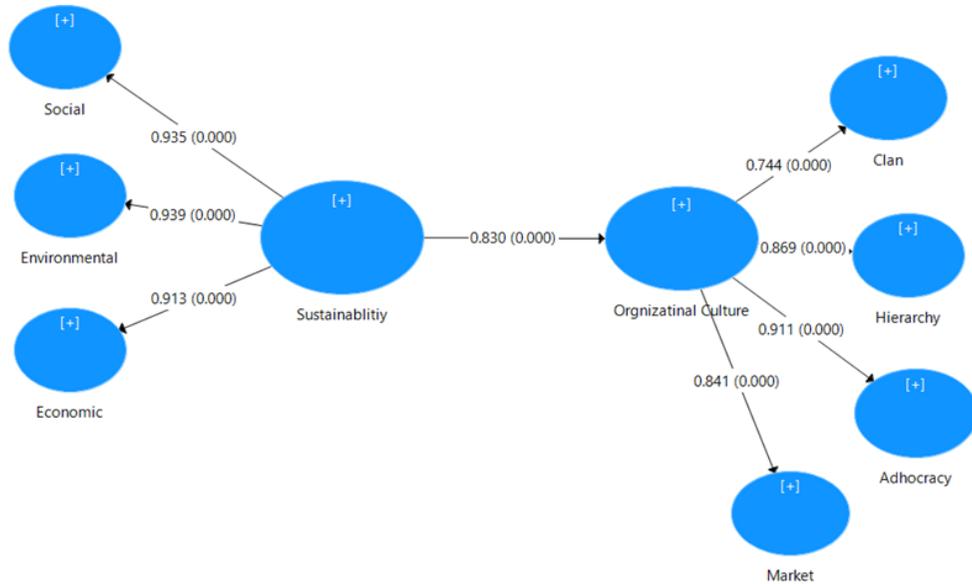


Figure 3: Path analysis test (t) for CS on OC

H3: Organizational culture with dimensions (Clan, Hierarchy, Adhocracy, Market) has a significant positive impact on the financial performance of Iraqi banks.

Table 5: Coefficient “GHR on CP”

Element	B	Mean	S. D	T	P	Result
OC -> FP	0.703	0.703	0.036	19.792	0.000	Accept

H3 is strongly supported by the findings in Table 5, which demonstrate that Organizational Culture (OC) significantly improves Financial Performance (FP) in Iraqi banks. The path coefficient (B = 0.703) shows a significant influence, indicating that the financial success of banks is significantly influenced by well-developed cultural dimensions, including Clan, Hierarchy, Adhocracy, and Market. Internal cultural factors are important drivers of performance outcomes in the banking industry, as evidenced by the t-value of 19.792 and p-value of 0.000, which confirm that this relationship is statistically significant at the 0.01 level.

These results emphasize how crucial it is to develop a robust and well-balanced corporate culture in order to improve financial performance. Banks establish an environment that promotes employee engagement and operational

effectiveness by cultivating innovation and adaptability (Adhocracy), structured processes and efficiency (Hierarchy), communication and trust (Clan), and competitiveness (Market). This emphasizes how organizational culture plays a strategic role in helping Iraqi banks convert their internal capabilities into increased market competitiveness, profitability, and efficiency.

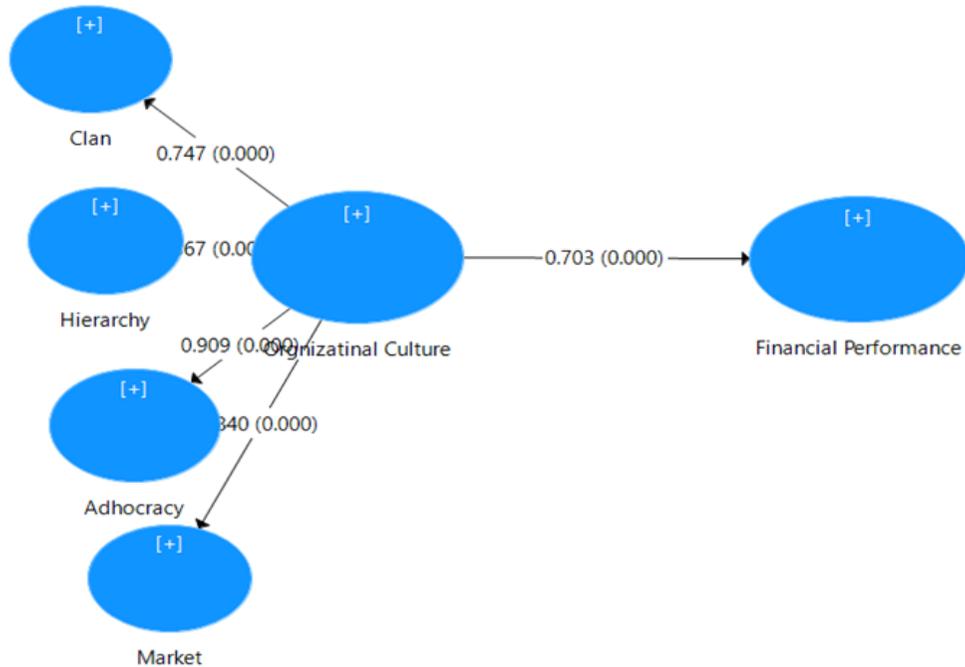


Figure 4: Path analysis test (t) for OC on FP

H4: Organizational culture significantly mediate the relationship between corporate sustainability and the financial performance of Iraqi banks.

Table 6: Coefficient “CS on FP through the mediating role of OC”

Element	B	Mean	S. D	T	P	Result
CS -> FP	0.601	0.599	0.081	7.430	0.000	Accept
CS -> OC	0.833	0.834	0.023	36.520	0.000	Accept
OC -> FP	0.206	0.208	0.081	2.560	0.011	Accept
CS -> OC -> FP	0.172	0.174	0.068	2.536	0.012	Accept

H4 is strongly supported by the findings in Table (6), which show that Organizational Culture (OC) mediates the relationship between Corporate Sustainability (CS) and Financial Performance (FP) in Iraqi banks. While CS has a very strong effect on OC (B = 0.833, t = 36.520, p = 0.000), its direct effect on FP is still positive and significant (B = 0.601, t = 7.430, p = 0.000), suggesting that organizational culture is significantly impacted by

sustainability practices. Furthermore, there is evidence of a partial mediation effect since both the indirect effect of CS on FP through OC (B = 0.172, t = 2.536, p = 0.012) and the path from OC to FP (B = 0.206, t = 2.560, p = 0.011) are statistically significant.

These results imply that although financial performance is directly improved by corporate sustainability, some of its effects are also transferred through enhancements in organizational culture. Sustainability initiatives create an internal environment that further supports financial outcomes by fostering cultural dimensions like efficiency, innovation, competitiveness, and collaboration. This emphasizes how important organizational culture is as a mediating mechanism and demonstrates how Iraqi banks can optimize the financial gains from sustainable practices while also developing a robust and flexible organizational culture.

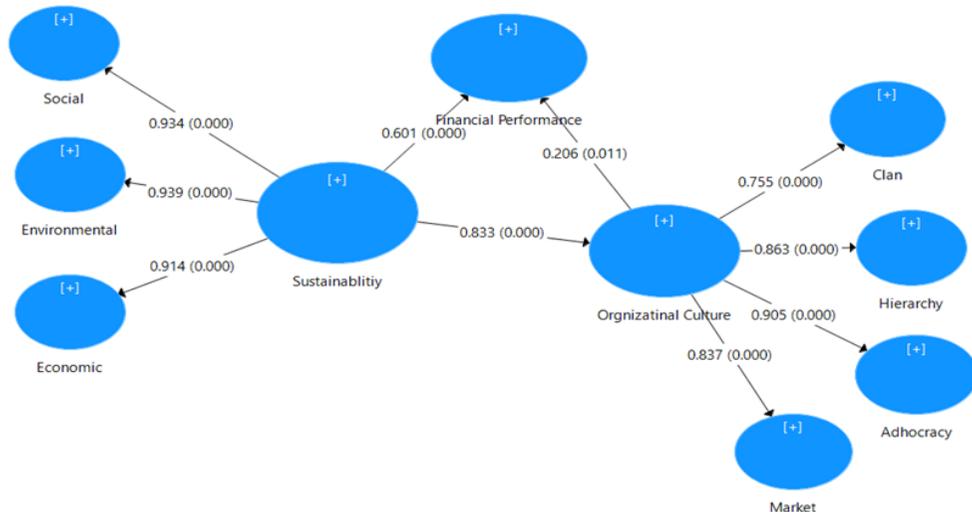


Figure 5: Analysis test (t) for CS on FP through the mediating role of OC

4. Discussion

The findings of this study confirm that corporate sustainability—across its social, environmental, and economic dimensions—significantly and positively influences the financial performance of Iraqi banks. This outcome reinforces previous evidence indicating that sustainability-oriented institutions tend to achieve stronger financial outcomes. For example, Khattak (2020) found that banks operating in Muslim-majority countries with well-established sustainability practices tend to outperform their counterparts financially, highlighting that institutional frameworks and effective governance mechanisms can further enhance the profitability derived from sustainability initiatives. Similarly, Amoh et al. (2025), in their examination of commercial banks in Cameroon, demonstrated that sustainability accounting practices are directly associated with improvements in financial

performance, confirming that transparent and responsible sustainability reporting enhances stakeholder trust and contributes to stronger financial outcomes.

The study also revealed a significant positive effect of corporate sustainability on organizational culture within Iraqi banks. This finding resonates with the results of Abou-Moghli and Al-Kasasbeh (2023), who showed that sustainability initiatives in Jordanian banks help cultivate cultures of accountability, innovation, and employee commitment. Likewise, Alshehhi, Nobanee, and Khare (2018) argued that sustainability practices play an essential role in embedding ethical and environmental values across organizations, ultimately fostering collaboration, trust, and a long-term strategic orientation—characteristics that define a strong and cohesive organizational culture.

Furthermore, the study found that organizational culture has a significant positive impact on the financial performance of Iraqi banks. This outcome aligns with the findings of Ahmed (2024), who demonstrated that organizational behaviors—such as clarity of roles, continuous improvement, and efficient communication—are central to strengthening financial indicators, including return on assets (ROA) and return on equity (ROE). In Jordanian banks, Al-Qudah and Al-Hawary (2022) similarly confirmed that cultural dimensions such as adaptability and mission clarity exert a direct and positive influence on financial outcomes. This is consistent with Denison's model, which posits that strong organizational culture is a foundational driver of superior business performance. In parallel, Akhter and Chaity (2024) found that organizational culture significantly enhances organizational performance in the Bangladeshi microfinance sector, further emphasizing the universal importance of culture as a performance driver across different financial environments.

Finally, the results demonstrated that organizational culture partially mediates the relationship between corporate sustainability and financial performance. This suggests that sustainability initiatives influence financial outcomes not only directly but also indirectly by shaping cultural norms, values, and behaviors that support operational effectiveness. This finding aligns with the broader literature emphasizing internal organizational dynamics as critical mechanisms through which sustainability translates into measurable performance improvements. In essence, sustainability practices help foster a culture that reinforces responsible behavior, strategic alignment, and operational efficiency, thereby amplifying their financial impact within Iraqi banks.

Suggestions for Future Research

Both the study's findings and limitations open avenues for future research to explore.

First, subsequent studies could expand beyond the banking sector to include other industries. Since this research focused solely on Iraqi commercial banks, it would be valuable to investigate whether the observed relationships between corporate sustainability, organizational culture, and financial performance also apply to sectors such as manufacturing, telecommunications, or healthcare. Examining diverse industries would offer a more comprehensive view of the findings' generalizability and reveal industry-specific factors that influence how sustainability efforts affect performance.

Second, future research could adopt a longitudinal design to assess how corporate sustainability, organizational culture, and financial performance evolve over time. Tracking these variables longitudinally would help establish causal connections and provide a clearer understanding of the long-term impacts of sustainability initiatives on organizational culture and financial results.

Third, there is an opportunity to delve deeper into the specific dimensions of corporate sustainability. While this study addressed social, environmental, and economic aspects broadly, future investigations could analyze particular sustainability practices—such as waste management, energy conservation, or community involvement—and their distinct effects on organizational culture and performance. Such detailed insights would enable organizations to focus on the most effective initiatives to maximize their impact.

Fourth, future work could explore additional mediating or moderating factors influencing the link between corporate sustainability and financial performance. Although organizational culture was identified as a partial mediator in this study, variables like leadership style, employee engagement, and regulatory conditions may also play critical roles. For example, examining the influence of transformational leadership or employee empowerment on the effectiveness of sustainability efforts could uncover strategies that enhance organizational outcomes.

Fifth, it would be beneficial to investigate how national and cultural contexts shape the relationships among corporate sustainability, organizational culture, and financial performance. Given that this research was conducted in Iraq, extending the study to other countries with different socio-economic and regulatory environments would help assess the broader applicability of the findings. Cross-cultural research could illuminate how cultural differences affect the adoption and success of sustainability initiatives,

which is particularly important for multinational firms tailoring strategies to local markets.

Finally, future studies could adopt a mixed-methods approach by combining quantitative surveys with qualitative methods such as interviews or case studies. While this research relied on quantitative data, integrating qualitative insights could deepen understanding of managers' perceptions, motivations, and challenges regarding corporate sustainability and organizational culture. This richer, more nuanced perspective would complement statistical findings and offer practical guidance for implementing sustainability practices effectively.

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Appendix
Questionnaire (English Version)

Part 1: Demographic information is for individual level:

We would like to obtain some information about you. Please tick (✓) an appropriate box:

<p>1- Please indicate your gender</p> <p><input type="checkbox"/> Male</p> <p><input type="checkbox"/> Female</p> <p>2- Please indicate your age: _____</p>	<p>3- Please indicate your job experience years: _____</p>
<p>4- Please indicate your highest level of education:</p> <p><input type="checkbox"/> Diploma or below</p> <p><input type="checkbox"/> Bachelor degree</p> <p><input type="checkbox"/> Master degree</p> <p><input type="checkbox"/> PhD</p>	<p>5- What is your background?</p> <ul style="list-style-type: none"> • Accounting and finance • Law and political science • Business and information technology • Public administration • Others - please specify:
<p>6- What is your classification category?</p> <p><input type="checkbox"/> Manager</p> <p><input type="checkbox"/> Assistant manager</p> <p><input type="checkbox"/> Executive director</p> <p><input type="checkbox"/> Head of Department</p> <p><input type="checkbox"/> Other</p>	

Where, [1 = strongly unimplemented, 2 = unimplemented, 3 = normal, 4 = implemented, 5 = strongly implemented].

Part 2: Independent Variables (Corporate Sustainability):

Social Dimension: (Shatnawi (2022))

In your opinion, to what extent do you agree or disagree with each of the statements listed below on a scale from 1 to 5.

NNo	Statement	1	2	3	4	5
Social Dimension						
1	The bank provides financial assistance to educational and health programs for the community.					
2	The bank supports the participation of employees in various social activities.					
3	The bank provides financial donations and assistance to charities and cultural and sports centres.					
4	The bank Employed of the disabled and the unemployed.					
5	The bank provides social and recreational services to its employees and their families.					
6	The bank provides transport, housing, health insurance and social security for its employees.					
7	The bank is interested in customers' suggestions and complaints.					

8	The bank develops product information that guides customers to social responsibility.					
9	The bank improves life standards of its employees by offering them loans.					

Environmental Dimension: (Shatnawi (2022))

In your opinion, to what extent do you agree or disagree with each of the statements listed below on a scale from 1 to 5.

NO	Statement	1	2	3	4	5
Environmental Dimension						
10	The bank uses transportation machinery that contributes to environmental pollution.					
11	The bank implements measures to reduce waste and conserve energy and environmental resources.					
12	The bank supports environmental protection initiatives, such as sustainability programs and green landscaping projects.					
13	The bank uses the best practices for the disposal of office waste and other non-production waste.					
14	The bank has the proper infrastructure and procedures in place to safely dispose of waste.					
15	The bank is committed to adopting procedures that ensure the conservation of environmental resources in its daily operations.					
16	The bank utilizes modern technological solutions to minimize its environmental footprint, such as energy-efficient systems and paperless operations.					
17	The bank seeks to minimize the use of harmful raw materials and adopts environmentally-friendly alternatives in its operations.					
18	The bank complies with environmental laws and regulations, even if they might impact profit margins.					
19	The bank views environmental responsibility as a social and ethical duty.					
20	The bank strengthens its competitive position through a commitment to sustainability and environmentally-conscious operations.					
21	The bank's commitment to green marketing increases consumer trust and loyalty.					
22	The bank promotes sustainability through the application of green marketing strategies, such as offering eco-friendly products or services.					

Economic Dimension: (Shatnawi (2022))

In your opinion, to what extent do you agree or disagree with each of the statements listed below on a scale from 1 to 5.

No	Statement	1	2	3	4	5
Economic Dimension						
23	The bank offers specialized programs to encourage tourism and investments in Iraq.					
24	The bank has developed strategic partnerships and agreements to support and grow Iraq’s trade.					
25	The bank implements initiatives to attract new businesses and foreign investments to Iraq.					
26	The bank invests in developing infrastructure that meets the growing demand for financial services in Iraq.					
27	The bank ensures clarity and accuracy in the information provided to clients and stakeholders before entering into contracts.					
28	The bank maintains transparency and fairness in dealings with potential investors and bidders in Iraq.					
29	The bank ensures that its services and procedures are easy to understand and accessible to clients.					

Part 3: Organisational Culture: (Naveed et al., (2022))

In your opinion, to what extent do you agree or disagree with each of the statements listed below on a scale from 1 to 5.

NO	Statement	1	2	3	4	5
30	My Bank is the very personal place, it is like an extended family, people seem to share a lot of themselves.					
31	My Bank is a dynamic and entrepreneurial place; people are willing to stick their necks out and take risks.					
32	My Bank is very result oriented; a major concern is with getting the job done, people are very competitive and achievement oriented.					
33	My Bank is a very controlled and structured place; formal procedure generally governs what people do.					
34	The manager in my bank is generally considered to exemplify mentoring, facilitating, or nurturing.					
35	The manager in my bank is generally considered to exemplify entrepreneurship, innovation, or risk taking.					
36	The manager in my bank is generally considered to exemplify a no nonsense, aggressive, result oriented focus.					
37	The manger in my bank is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.					
38	The management style in my bank is characterized by teamwork, consensus, and participation.					
39	The management style in my bank is characterized by individual risk taking, innovation, freedom, and uniqueness.					
40	The management style in my bank is characterized by hard-driving competitiveness, high demands, and achievement.					

41	The management style in my bank is characterized by security of employment, conformity, predictability, and stability in relationship.					
42	The glue that holds my bank together is loyalty and mutual trust, commitment to this organization runs high.					
43	The glue that holds my bank together is commitment to innovation and development. There is an emphasis on begin on the cutting edge.					
44	The glue that holds my bank together is the emphasis on the achievement and goal accomplishment.					
45	The glue that holds my bank together is formal rules and policies, maintaining a smoothly running organization is important.					
46	My bank emphasizes human development, high trust, openness, and participation persist.					
47	My Bank emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.					
48	My bank emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace and dominant.					
49	My bank emphasizes permanence and stability, efficiency, control and smooth operations are important.					
50	My bank defines success on the basis of the development of human resources, teamwork, employee's commitment, and concern for people					
51	My bank defines success on the basis of having unique or the newest products. It is a product leader and innovator.					
52	My bank defines success on the basis of winning the marketplace and outpacing competition. Competitive market leadership is key					
53	My bank defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.					

Part 4: Financial Performance: (Shatnawi (2022))

No	Statement	1	2	3	4	5
Financial Performance						
54	For the last 5 years, our return on assets has been substantially better.					
55	For the last 5 years, our sales growth has been substantially better.					
56	For the last 5 years, our profit growth has been substantially better.					
57	For 4 the last 5 years, our return on investment has been substantially better.					
58	For the last 5 years, our operating profits have been substantially 5 better.					
59	For the last 5 years, our cash flow from operations has been 6 substantially better.					
60	For the last 5 years, our 7 earnings per share from operations have been substantially better.					
61	For the last 5 years, our return on equity from operations has been 8 substantially better.					
62	For the last 5 years, our market share from operations 9 has been substantially better.					

The Dual Role of Public Debt in Morocco's Investment Dynamics: Empirical Evidence

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Abstract

This study examines the effect of public debt on investment performance in Morocco over the period 1990–2024. Gross fixed capital formation serves as the dependent variable, while public debt, government expenditure, inflation, and population growth are used as explanatory variables. Using the Autoregressive Distributed Lag (ARDL) approach, the analysis captures both short-run and long-run dynamics. The results reveal that in the long-run, public debt has a negative and statistically significant effect on investment, which suggests that excessive indebtedness challenges capital formation. In the short-run, only public debt has a temporary positive impact that fades over time. The negative and highly significant error correction term confirms a stable long-run relationship between the variables. Diagnostic tests indicate that the model is free from serial correlation, heteroskedasticity and instability. Globally, the findings underscore that while debt can initially stimulate investment, sustained debt accumulation could hinder it, highlighting the importance and need for prudent debt management and more efficient use of borrowed resources in Morocco. These outcomes suggest that an appropriate composition of public debt and efficient public investment management is crucial for sustaining private investment and long-term

economic growth in Morocco, providing policy-relevant insights for fiscal authorities seeking to balance debt sustainability with investment-led development.

Keywords: Public debt, investment, ARDL model, fiscal policy, Morocco

Introduction

In recent years, particularly in the wake of the COVID-19 crisis, the global economy has faced significant and persistent fiscal pressures, rising public debt levels, and structural challenges. With global public debt reaching unprecedented levels, understanding its implications for productive investment and long-term economic performance has become increasingly critical. According to the International Monetary Fund (IMF), global public debt reached approximately USD 98 trillion by the end of 2024, representing about 94% of global GDP, and is projected to approach 100% of GDP by 2030. This situation reflects the cumulative effects of sustained fiscal deficits—averaging around 5% of global GDP—driven by post-pandemic recovery measures, increased social spending, and rising debt-servicing costs. Although private borrowing has declined in some economies, governments worldwide continue to rely heavily on public debt to finance investment and social expenditure.

Within this global context, Morocco faces similar fiscal challenges. Public debt reached around 70% of GDP in 2024, a level that exceeds prudential thresholds commonly recommended by international institutions. Although this level of public debt is partly associated with large-scale investments in infrastructure, energy, and industrial development, several analysts, including El Moussaoui (2025), warn that Morocco's rising debt heightens vulnerability to external shocks and highlights the need for improved fiscal governance (World Bank, 2024). Despite these challenges, investment remains a central pillar of Morocco's development model. Gross fixed capital formation reached one of the highest levels in the region, accounting for 28.8% of GDP in 2023, with public investment representing approximately 9% to 10% of GDP. In contrast, private investment has expanded more slowly due to financing constraints and regulatory barriers.

Despite growing attention from policymakers and researchers to public debt dynamics, empirical evidence regarding the effect of public debt on investment remains mixed. Some studies associate debt accumulation with enhanced productive capacity, particularly when borrowing is directed toward infrastructure and capital formation, as highlighted by Marmullaku et al. (2021) and Tarawalie et al. (2021). In contrast, other studies, such as Mendonça (2021), Picarelli et al. (2019), and Islam (2024), report a negative impact of public debt on both public and private investment, especially in

highly indebted economies. Additional research points to a non-linear relationship, suggesting that debt may stimulate investment below certain thresholds but become detrimental once these levels are exceeded (Penzin et al., 2022). However, these findings remain divergent. Moreover, a substantial part of the literature focuses primarily on the public debt–growth nexus, treating investment mainly as a transmission channel rather than as a central outcome variable.

Despite the extensive empirical literature on public debt and macroeconomic performance, several important gaps remain, particularly in the Moroccan context. Existing studies predominantly rely on cross-country panel analyses or concentrate on economic growth, providing limited Morocco-specific evidence on the direct impact of public debt on investment. Furthermore, few studies explicitly distinguish between short-run and long-run effects of public debt on investment, despite the relevance of such dynamics for economies experiencing sustained fiscal expansion. In addition, the debt–investment relationship in Morocco has rarely been examined over a long time horizon that captures major macroeconomic shocks, including recent post-crisis periods.

To address these gaps, this study analyzes the impact of public debt on investment performance in Morocco over the period 1990–2024, using gross fixed capital formation as the central dependent variable. By employing the Autoregressive Distributed Lag (ARDL) approach, the analysis captures both short-run and long-run dynamics, allowing for the identification of the dual role of public debt. Beyond contributing to the Moroccan case, this study also offers insights relevant to other emerging economies seeking to reconcile debt sustainability with long-term investment-led growth.

This paper is structured as follows. The next section reviews the relevant literature, followed by the model specification, data sources, and estimation methodology. The empirical results are then presented and discussed, before concluding with key findings and policy implications.

Literature review

The relationship between public debt and investment has generated divergent findings among economists. While some argue that public debt can stimulate productive investment when used efficiently, others highlight that excessive debt levels may hinder capital formation and, consequently, economic growth.

A body of literature highlights the positive role of public debt in stimulating investment, particularly when borrowed funds are allocated to productive expenditures. In this context, debt-financed investment can improve the economy's productivity through the increase of the marginal productivity of private capital and labor. This expansion of productive

potential can, in the long-term, stimulate private investment and consumption, as improvements in infrastructure tend to enhance efficiency and reduce the costs of production across the economy. As shown by Leduc et al. (2013), well-targeted and public investments financed by debt can lead to positive effects on economic activity, supporting sustainable long-run growth. On the same perspective, Tarawali et al. (2021) find that external debt represents an additional source of capital, fulfilling the financing gap faced by developing economies, which helps promote investment and economic growth. Within this framework, a moderate and well-managed level of public debt can serve as a complementary financial tool that supports productive capital accumulation. Evidence from a study on a sample of European transition economies from 1995 to 2017, done by Marmullaku et al. (2021), reinforces this perspective by finding that public debt positively influences economic growth through public investment, suggesting that borrowing can be an effective tool for financing capital formation in emerging economies. They concluded that financing capital investment through public debt levels can lead to greater economic growth by expanding investment under certain appropriate fiscal conditions. However, Penzin et al. (2022) identify a non-linear relationship between public debt and private investment in emerging economies. Using a threshold regression model, they find that below a threshold of 3%, public debt exerts a positive effect on private investment by financing productive activities and improving macroeconomic conditions. Their findings suggest that low, well-managed and controlled debt ratios can generate a crowding-in effect that supports investment and economic growth, before a reverse effect occurs when public debt exceeds the threshold. In a similar non-linear perspective, Kamiguchi (2023) finds that when an economy is dynamically inefficient, that is, when the growth rate exceeds the return on capital, investments financed through debt can improve economic growth by increasing productivity. By contrast, in a dynamically efficient economy, where the growth rate is lower than the return on capital, debt-financed public investment can hinder economic growth unless public capital generates high productivity gains. Consistent with this view, Mabula et al. (2019) show that public debt can have a dual effect; it may crowd-in private investment when used to finance infrastructure, but it can also crowd-out private investment. High public debt ratios force the government to increase future taxes to service the debt.

While moderate levels of public debt can stimulate productive investment, a growing body of empirical evidence highlights the adverse effects of excessive debt on investment performance. Elevated debt burdens can reduce the government's ability to finance new investments or respond to economic shocks, crowd out private capital and weaken public investment capacity, that way constraining long-term economic activity. For instance

Mendonça (2021), employ a panel of 24 emerging economies from 1996 to 2018, finds that increases in the debt-to-GDP ratio lead declines in both public and private investment, with the effect being intensified after the 2007-2008 global financial crisis. The author attributes this result to rising debt-servicing costs and tighter fiscal constraints, which limit the government's capacity to sustain public sector investment. In a similar perspective, Picarelli et al. (2019) report that for every 1% increase in public debt, public investment declines by 0,03%, particularly in countries with already high debt ratios. These results support the crowding-out effect, where debt accumulation diverts resources away from productive capital formation. Furthermore, Islam (2024), using multi-wave firm-level panel data from developing economies, shows that higher public debt ratios significantly reduce private investment, particularly when increased government indebtedness challenges the access of firms to credit. The study also identifies a transmission channel where rising debt levels lead governments to increase taxation and administrative controls to finance debt servicing, creating fiscal and bureaucratic burdens that discourage private investment, especially for small and medium-sized enterprises. Focusing on the region of Eastern Africa, Otieno (2024) uses a Spatial Durbin Fixed-Effects (SDM-FE) model and finds that external public debt has a negative spillover influence on regional growth activity. The results also indicate that excessive borrowing reduces both domestic and foreign investment by reducing fiscal space, raising interest rates, and increasing macroeconomic uncertainty. The study recommends the need for prudent debt management to support investment and ensure stable economic growth in interdependent regional economies. In a more country-specific analysis, Çerpja (2024) finds that external public debt impacts negatively and significantly public investment in Albania in the long-run, while internal debt remains insignificant. The author attributes this outcome to the fact that external debt may hinder capital formation when it is not directed toward productive sectors.

These findings are consistent with the findings of Ncanywa (2018), who used an ARDL, Granger-causality, impulse-response and variance-decomposition techniques to report that public debt impacts negatively on investment in South Africa. The study also identifies a bidirectional causal relationship between public debt and growth, suggesting that high debt levels slow growth, which in turn intensifies fiscal pressures.

Globally, this body of literature dives into one conclusion, the fact that elevated public debt levels tend to decrease investment performance. This finding is commonly explained by the financial crowding-out effects, reduced fiscal space for productive investment, increased regulatory and administrative burdens and heightened macroeconomic uncertainty.

Overall, the literature reveals that the effect of public debt is not uniform but depends on its level, composition and the way in which borrowed funds are allocated and managed.

Data and methodology

Data and model specification

The study examines the effect of public debt, government expenditure, inflation and population growth on investment in Morocco. In line with previous empirical studies such as Çerpja et al. (2024) and Ncanywa et al. (2018), gross fixed capital formation (GFCF) is employed as a proxy for investment, as it reflects capital accumulation through expenditures on fixed assets that boost productive capacity. Public debt is included as the main independent variable to capture the government’s fiscal stance and its reliance on borrowing to finance expenditure and investment. Government expenditure is employed to account for the role of fiscal policy in supporting aggregate demand and public infrastructure, while inflation is used to reflect macroeconomic stability, as price fluctuations influence investment decisions through uncertainty and real interest rates. Finally, population growth is included to capture demographic pressures that may affect investment requirements and per capita capital formation. The data are collected on an annual basis from the World Development Indicators (WDI, 2025) and the International Monetary Fund (IMF, 2025) databases over the period from 1990 to 2024. Table 1 offers a detailed summary of the variables and their sources, while Figure 1 illustrates the yearly trends of the variables employed in the analysis. The following model represents the empirical assessment of the analysis:

$$GFCF_t = \alpha_0 + \alpha_1 DBT_t + \alpha_2 GOVEX_t + \alpha_3 INFL_t + \alpha_4 POP_t + \epsilon_t$$

Where $GFCF_t$ indicates gross capital formation, used as the dependent variable, DBT_t represents the general government gross debt, $GOVEX_t$ refers to general government final consumption expenditure, $UNEMP_t$ stands for unemployment, $INFL_t$ represents inflation measured by consumer prices and POP_t refers to population growth.

Table 1: A summary of the parameters and their sources.

Parameter	Description	Source
GFCF	Gross capital formation (% of GDP)	World Bank (WDI)
DBT	General government gross debt (% of GDP)	International Monetary Fund (IMF)
GOVEX	General government final consumption expenditure (annual % growth)	World Bank (WDI)
INFL	Inflation, consumer prices (annual %)	World Bank (WDI)
POP	Population growth (annual %)	World Bank (WDI)

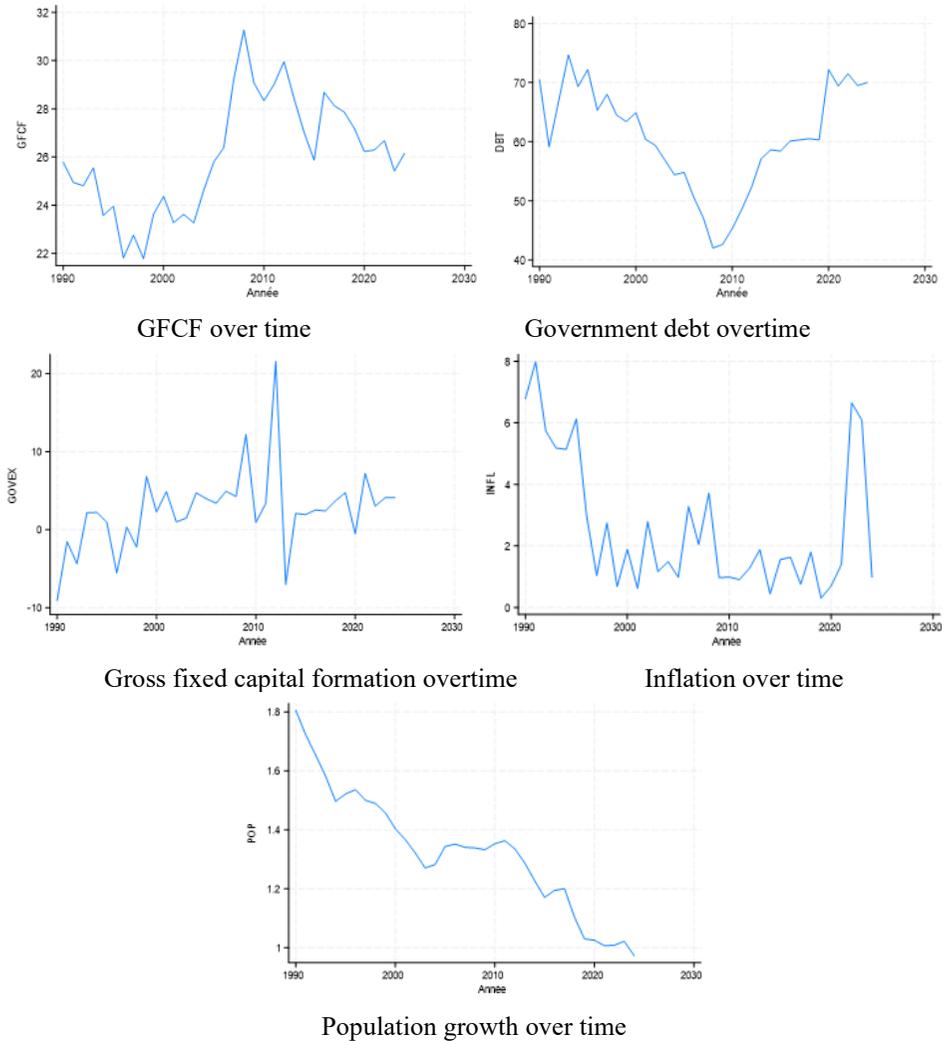


Fig. 1. Yearly trends of the variables

Methodology

Figure 3 presents the step-by-step methodological framework used and followed to perform this study. The first step of the analysis is based on the testing of the stationarity of the data. Implementing unit root tests is a crucial and necessary step, as it helps prevent misleading regression findings. However, the effectiveness of unit root tests can depend highly on sample size. Therefore, the use of multiple tests is recommended to reduce the possibility of misinterpreting the integration characteristics of the time series (Raihan & al.2025). To confirm the integration order of the variables and rule out I(2) processes, both the Augmented Dickey–Fuller (ADF) test (Dickey & Fuller, 1979) and the Phillips–Perron (PP) test (Phillips & Perron, 1988) have been

mobilized. After the verification of stationarity, we proceeded to the estimation of the ARDL bounds cointegration test introduced by Pesaran & al. (2001). This approach gives the ability to confirm the existence of a long-term relationship between the variables and accommodates regressors integrated of different orders, specifically I(0) and I(1). We used the Stata ardl command to estimate the ARDL model, applying the Akaike Information Criterion (AIC). The use of AIC ensures an optimal balance between model fit and parsimony while reducing the risk of over-parameterization. A maximum of four lags is permitted to capture the dynamic structure of the variables while preserving degrees of freedom. Moreover, although potential endogeneity concerns may arise in the relationship between public debt and investment, the ARDL framework helps mitigate this issue by incorporating lagged values of the explanatory variables and allowing for dynamic adjustments over time, thereby reducing simultaneity bias. The bounds test examine the null hypothesis of no long-run relationship using the F-statistic. If the value of F-statistic appears to be greater than the critical bounds, the null is rejected and the existence of cointegration is confirmed.

The following equation represents the ARDL bounds test:

$$\begin{aligned} \Delta GFCF_t = & \sum_{i=1}^p a_i \Delta DBT_{t-i} + \sum_{j=0}^{q_1} \beta_j \Delta GOVEX_{t-j} + \sum_{i=0}^{q_2} \beta_i INFL_{t-i} \\ & + \sum_{l=0}^{q_3} \beta_l \Delta POP_{t-l} + \alpha_1 GFCF + \alpha_2 DBT + \alpha_3 GOVEX \\ & + \alpha_4 INFL + \alpha_5 POP + \varepsilon_t \end{aligned}$$

Δ refers to the first-difference operator, The coefficients $a_i, \beta_j, \beta_i, \beta_l$ refer to the short-run dynamic coefficients, while α_1 to α_6 denote the long-run relationship coefficients, ε_t denotes the error term. Once the cointegration is established, the long-run coefficients are obtained from the level terms in the ARDL model, while the short-run dynamics are from the differenced terms. The Error Correction Term (ECM) is included to indicate the speed of adjustment toward the long-run equilibrium after a disturbance. Jarque-Bera test is employed to verify the normality of residuals, Breusch-Godfrey LM is used to test autocorrelation, and Breusch-Pagan is applied to examine the heteroskedasticity. Moreover, we conduct the cumulative sum of squares test (CUSUMQ) to assess the stability of the ARDL model over the period of study.

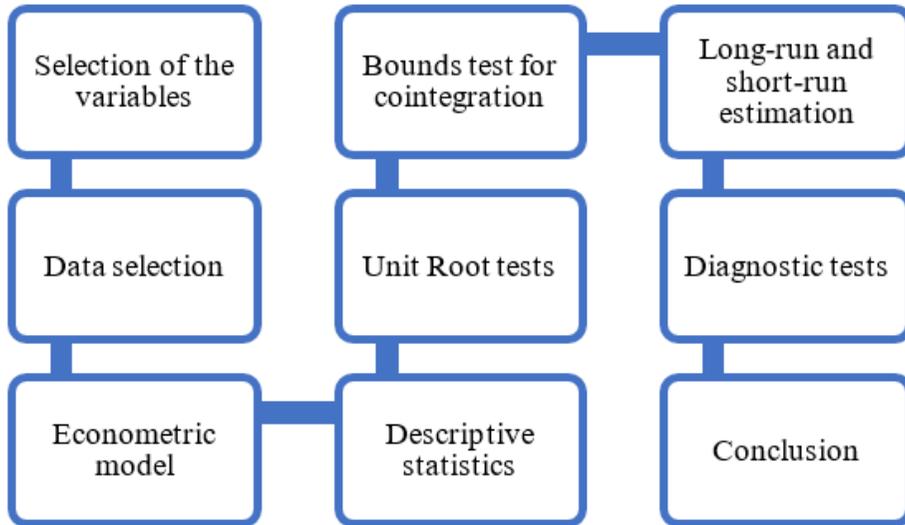


Figure 2: Flowchart of the study

Results and discussion

Table 2 presents the descriptive statistics for the variables employed in the study. The results show that gross fixed capital formation has an average value of 26.02% of GDP, with a standard deviation of 2.38%, suggesting moderate fluctuations in investment activity. The minimum and maximum values, 21.78% and 31.27%, respectively, indicate that Morocco experienced both periods of lower and higher capital accumulation during the study period. Public debt records a mean of 60.61% of GDP, with a standard deviation of 8.87%, and values ranging between 42% and 74.7%, highlighting a relatively high but variable debt ratio. Government expenditure averages 2.47%, with a standard deviation of 5.24% and extreme values between -9.10% and 21.57%, reflecting strong fiscal variations over time. Regarding inflation, the mean value stands at 2.59%, with a standard deviation of 2.19%, and a range between 0.30% and 7.99%, indicating moderate but noticeable price volatility. Finally, population growth presents a mean of 1.33%, a low standard deviation of 0.21%, and values varying between 0.97% and 1.81%, illustrating steady demographic dynamics in Morocco throughout the observation period.

Table 2: Descriptive Statistics

Parameter	Mean	Std. Dev	Min	Max
GFCF	26.02033	2.375884	21.78203	31.26829
DBT	60.60571	8.870007	42	74.7
GOVEX	2.473179	5.237959	-9.101539	21.57288
INFL	2.594138	2.190673	0.303386	7.986166
POP	1.326268	0.2084438	0.9728276	1.80544

Table 3 reports the results of the unit root tests performed using both the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) methods to assess the stationarity of the variables. The results reveal that government expenditure is stationary at level, indicating integration of order I(0), with both ADF and PP tests showing significance at conventional levels. Meanwhile, gross fixed capital formation and public debt are non-stationary at level but become stationary after first differencing, confirming their integration of order I(1). The same case goes for inflation and population growth, they are also integrated of order I(1), as both series only achieve stationarity after first differencing under the two tests.

Overall, the outcomes confirm a mixture of I(0) and I(1) variables, with no variable integrated of order two I(2). This justifies the use of the Autoregressive Distributed Lag (ARDL) model, which is suitable for datasets containing variables that are either stationary at level or at first difference.

Table 3: Unit Root Test Results (ADF and PP).

Parameter	Test type	Level (p-value)	First Difference (p-value)	Order of Integration
GFCF	ADF	0.7268	0.0063	I(1)
	PP	0.6140	0.0000	
DBT	ADF	0.9729	0.0152	I(1)
	PP	0.9059	0.0000	
GOVEX	ADF	0.0021		I(0)
	PP	0.0000		
INFL	ADF	0.1222	0.0003	I(1)
	PP	0.0921	0.0000	
POP	ADF	0.1774	0.0028	I(1)
	PP	0.2100	0.0153	

Table 4 displays the results of the ARDL bounds test for cointegration. The results show that F-statistic value of 4.796 exceeds the upper critical bound value of 4.01 at the 5% significance level, which leads to the rejection of the null hypothesis of no long-run relationship among the variables. This result confirms the existence of a stable long-run cointegration between gross fixed capital formation and the explanatory variables included in the model.

Table 4: Bounds Test for Cointegration

Test statistic	Value	I(0) Bound	I(1) Bound	Conclusion
F-statistic	4.796	2.86	4.01	Cointegration exists
K=4				

Table 5 presents the detailed results of the ARDL estimation, revealing both the long-run and short-run links between gross fixed capital formation and its explanatory variables.

In the long-run dynamic, the outcomes indicate that public debt has a statistically significant and negative effect on investment, with a coefficient of

-0.2407 significant at the 1% level, which implies that a 1 percentage point rise in the debt-to-GDP ratio is associated with a decline in investment by approximately 0.24 percentage points in the long-run. This finding suggests that rising public debt discourages private and public investment in Morocco over the long-term, possibly due to crowding-out effects, higher interest rates, or the redirection of resources toward debt servicing rather than productive capital expenditure, this results goes hand in hand with the ones found by Asif & al. (2024) and Hakimi & al. (2019) and Mabula & al. (2019) who found that high public debt tends to crowd out private investment, since it imposes a great burden on the economy and leads to higher future taxation to finance debt servicing, which discourages private sector activity. Meanwhile, government expenditure exerts a positive influence on GFCF (0.1523), implying that public spending can stimulate investment activity by improving infrastructure and boosting aggregate demand. Similarly, inflation has a positive and significant coefficient, which indicates that moderate inflation may enhance investment performances in the long-run, as it can increase nominal returns and stimulate business activity when price expectations remain stable. In contrast, population growth has a negative and significant impact (-0.5074, significant at 5%), suggesting that rapid demographic expansion might reduce per capita investment or strain public resources, leading to reduced capital formation.

In the short-run, public debt presents a positive and significant relationship with investment (0.1362, significant at 5%), indicating that short-term borrowing can temporarily boost capital formation, which may reflect the trajectory of the borrowed value, in other way the financing of ongoing infrastructure projects or fiscal stimulus measures. However, this effect may not be persistent in the long-term if debt levels become unsustainable. Evidence from studies done on other countries such as the research of Tarawalie & al. (2021), who found that external debt is seen as capital that increases investment, bridges the financing gap, and promotes growth, and also Marmullaku & al. (2021) who have also found that public debt has a positive impact on growth and this is achieved through public investment. The non-existence of certain variables in the short-run estimation table is due to the optimal lag selection procedure of the ARDL model, which automatically excludes short-run dynamics that are statistically insignificant. This indicates that short-term variations in these variables do not contribute meaningfully to explaining investment fluctuations for the case of Morocco, their long-run effects remain significant.

The error correction term (ECM) has a negative and highly significant coefficient (-0.5070, $p < 0.01$), confirming the existence of a stable long-run equilibrium between GFCF and its determinants. The coefficient magnitude implies that approximately 50.7% of any disequilibrium from the previous

year is corrected within the current period, demonstrating a moderate adjustment speed toward equilibrium.

Finally, the model shows a strong explanatory power, with an R^2 of 0.8444 and an adjusted R^2 of 0.8085, indicating that about 81% of the variation in investment is explained by the independent variables. Overall, the results reveal that while short-term debt accumulation can stimulate investment, excessive debt amounts have a negative impact on Morocco’s long-run investment capacity, to that can be added the fact that well-targeted government expenditure and moderate inflation may support capital formation.

Table 5: Results of ARDL long- and short-run analysis

Variables	Coefficient	t-Statistic	p-value
Long-run relationship			
DBT	-0.2406662 ***	4.75	0,000
GOVEX	0.1522971 *	1.72	0,097
INFL	0.4715598**	2.20	0,037
POP	-0.507377**	-2.35	0,027
Short-run dynamics			
DBT	0.1362082 **	2.73	0.011
Constant	23.13015 ***	4.01	0.000
Error Correction Term (ECM)	-0.5070044 ***	-4.35	0.000
R-SQUARED	0.8444		
Adjusted R-squared	0,8085		

Note: *p < 0.10, **p < 0.05, ***p < 0.01

Table 6 displays the findings of the diagnostic tests performed to evaluate the statistical reliability of the ARDL estimation. Firstly, the Jarque–Bera test for normality of residuals produced a statistic of 2.04 with a p-value of 0.36, which indicates that the residuals are normally distributed. Secondly, the Breusch–Godfrey LM test for autocorrelation, applied with two lags, yielded a Chi-square statistic of 2.017 and a p-value of 0.3647. This result fails to reject the null hypothesis of no autocorrelation, suggesting that the residuals are free from serial correlation. Finally, the Breusch–Pagan–Godfrey test reported a Chi-square statistic of 0.74 with a p-value of 0.3905, confirming the presence of homoscedasticity. Collectively, the findings of these diagnostic tests provide strong evidence that the ARDL model is well specified and statistically reliable.

Table 6: Diagnostic Tests

Test	Statistic	p-value	Conclusion (5%)
Jarque-Bera test	2.04	0.3600	Residuals normal
Breusch-Godfrey LM test (lag=2)	2.017	0.3647	No autocorrelation
Breusch-Pagan- Godfrey test	0.74	0.3905	Homoscedasticity

Figure 4 reports the result of the CUSUM of Squares (CUSUMQ) test used to assess the structural stability of the estimated ARDL model. The findings show that the CUSUMQ statistics remain within the 5% significance bounds over the entire sample period, which indicates the absence of abrupt structural breaks or sudden variance shifts. This outcome suggests that the estimated long-run relationship and short-run dynamics are stable over time, enhancing confidence in the robustness of the model’s empirical results. Moreover, the smooth trajectory of the cumulative variance, without sharp deviations beyond the confidence limits, supports the validity of statistical inference in the time-series framework.

In addition to the CUSUMQ test, parameter stability was also examined using the CUSUM test. The findings indicate that the CUSUM statistics show some sensitivity during certain sub-periods of the sample. This behavior may reflect gradual adjustments in the estimated coefficients rather than structural instability, particularly given the long observation period (1990–2024), which encompasses major economic reforms, external shocks, and the COVID-19 crisis. Such gradual parameter variations are observed commonly in macroeconomic time-series data, especially over long samples, and do not necessarily undermine the validity of the long-run relationship.

Importantly, the stability confirmed by the CUSUMQ test reveals that any coefficient changes are progressive rather than driven by major regime shifts, supporting the reliability of the ARDL framework in capturing Morocco’s investment dynamics. Overall, the robustness and stability diagnostics provide strong evidence that the main results, particularly the long-term negative effect of public debt on investment, are not driven by model instability but reflect Morocco’s persistent structural characteristics of the economy.

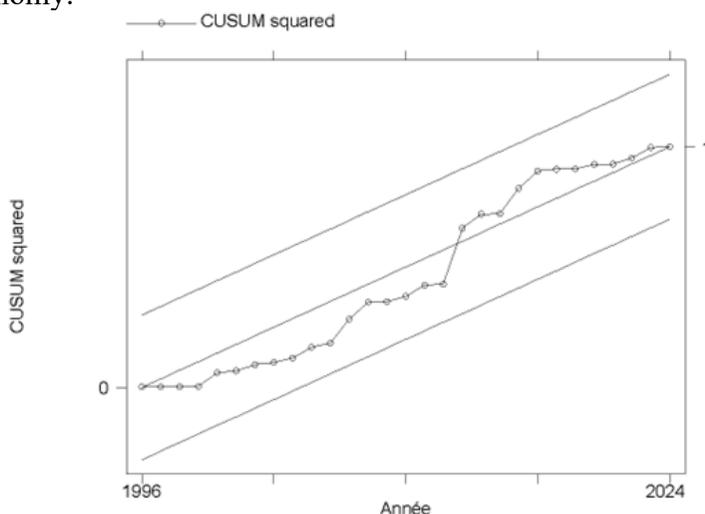


Figure 4: CUSUM of Squares Tests

Conclusion

Our study investigates the relationship between public debt, government expenditure, inflation, population growth and investment performance in Morocco over the period 1990 - 2024, using gross fixed capital formation as the dependent variable. The Autoregressive Distributed Lag approach was employed to capture both short- and long-run dynamics over the study period. As a preliminary step, the Augmented Dickey–Fuller and Phillips–Perron unit root tests were conducted, revealing a mix of $I(0)$ and $I(1)$ variables, thereby justifying the use of the ARDL model. The bounds test results confirmed the existence of a long-run cointegrating relationship between investment and its macroeconomic determinants.

In the long-run, the estimates indicate that public debt exerts a statistically significant and negative effect on GFCF, implying that higher debt ratios tend to crowd out productive investment in Morocco. Conversely, government expenditure and inflation exert positive effects, suggesting that productive public spending and moderate inflation can stimulate investment through improved infrastructure and higher aggregate demand. Population growth, however, exerts a negative and significant impact on investment, reflecting the potential strain of demographic pressures on capital formation and public resources. In the short-run, the results reveal a positive and significant relationship between public debt and GFCF, indicating that temporary borrowing may support investment financing, particularly for infrastructure projects. Nevertheless, this short-term benefit may not be sustainable if debt levels continue to rise without productivity gains. The negative and significant error correction term confirms a stable adjustment process toward the long-run equilibrium.

To assess the robustness of the estimated ARDL model, a series of diagnostic tests was carried out. The results of the Jarque–Bera, Breusch–Godfrey LM, and Breusch–Pagan–Godfrey tests confirmed that the residuals follow a normal distribution, indicated the absence of serial correlation and heteroskedasticity, respectively. Furthermore, the CUSUMQ tests demonstrated that the model’s parameters remained stable over the entire sample period, reinforcing the validity of the long and short-run estimates.

Overall, these findings highlight the dual nature of public debt in Morocco’s investment dynamics, while short-term borrowing can stimulate capital formation, excessive and persistent indebtedness undermines long-run investment potential. The findings of this study provide several important policy implications for Morocco in the context of rising public debt and investment-led development. The results highlight that the composition of public debt is crucial: debt-financed spending should be directed primarily toward productive investments such as infrastructure, energy, logistics, and industrial development, which are more likely to support capital formation and

crowd in private investment. In contrast, excessive reliance on debt to finance recurrent or low-productivity expenditures may weaken long-term investment performance.

Moreover, investment efficiency matters as much as debt levels. The negative long-run impact of public debt on investment underscores the need to strengthen public investment management through improved project appraisal, cost–benefit analysis, and monitoring mechanisms, ensuring that borrowed resources generate tangible productivity gains.

In addition, closer coordination between fiscal policy and investment planning is essential. Aligning public debt management with national investment strategies and medium-term budgetary frameworks would help maintain fiscal sustainability while supporting long-term growth objectives. Finally, avoiding prolonged dependence on debt-financed unproductive spending is critical to preserving fiscal space and reducing vulnerability to external shocks. Public debt should be used primarily to finance projects that yield tangible economic and social benefits, thereby strengthening Morocco’s productive capacity and enhancing citizens’ well-being. Future research could extend this analysis by incorporating institutional quality, fiscal transparency, and budget governance variables to better understand how governance frameworks shape the effectiveness of public debt and investment policies in Morocco.

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Data Availability: All data are included in the content of the paper.

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Exploring the Impact of Parent-Adolescent Conflict on Adolescent Academic Performance, Retention, and Concentration in the South Dayi District, Ghana

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Abstract

Parent-adolescent conflict is a global problem that confronts most families. It remains a key concern due to its consequences on emotional, social, and psychological well-being, as well as its long-term implications for the family and adolescents' overall development. This study explored the impact of parent-adolescent conflict on adolescents' academic performance, retention, and concentration in South Dayi District, Ghana. The objectives of the study were to examine the causes of adolescent-parent conflict on adolescents' academic performance, retention, and concentration, and the consequences of parent-adolescent conflict on adolescents' academic performance, retention, and concentration. This study adopted a qualitative approach and a case study design. Thirty-two (32) participants were purposively selected from two Senior High Schools in the South Dayi District, and the data were thematically analyzed. The findings showed that poverty, neglect of parental obligations, broken homes, early relationships with the opposite sex, and single parenting, among others, were the leading causes of conflict between parents and adolescents. The study also revealed that parent-

adolescent conflict resulted in school dropouts, lack of concentration in school, and early relationships with the opposite sex, among others. It was concluded that the adolescent stage is delicate; therefore, effective interventions and strategies must be initiated by the government in collaboration with district authorities and Non-Governmental Organizations (NGOs), to enable educators, parents, and school counsellors to help adolescents who may be experiencing academic difficulties as a result of conflict at home. It is recommended that schools develop comprehensive counselling services, including frequent counselling sessions, to help students facing challenges at home due to clashes with parents to enable them to focus on their academic work and manage their time properly. In addition, the Government of Ghana, in collaboration with the Ministry of Gender, Children, and Social Protection, should support poor and single parents with alternative Income-Generating Activities (IGAs) to enable them to effectively provide the needs of their adolescents.

Keywords: Phytosociological characterization, *Turraeantho-Heisterietum* association, Banco National Park

1. Introduction

Parent–adolescent conflict is a challenge that confronts families worldwide, including in Ghana. The role of parents in shaping the lives of their adolescents has increased recently due to the high rate of social vices among adolescents. Conflict is a disagreement or struggle between two people or groups with opposing views. The stronger the emotions and intimacy between the people involved, the more likely it is that conflict will emerge (Adams, 2008). Parent-adolescent conflict refers to a situation in which the smooth interaction and relationship between parents and their adolescents is disrupted and characterized by acrimony resulting from disagreement.

In Ghanaian traditional societies, child training was the responsibility of the entire community. However, this trend has changed due to a shift in focus from the extended family system to nuclear families arising from modernization. Child training is no longer the responsibility of the entire community but the unique responsibility of parents. Steinberg (2010), asserts that the early years of adolescence, particularly the period of ages 10 to 15, have been linked with the emergence and escalation of conflict between young adolescents and parents. The more intense conflict that surfaces in the family presents unique challenges to parents and their young adolescents as they attempt to deal with the challenging nature of their relationships.

Many studies on families have found that conflict is part of growing up, but parent-child relationships that are very high in conflict and low in support impair normal adolescent development (Steinberg & Silk, 2002).

Parent-adolescent conflict remains a critical concern because of its adverse consequences on emotional, social, and psychological well-being and the potential long-term implications for the family and the overall development of adolescents. In South Dayi District, evidence suggests that such conflicts are common. However, there is a noticeable dearth of comprehensive research investigating the negative effects of these conflicts on adolescents' academic performance, retention, and concentration.

In view of the critical role education plays in personal and national development, understanding how parent-adolescent conflict affects the academic performance, retention, and concentration of adolescents is vital for parents, educators, counsellors, and policymakers, as it allows for the development of more informed, targeted, and effective strategies to support students, improve educational outcomes, and create a conducive learning environment. This study seeks to explore the impact of parent-adolescent conflict on the academic performance, retention, and concentration of students in the South Dayi District, Ghana. The questions this study seeks to answer are as follows: a) What are the causes of conflict between parents and their adolescents? b) How does parent-adolescent conflict negatively affect the academic performance, retention, and concentration of adolescents?

2. Literature Review

2.1 Causes of Parent-Adolescent Conflict

The related literature underscores that parent-adolescent conflict is a regular occurrence, particularly during early adolescence, and may have a substantial impact on both parents' and adolescents' well-being (Santrock, 2014; Allison, 2000). Conflict tends to escalate during this period due to the hormonal, cognitive, and social changes connected with puberty and the adolescent's search for independence and identity. Adolescents' growing idealism causes them to compare their parents to an internalized image of the "ideal parent," which frequently results in dissatisfaction and tension (Santrock, 2014). Adolescents' cognitive growth leads to conflict by questioning authority, challenging contradictions, and seeking autonomy (Steinberg and Silk, 2002). Teenagers are more prone to argue over personal habits, social ties, clothes, friends, and family rules (Zelege, 2021; Smetana et al., 2006). During early adolescence, mothers and daughters experience frequent and intense conflict.

Poverty, unemployment, and financial stress are associated with increased family conflict. Financial difficulties may limit parental emotional availability and increase irritation, resulting in strained interactions (Conger et al., 2010; Vu et al., 2022). Education level and work-related stress also impact parenting quality, with lower educational attainment and longer working hours associated with less effective parenting and more conflict (Crouter et al., 1999;

Dotterer et al., 2008). Technological improvements and social media have created new points of contention in the field. Parents frequently struggle to manage digital activities, but teenagers appreciate autonomy in media usage, resulting in friction (Buzzetta, 2011; Nanglu, 2014). Furthermore, peer influence and generational or cultural differences may conflict with parental expectations, especially in individualistic societies (Chao, 2001; Collins & Steinberg, 2020; Phinney et al., 2001).

Family structure is also important in this regard. Conflict levels are greater in single-parent and polygamous families, where adolescents may receive insufficient parental participation or uneven treatment (Amato 2001; Al-Sharfi et al. 2016; Macabangon 2022). Pervez and Batool (2016) found that adolescents from polygamous households had distant and detached relationships with their fathers. Marital instability and divorce often affect family dynamics, causing role uncertainty, split loyalties, and increased conflict (Cummings and Davies 2010; Fosco and Grych 2010). Excluding adolescents from decision-making processes frequently impedes effective resolutions of disputes. In contrast, shared decision-making improves relationships and reduces tension (Xia et al., 2004; Steinberg and Silk, 2002). Mental health concerns in parents or adolescents, trauma, and unfavorable childhood experiences exacerbate conflict, frequently with long-term consequences (Frazer et al., 2021; Melching, 2011). Differences in parental and adolescent aspirations for autonomy are linked to higher levels of conflict (Smetana, 2017). Conflict may arise from growing adolescent resistance to parental authority and demands for more autonomy (Rathus, 2014), and parental efforts to maintain control over particular areas related to adolescent safety, home responsibilities, and academic success, on the other hand (Smetana et al., 2006). Conflict between teenagers and parents frequently results from adolescents discovering that they are different from their parents and that their parents can make mistakes. Teenagers who have largely followed their parents' guidance may start to quarrel and deviate (Noller & Collan, 2016). Adolescents from neglectful, indulgent, and authoritarian homes reported higher levels of autonomy expectations, which were associated with more frequent and intense parent-adolescent conflict (Bi et al., 2018).

2.2 Negative Consequences of Parent-Adolescent Conflict on Adolescents' Academic Performance, Retention and Concentration

Parent-adolescent conflict, as a common developmental event, can have serious consequences for adolescents' academic performance (Dotterer et al. 2008). Research indicates that the nature, frequency, and severity of these disagreements can influence academic achievement positively or negatively

(Smetana, 2010; Crosnoe & Johnson, 2011). Adolescents who experience frequent and intense conflicts with their parents are more likely to encounter adverse effects on their academic performance (Crosnoe & Johnson, 2011). Conversely, higher levels of conflict sometimes correlate with increased academic achievement (Gadalla et al., 2016). Adolescents who maintain positive relationships with their parents tend to view conflict as a constructive catalyst for academic success, whereas those with negative relationships may view conflict as detrimental (Smetana et al., 2006). A supportive home environment is vital for optimal learning (Ghana Ministry of Education, 2018), and adolescence is a crucial period for developing academic skills (Jimerson et al., 2000). Frequent and severe disagreements can disrupt learning by inducing stress, anxiety, and impaired cognitive functioning, all of which hinder academic engagement and achievement (Cummings et al., 2006; Goeke-Morey et al., 2009). Teenagers caught in ongoing parent-adolescent conflict often struggle to concentrate, retain knowledge, and perform well in school (Goeke-Morey et al., 2009), increasing the likelihood of withdrawing from school activities and experiencing diminished academic self-efficacy. This disengagement frequently results in poor study habits, absenteeism, and low academic performance (Fosco et al., 2012). The quality of the parent-child relationship plays a significant role; constructive conflicts over academic matters can foster motivation and independence, leading to better outcomes (Smetana et al. 2006). Conversely, conflicts over non-academic issues, such as curfews and friendships, tend to have negative effects (Crosnoe & Johnson, 2011). Conflict within the family can undermine healthy communication patterns and make it more challenging for parents to support their children's academic endeavors (Deater-Deckard et al., 2006). Parents preoccupied with conflict may be less receptive to their children's educational needs or availability, which can decrease their motivation and academic performance (Katz & Woodin, 2002). Furthermore, parent-adolescent conflict can influence how engaged adolescents are with school, including their attitude towards learning, attendance, and participation in extracurricular activities (Lansford et al., 2006). High levels of conflict may directly impede academic achievement by making it difficult for adolescents to focus, retain information and perform well (McGinnis, 2016). Parental support, such as academic advising, supervision, and involvement, can also be disrupted by conflict in the parent-adolescent relationship. Lack of support and inconsistent parenting styles resulting from conflict can harm adolescent motivation, self-esteem, and engagement in their studies (Deb, 2018). Although adolescent conflict with parents is a normal part of development and may facilitate independence, it can also contribute to a decline in academic success over time (Dotterer, Hoffman, Crouter & McHale, 2008). Such conflicts are linked to lower self-esteem, depressive symptoms and feelings of worthlessness (Ozdemire, 2014).

Adolescents who perceive conflict as hostile and leading to social withdrawal tend to have poorer academic performance, lower self-esteem, and less developed social skills than those involved in more constructive conflicts who maintain social interaction afterwards (Collins et al., 2022). A home environment filled with conflict and lacking responsiveness can hinder a teen's learning and diminish their confidence in their academic abilities (Yuin & Yaacob, 2016). Adolescents who report more frequent and intense disagreements with their parents are more likely to engage in problematic behaviors and face academic challenges (Xiong et al., 2008). High conflict levels can lead children to lose interest in learning, reduce their motivation, and struggle to focus and regulate their emotions (Riggio & Valenzuela, 2016). Intrinsic motivation and persistence in tasks are associated with conflicts characterized by warmth, support, and constructive resolution strategies, which can enhance involvement and effort in academic activities, thereby improving academic outcomes (Barber, 2013).

2.3 Theoretical Background: The Social Learning Theory, Attachment Theory and Family Systems Theory.

Social Learning Theory (Bandura, 1977) and Attachment Theory (Bowlby, 1969) explain how unresolved conflict can harm emotional security, influence behavior, and impair relationships with teachers and peers. Conflicts therefore have emotional implications, such as anxiety, sadness, and low self-esteem, all of which are associated with poor academic performance (Fosco & Grych, 2010; Ozdemire, 2014). A lack of effective parental communication and support may discourage adolescents from seeking academic assistance, compounding their low performance (Fan & Chen, 2001; Deater-Deckard et al., 2006). Conflict has the potential to diminish student involvement, raise absenteeism, and impede participation in school activities (Lansford et al., 2006). Economic hardship can exacerbate conflict and limit access to academic resources, especially in low-income families (Conger et al., 2002; Park & Bauer, 2002). Parenting styles and engagement are critical factors. Authoritarian parenting, defined by warmth and strong demands, is associated with improved academic performance (Spera 2005). Neglectful or dictatorial techniques, on the other hand, may demotivate employees and degrade their performance. High parental expectations, along with support and communication, increase academic self-efficacy and motivation (Brotman et al., 2018; Jaynes, 2005).

In essence, empirical studies show that conflict and academic difficulties are linked through both direct (e.g., cognitive disruption) and indirect pathways (e.g., reduced support) (McGinnis, 2016; Deb, 2018). Conflict may also alter adolescents' perceptions of parental warmth and

support, affecting their emotional control and academic attention (Kim et al., 2015; Carrera, 2019).

However, moderate levels of constructive conflict may foster independence, emotional regulation, problem-solving, and communication skills necessary for academic success (Cummings & Davies, 2010; Steinberg & Silk, 2002; Fabes et al., 2018). The study was also anchored on Bowen's (1978) Family Systems theory, which views the family as an emotional unit or system of which all members are interconnected. Thus, according to Bowen (1978), any conflict between parents and adolescents can destabilize family dynamics, creating stress that interferes with adolescents' academic success. Therefore, underscores the fact that family conflicts need to be appropriately managed, as what happens to one member of the family affects all the others. Thus, conflict, stress, or emotional struggles in one relationship (such as between parents and adolescents) can influence the functioning and well-being of other family members, including the adolescent's school performance.

3. Research Methodology

This study used a qualitative approach, and the analysis was based on themes. A qualitative research approach was employed because it enabled the researcher to delve into the participants' experiences, motivations, and feelings (Denzin & Lincoln, 2018). Thematic analysis involves identifying, analyzing, and reporting patterns (themes) within the data (Braun & Clarke, 2006). It minimally organizes and describes the dataset in rich detail and further interprets various aspects paramount to the study (ibid). This was a case study. A case study design was used because it is one of the most practical ways to solve a problem, ascertain the current condition, and gather rich and comprehensive data about the problem at hand in the community (Yin, 2014). In this study, the community involved was that of the inhabitants of South Dayi. A sample of 32 participants was purposively selected from two Senior High Schools (SHS) in the South Dayi District, consisting of 12 adolescents (aged 14-17years), 12 parents, 5 teachers, 2 counsellors, and 1 district education officer at the Municipal Assembly in charge of adolescents. The sample (32 participants) was based on data saturation, in which additional data could not add any new knowledge (Guest, Bunce, & Johnson, 2006). This enabled the researcher to gather rich and credible information on the ground, making the research reliable, worthwhile, and valid. Data were collected using in-depth interviews and focus group discussion guides, and the results were analyzed using a thematic analytical approach. **Table 1** depicts the units of observation and their proportional representation of participants.

Table 1: Unit of Observation and Proportional Representation of Participants

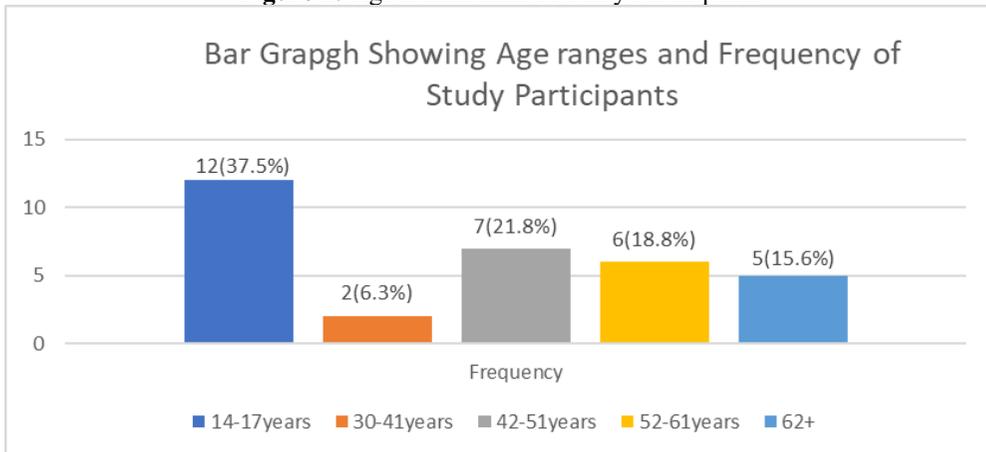
Participant Categories	Total Number	Proportion	Location
Adolescents	12	37.5	Kpeve &
Parents	12	37.5	Kpeve &
Teachers	5	15.625	Kpeve &
School Counsellors	2	6.25	Kpeve &
District Adolescent Officer	1	3.125	South Day District
Total	32	100	

Source: Field Survey, 2024

3.1 The Study Setting

This study was conducted in the South Dayi District of the Volta Region of Ghana. The district is among the 261 Metropolitan, Municipal, and Districts in Ghana and forms part of the 18 Municipalities and Districts in the Volta Region. It was formerly part of the Kpando District until the southern portion was carved out of the Northern Belt to form the South Dayi District in 2004. The district's administrative capital is Kpeve, located in the Volta Region, which shares a boundary with the Asuogyaman District of the Eastern Region. Agriculture is the dominant economic activity in the district, and the major agricultural activities are crop production, animal rearing, and fishing. The main crops cultivated are maize, cassava, yam, and plantain. According to the 2021 population and housing census in Ghana, the total population of the South Dayi District was 57,526, of which the majority, 68.3% of the population, lived in rural areas, while the rest (31.7) lived in urban areas. Males consisted of 49.9% whilst female comprised 50.1%. The population structure depicts a high youthful population of 60.2% between the ages 15-64, with children and adolescents aged 0-14 comprised 33.5%. This signifies a very high adolescent and youthful population in the district and highlights the need to focus on adolescents and youth by addressing their challenges to promote high productivity and development in both the district and Ghana. **Figure 1** depicts the District Map of South Dayi, showing the study sites.

Figure 2: Age Distribution of Study Participants



Source: Field Survey, 2024

Figure 2 shows that the majority of the participants were adolescents aged 14-17 years (37.7 %). Participants between 30-41years constitute 6.3% and those within the ages 42-50years are approximately 21.8%. Participants aged 52-61years are about 18.8% of the sample, and the remaining 15.6% were aged 61 years and above

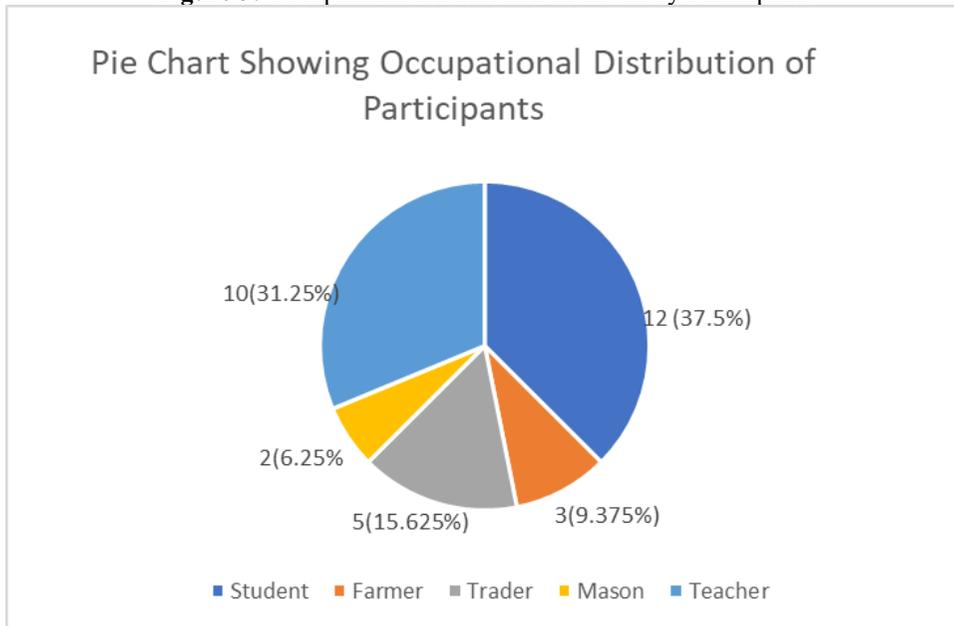
Table 3: Distribution of Caregivers of Adolescents

Parents/Guardians	Frequency	Percentage
Father	1	8.3
Mother	6	50.0
Both parents	2	16.7
Siblings	2	16.7
Self	1	8.3
Total	12	100.0

Source: Field Survey, 2024

Table 3 shows the distribution of adolescents' caregivers. From the table, mothers form the majority (50.0%) of adolescent caregivers. Both parents and siblings of adolescents comprised 16.7% and 16.7%, respectively, while fathers constituted 8.3%, and adolescents who cared for themselves comprised 8.3%. The caregiver distribution implies that many adolescents are being cared for by single mothers, which means that many mothers have to provide for their adolescents' needs singlehandedly. This could be a source of pressure for single mothers, presenting a possibility of inefficiency in extending support to adolescents and a potential source of conflict between single mothers and their adolescents. and the accompanying challenges. In addition, a few of them had to be taken care of by their siblings and, in some cases, by the adolescents themselves, which could be challenging for both the adolescents and their siblings.

Figure 3: Occupational Distribution of the Study Participants



Source: Field Survey, 2024

Figure 3 above is a pie chart showing the occupational distribution of adolescents. The pie chart demonstrates that the majority of the participants were students (37.5 %), followed by farmers (9.375%), traders (15.635%), masons (6.25%), and teachers (31.25%). The teaching occupation outnumbering the other occupations means that caregivers of adolescents are in relatively good jobs but they could be single mothers, making it difficult for caregivers to effectively care for adolescents, hence presenting a potential for conflict.

4.1 Factors Accounting for Parent-Adolescent Conflict.

The causes of parent–adolescent conflict revealed by the study include poverty, neglect of parental responsibilities, broken homes, single parenting, and misattribution by parents.

4.1.1 Poverty

The findings demonstrated that parents who struggle to pay for their adolescents' basic needs, particularly education, frequently have disputes with them. From the participants' perspective, many adolescents expressed that their parents' inability to provide their basic needs as a result of poverty, particularly educational needs such as textbooks, practical fees, feeding fees, provisions, and extra tuition fees, frequently causes conflict between them. Most parents also confirmed this by indicating that their inability to meet the

needs of their adolescents as a result of poverty accounted for the conflict. The study found that most adolescents feel angry and frustrated because they are unable to access the same opportunities as their peers due to financial limitations. Describing the situation, A1, a female adolescent, stated:

“Because of poverty, after my BECE, although my mother asked me to stay in the house and help her sell water, I refused because I want to go to Senior High School. She insisted that I should not go because she did not have the money to send me to school. This brought conflict between us” (A1, 17-year-old female adolescent, Peki 2024).

4.1.2 Neglect of parental responsibilities

Moreover, the study found that most adolescents in the district experience constant parental irresponsibility and feel abandoned and abhorrent because their parents were unable to offer them the required assistance. Participants explained that their parents' inability to fulfil their responsibilities made them feel neglected, leading to resentment and conflict. A few adolescent participants also revealed that their parents, especially fathers, do not even know that they are in school and have never visited them or attended any Parent-Teacher Association meeting for them. According to them, they sometimes cry upon seeing their colleagues' parents visiting. A8, a male adolescent participant narrating his story, said:

“The conflict I have with my father is that he gave birth to me, but he is not taking care of me. He has neglected me ever since I was born. It is said that we should not wish for death, but I wish he was dead so that I know I do not have a father.” (A8, 18-year-old male adolescent, Peki 2024).

4.1.3 Broken Home

Findings also revealed a broken home as one of the leading causes of conflict between parents and their adolescents in the district. A broken home is a term used to describe a home when the parents are not living together as a couple. From the participants' perspectives, many of the adolescents reported that their parents were separated, and some remarried. According to the participants, they have challenges dealing with stepmothers and fathers, as they always receive unfair treatment from their stepparents because they are not their biological parents. A few other participants also reported that they had conflicts with their parents, particularly fathers, because they refused to take care of them after breaking up with their mothers. Sadly, this, according to a few of them, has negatively affected them. For instance, one of the female adolescent participants mentioned that at an early age, 16 years, she started

taking boyfriends with the hope of getting support from them. Explaining the situation, C2, a female school counsellor, narrated:

“According to one of the girls who came to me, her mother and father broke up because of conflict, and her father had to leave the house he built for the mother and went to rent a different place. Now her mother decided to marry another man and brought him to the father’s house, which she (the adolescent) was against. The girl became very angry and refused to talk to her mother and her stepfather, and this brought conflict between the girl and her parents, such that the mother refused to provide her with basic needs. The girl, therefore, went in for a boyfriend who would support her.” (C2, female school counsellor, Peki,2024).

This indicates that the process of separation was awfully difficult for adolescents, as they need to get used to living with stepfathers and mothers in blended families.

4.1.4 Single Parenting

It was also found that most adolescent participants were facing challenges living with single parents. The majority of the participants reported that their parents were struggling to cope with the challenges of single parenthood and financial instability; as such, they find it extremely difficult to provide them with their basic needs, as they are not doing any meaningful work. This lack of involvement from their parents made them feel neglected, fueling conflict and rebellious behaviour. Describing the situation, P1, a 66-year-old female parent participant, has this to say:

“I am a single parent and a farmer, so anytime my daughter asks for money or any other thing that I am not able to provide for her, it tends to lead to tension between us, particularly her practical items, because she is doing home economics. Sometimes I call her father's family, but I do not get any form of assistance from them, and this often bring conflict between my daughter and me” (P1, a 66-year-old parent, Kpeve 2024).

4.1.5 Misattribution by parents

The study findings also revealed that parents' wrongful blame of their adolescents contributed to conflict between parents and their adolescents in the district. From the participants' perspective, a few adolescents stated that frequent criticisms from parents, especially when they believe they are not at fault, make them feel unjustly treated and undermine their autonomy. According to the participants, this triggered anger, rebellion, and resistance in

an attempt to show their innocence. Describing the situation, A6, a male adolescent participant, narrated this:

“On the 26th of October, 2022, I had a conflict with my mother about stolen money. My mother placed Gh¢100.00 on the table and went out, and I was the only one left in the house because my sister went to school. My mother said I was the one who took the money without even giving me the chance to explain myself, but I was not the one who took it. I was unhappy and felt like am being disrespected. I frequently ponder on the clash I had with my mum and this makes me unable to concentrate on my academic work that term I did not do well at school at all” (A6, male adolescent, Kpeve, 2024).

4.2 Negative Effects of Parent-Adolescent Conflict on Adolescent Academic Performance, Retention and Concentration.

Findings revealed a lack of concentration during academic activities, high absenteeism and truancy, poor time management, high school dropout rate and early relationship with the opposite sex among adolescents as the factors that negatively impact adolescents’ academic performance, retention and concentration.

4.2.1 Lack of Concentration

The results of the study revealed that parent-adolescent conflict impairs the adolescent's ability to focus on their studies. Conflict with parents may be extremely stressful for adolescents, who may continue to worry about the tension between their parents and themselves. According to the participants, the majority of the adolescents reported feeling bored and finding it difficult to pay attention in class and to their academics, while they had conflicts with their parents. According to adolescents, conflict with their parents makes them become sad because they frequently reflect on the scenario at home and the words their parents used to them, making it difficult for them to take advantage of any opportunities. According to the participants, recalling the issue always bothers them, making it difficult for them to concentrate in class and on schoolwork. As a result, several of the participants stated that they are unable to concentrate, and even when they force themselves to study, they are unable to recall anything; thus, they always place their heads on the table when the teacher is teaching. In contrast, a few other participants stated that they frequently ask permission to walk outside to relieve themselves and will not return until the session is completed. A5, a male adolescent participant, expressed this concern in the following quote:

“Because of the conflict when I come to prep, I could not focus and learn anything because I continue to think about the issue and when I go to class too and the teacher is teaching, I will just be watching him but my mind will not be on what his teaching because I will still be thinking” (A5, 18-year-old male adolescent, Peki, 2024).

This finding suggests that teenagers who are in conflict with their parents fail to cope with their academic work.

4.2.2 Absenteeism and Truancy

It was also discovered that adolescents who have had conflicts with their parents are less likely to attend school and are more likely to be absent. Regular school attendance allows adolescents to participate in class discussions, complete class exercises and assignments on time, and participate in extracurricular activities. However, according to the participants, many of the adolescents were truant and regularly absent from school as a result of their parents' failure to provide them with their fundamental requirements, including their educational needs, due to conflict. According to the participants, they often lack pens and exercise books to write with, so they have to miss school or leave class to work for others to support themselves. This made them highly stressed psychologically to the point of falling asleep whilst in class. In contrast, a few parent participants stated that they had ceased caring for their adolescents' basic needs to make them disciplined and force them to take instructions seriously. This circumstance is particularly alarming since it undermines the adolescents' efforts to concentrate and do well in school. Speaking about the scenario, A8, a male adolescent participant, disclosed that:

“Formerly, in a class of 40 students, I can say I placed 10th but as this problem started, I sometimes absent myself from school or leave class and go and do some job for people whiles my colleagues are in class learning. This affecting my performance because the time I am supposed to attend class and also study my books is what I use to work for money to enable me fed for myself” (A8, 18-year-old male adolescent, Peki, 2024).

This result shows that adolescents who were absent from school missed out on critical instruction time and were unable to complete class exercises and assignments. This causes gaps in their understanding of the content being taught, making it difficult for them to keep up with their classmates and perform effectively.

4.2.3 Poor Time Management

The result of the study again revealed that, adolescents who had problems with their parents were unable to effectively manage their time at school. According to the participants, the majority of the adolescents claimed that because of the difficulties they were experiencing, they regularly squandered time meant for study to chat with friends and this affected their performance negatively. Meanwhile, effective time management is one of the factors that could help adolescents perform better in school. Talking about the situation, A3, a male adolescent disclosed this:

“I always do not learn and do my homework. I will go to my friends and we will discuss things we do at home” (A3, 17-year-old male adolescent, Kpeve, 2024).

4.2.4 High School Dropout Rate

It was found that a lack of parental support due to adolescent parent conflict made it difficult for some adolescents to remain in school and they had to compromise school to resort to working to fend for themselves and pay for practicals and PTA dues. However, adolescent could not comfortably combine academic work with working effectively, as a result, they finally dropped out of school. A7, a female adolescent participant, described the situation as follows:

“The lack of support as a result of the conflict really affected me a lot. I work to help myself, so I get tired so when I go to class, I always dose off when the teacher is teaching. I wasn’t concentrating and that was why I drop out for about one and half years to sell cloth.” (A7, female adolescent, Peki, 2024).

4.2.5 Early Relationship with the Opposite Sex

Early sexual relationship was one of the effects of conflict among adolescents and their parents in the South Dayi District in Ghana. It was found that adolescents were confronted with financial challenges after having disagreements with their parents. From the participants' perspectives, a few of the adolescents expressed that because they struggle to finance their education, they compromised their moral upbringing by engaging in early sexual relationship with the opposite sex for financial support. Most of these female adolescent participants indicated that they routinely engaged in phone conversations or chats with their boyfriends without attending prep, and that they spent the entire night speaking without resting, causing them to fall asleep in class. Describing the situation, A7, a female adolescent, participant narrated:

“If my father were to be that type of father that will support me, I don’t think I will go out of the house and come back the next morning before going to school. I don’t think I will take a boyfriend that will be calling me during the time that I am supposed to be at preps I spent the whole night talking to my boyfriend, when I go to class I sleep in class.” (A7, female adolescent, Peki,2024).

4.3 Result Discussion

Poverty was found as one of the key causes of parent-adolescent conflict. It was found that parents who found difficulty paying for the basic needs of their adolescents' such as payment of educational needs (textbooks, provisions, extra tuition, among others) had frequent disagreements with parents. This result agrees with the works of Conger et al. (2020), who found that conflict between parents and adolescents is worsened by socioeconomic pressures such as poverty, unemployment, and financial instability. Similarly, Schofield et al. (2010) argue that financial hardships may make it more difficult for parents to assist their children emotionally. It was also found that most adolescents in the district experience constant parental neglect and feel abandoned and neglected by their parents for inability to offer the required assistance they need leads to conflict between parents and their adolescents. Adolescents feel rejected for seeing their peers' needs being met by parent whilst theirs neglected by their parents. This finding gives credence to the Developmental System Theory, which explains that conflict between parents and their adolescents is not solely determined by individual factors, such as personality or temperament, but rather by the complex interactions between the individual and their environment (Lerner, 2018).

Further, a broken home was found to be one of the leading causes of conflict between parents and their adolescents in the district. A broken home is a term used to describe a home when the parents are not living together as a couple but live apart. The majority of the participants indicated that their parents had separated and remarried and they had difficulty living with stepmothers and fathers due to partial treatment. This finding seems to align with Amato (2001), Steinberg & Silk (2002) and Fosco & Grych (2010) who argued that, conflict between parents and teenagers is influenced by the makeup and structure of the household. According to Amato (2001), conflict levels may increase as a result of increased pressures brought on by divorce that destabilize family dynamics. Similarly, Steinberg & Silk (2002), emphasized that, conflict is common in households where teenagers have to adjust to parental remarriage. Families experiencing divorce or separation may have greater levels of parent-adolescent conflict, as adolescents frequently take sides or battle with conflicting loyalties (Fosco & Grych, 2010).

Moreover, it was evident that adolescents had challenges living with single parents. The majority of the participants reported that their parents were struggling to cope with the challenges of single parenthood and financial difficulties. Amato (2001) similarly discovered that conflict levels may increase as a result of increased pressures brought on by single-parent households that destabilize family dynamics. Erroneous blaming of children by parents was another factor resulting in adolescent-parent conflict in the district. Unfair criticisms faced by adolescents make them think they are being wrongfully blamed for misconduct. Adolescents however feel unfairly treated hence undermining their autonomy. Smetana (2011) and Laursen & Collins (2009) also found unjust blaming of adolescents as a factor that disrupts parent-adolescent relationships, creating anger, misunderstanding, and emotional suffering among teenagers. Laursen & Collins (2009), argued that when parents mistakenly blame their children for behavioral problems or home disputes, adolescents may experience emotions of unfairness and dissatisfaction. These sentiments, if not addressed, contribute to ongoing parent-adolescent conflict (Laursen & Collins, 2009).

4.4 Impact of Parent-Adolescent Conflict on Adolescent Academic Performance, Retention and Concentration.

The result of this study shows that parent-adolescent conflict weakens adolescent's ability to focus on their studies. Conflict with parents may be tremendously traumatic for adolescents, who may continue to worry about the tension between their parents and themselves. The majority of the adolescents reported feeling bored and finding it difficult to pay attention in class. According to adolescents, clashes with their parents make them sad because they regularly reflect on the conflict scenario at home and the verbal humiliation from parents makes it difficult for them to concentrate in class and on schooling and school demands. On some occasions, adolescents requested permission from teachers to leave class for some time. Cummings et al. (2006), argued that children frequently experience emotional pain as a result of parent-adolescent conflict, which can affect how well they learn and function cognitively. Goeke-Morey et al. (2009), further emphasized that these negative emotional states are associated with decreased attention, memory problems, and poorer cognitive flexibility. As a result, adolescents who have conflicts with their parents may struggle to focus, recall information, and perform well at school.

It was again found that adolescents who have had conflicts with their parents rarely attended school. The majority of the adolescents were truant and mostly absent from school due to the failure of parents to provide them with the basic school needs. According to the participants, they often lack pens and exercise books to write and have to miss school or leave class to engage in

economic activities to support themselves. This made them highly exhausted and they mostly fell asleep in class. In contrast, some parents confirmed they had stopped the basic need to make them disciplined and take instructions. These findings conflict with the objectives of the Ghana's Ministry of Education (2018), which requires parents to perform their home-school obligations or expectations in order to meet their children's needs, but align with Chung (2015) and Lansford et al. (2006) findings that stressed that, the degree of adolescents' school engagement, including their attitudes about school, commitment to academic work, attendance, and interest in extracurricular activities, is influenced by parent-adolescent conflict.

Findings also revealed that adolescents who had disagreement with their parents were unable to effectively manage their time at school. Adolescents disclosed that, when they had clashes with their parents, they spent more time chatting with friends instead of concentrating on their studies and this affected their performance, retention and concentration in school. According to Smetana (2011), persistent and severe conflicts can affect teenagers' psychological and behavioral functioning, particularly their capacity to properly manage time. Repetti, Robles, & Reynolds (2011), further accentuated that, adolescents who have frequent conflicts with their parents may struggle to focus on their academic and personal duties, resulting in procrastination and poor time management.

It was discovered that a lack of parental support as a result of adolescent-parent conflict made it difficult for some adolescents to remain in school and they finally had to resort to economic activities to help themselves. However, adolescents were unable to combine education with economic activities with ease and finally dropped out of school. This result seems consistent with that of the Ghana Ministry of Education (2018), which emphasized the importance of parental involvement in children's education, stating that parents' involvement in their children's education improves academic success. This finding is also related to that of Yuin & Yaacob (2016), who argued that, parents who want their adolescent children to achieve well in school should stay close to them and provide them encouragement and support to boost their academic self-efficacy. In contrast, conflict-related lack of support and erratic parenting techniques were found to be detrimental to the adolescents' motivation, self-esteem, and academic engagement (Deb, 2018).

Conclusion and Recommendation

The study revealed that parent-adolescent conflict in the district is influenced by a variety of socio-economic and behavioral factors, including poverty, single parenting, broken homes, and the neglect of parental obligations. Furthermore, behavioral issues such as misattribution by parents contribute to strained relationships. The effects of these conflicts on

adolescents' academic performance are severe, resulting in absenteeism, truancy, lack of concentration and poor time management. These findings highlight the need for targeted interventions to improve parent-child relationships and enhance adolescents' academic success. As advocated by Bowen (1978), parents should allow adolescents to develop independence while staying emotionally connected. This implies that open communication and clear boundary-setting should be strengthened, allowing adolescents to express their views respectfully, while parents provide supportive guidance without exerting excessive control over adolescents' behaviour. Besides, the socio-cultural expectations of children by parents in Ghana need some adjustments since children are socialized to adhere to instructions from parents with little space for children to voice their concerns. Based on the conclusion, it is recommended that:

1. Heads of senior high schools should develop comprehensive counselling services, including frequent counselling sessions, to help students focus on schoolwork and manage their time properly.
2. The Ministry of Gender, Children and Social Protection, including local authorities and non-governmental organizations, should provide resources for family support services, adolescent counselling, and conflict resolution programs.
3. Non-Governmental Organizations and Civil Society Groups should organize workshops and mentorship programs to help adolescents develop self-discipline, goal-setting skills, and responsible behaviour.
4. Ghana Education Service, in collaboration with Parent-Teacher Association, should organize a sensitization program for parents on the importance of effective communication, positive discipline, and monitoring their children's activities.
5. The Government of Ghana in collaboration with the Ministry of Gender, Children and Social Protection should support poor and single parents with alternative income generating activities to enable them effectively provide the needs of their adolescents.

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Impact de la dynamique des exportations sur la qualité des infrastructures de transport en Afrique subsaharienne

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Résumé

L'objectif de cette recherche est d'évaluer l'impact de la dynamique des exportations sur la qualité des infrastructures de transport dans 32 pays d'Afrique subsaharienne sur la période 2009–2019. Pour ce faire, un modèle ARDL (AutoRegressive Distributed Lag) dynamique de panel a été utilisé. Des tests préliminaires, notamment ceux de Pédróni (2004) et Westerlund (2007), ont révélé l'existence d'une relation de cointégration à long terme entre les séries considérées. Les résultats montrent que les coefficients estimés sur les exportations et sur le taux de croissance du PIB sont positifs et statistiquement significatifs à la fois à court et à long terme. Par ailleurs, à long terme, les indicateurs institutionnels, tels que la stabilité politique et le contrôle de la corruption, exercent un impact positif et significatif sur l'indice de qualité des infrastructures (routes, aéroports et ports). En outre, l'utilisation des méthodes d'estimation complémentaires, telles que les moindres carrés entièrement modifiés (FMOLS) et les moindres carrés ordinaires dynamiques (DOLS), a permis de confirmer la robustesse des résultats. Ces résultats indiquent que la croissance des exportations contribue de manière significative à l'amélioration de la qualité des infrastructures de transport en Afrique subsaharienne. Cet effet est d'autant plus marqué lorsqu'elle s'accompagne

d'institutions solides, soulignant ainsi le rôle central des échanges commerciaux et de la gouvernance dans le développement des infrastructures.

Mots-clés : Infrastructures de transport, Exportations, ARDL en panel

Impact of Export Dynamics on the Quality of Transport Infrastructure in Sub-Saharan Africa

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Abstract

This article examines the impact of export dynamics on the quality of transport infrastructure in 32 sub-Saharan African countries over the period 2009–2019. The analysis is conducted within the framework of a dynamic panel ARDL model. Preliminary cointegration tests, namely those of Pedroni (2004) and Westerlund (2007), confirm the existence of a long-run equilibrium relationship among the variables. The empirical results reveal that exports and GDP growth exert positive and statistically significant effects on infrastructure quality both in the short and long run. In addition, institutional factors, particularly political stability and control of corruption, are found to enhance infrastructure quality in the long run. Robustness checks performed using fully modified least squares (FMOLS) and dynamic ordinary least squares (DOLS) corroborate these findings. The evidence suggests that sustained export growth, when accompanied by strong institutional frameworks, plays a crucial role in improving the quality of transport infrastructure in sub-Saharan Africa. These results highlight the complementary role of trade expansion and governance in fostering infrastructure development.

Keywords: Infrastructure, Exports, Panel ARDL, Institutions

Introduction

La qualité des infrastructures constitue un facteur déterminant pour la compétitivité internationale, la connectivité des marchés et le développement économique, et reste une nécessité pour les pays en développement dans leur processus d'industrialisation. Théoriquement, la relation entre les dépenses en

infrastructures et la croissance économique a été mise en évidence par Barro (1990). D'autres auteurs se sont intéressés à cette relation, c'est le cas de Escribano et al. (2010) qui montrent qu'un faible niveau d'infrastructures ainsi que de services de transport et de commerce accroît les coûts de transaction, limite la production rurale et restreint l'accès des populations aux marchés, exerçant ainsi un effet négatif sur l'activité économique. De même, Melo et al. (2013) soulignent que la qualité des infrastructures de transport, grâce aux effets de réseau, favorise le développement socioéconomique des États.

Les initiatives menées par des organisations telles que la Banque mondiale et les programmes d'aide au commerce ont permis aux économies en développement d'accroître leur participation dans la chaîne de production mondiale, en se spécialisant dans des segments spécifiques (Amendolagine et al., 2019). La littérature économique montre que de bonnes performances à l'exportation améliorent l'efficacité des entreprises, permettent des économies d'échelle et favorisent l'utilisation optimale des ressources, renforçant ainsi la position des pays sur le marché mondial (Ram, 1987). Une infrastructure de transport bien développée réduit les coûts logistiques, facilite la circulation des biens et optimise l'utilisation des facteurs de production tels que le travail et le capital (Bruinsma et al., 1989 ; Schwab, 2018 ; Cho, 2014).

Des études empiriques confirment ces travaux. Pérez et Wilson (2010) observent un effet positif et significatif de la qualité des infrastructures sur la dynamique des exportations dans 101 pays, incluant les économies en développement. Kodongo et Ojah (2016) montrent que la croissance économique en Afrique subsaharienne dépend des dépenses publiques en infrastructures routières, tandis que Rehman et al. (2020) trouvent que des infrastructures de transport efficaces (routes, voies ferrées et aéroports) augmentent les exportations et réduisent le déficit commercial en Asie du Sud. Les infrastructures portuaires jouent également un rôle crucial pour le commerce extérieur, puisque 80% des échanges mondiaux transitent par la voie maritime (CNUCED, 2018). Les auteurs comme Munim et Schramm (2018) confirment que la qualité des ports influence positivement le commerce dans les pays en développement, tandis que Celbis et al. (2014) soulignent que les contraintes d'espace et la congestion portuaire augmentent les coûts de transport.

En Afrique subsaharienne, la prédominance du transport routier coexiste avec un réseau largement non revêtu, limitant l'accès de la population à des services essentiels et réduisant l'efficacité logistique. Les infrastructures portuaires souffrent de capacités limitées et d'un manque de connectivité avec l'arrière-pays, entraînant des retards dans la livraison des marchandises (BAD, 2014). Selon Foster et Briceño-Garmendia (2010), une infrastructure de mauvaise qualité réduit le taux de croissance moyen par habitant d'environ

2% en Afrique. Ces insuffisances constituent un frein à l'intégration des pays dans l'économie mondiale (Button et Yuan, 2013 ; Hoekman et Nicita, 2010).

L'Afrique subsaharienne (ASS) demeure en retard par rapport aux autres régions en développement dans toutes les dimensions de l'infrastructure de transport (Banque mondiale, 2017). Selon le Forum économique mondial, l'indice de compétitivité basé sur la qualité des infrastructures atteignait respectivement 46,3 et 45,0 en 2018 et 2019 (échelle de 0 à 100). L'accès routier est estimé à seulement 34% contre 50% dans d'autres économies en développement, et la densité ferroviaire reste faible (Banque mondiale, 2018 ; Union africaine, 2014).

Depuis 2010, la part de l'Afrique subsaharienne dans le commerce extérieur a augmenté, principalement grâce aux exportations de services commerciaux, qui représentent 70% des exportations africaines de biens et services (OMC, 2019). Cependant, ces opportunités peuvent être limitées par la mauvaise qualité des infrastructures et des services logistiques, affectant l'efficacité et la fluidité du commerce international.

Partant de ce constat, il est pertinent de se poser la question de recherche suivante : quelle est l'influence de la dynamique des exportations sur la qualité des infrastructures de transport dans les pays d'Afrique subsaharienne ?

L'étude présente un double intérêt. Premièrement, elle apporte un éclairage sur la relation entre la dynamique des exportations et la qualité des infrastructures en mettant un accent particulier sur les dimensions de court et de long terme en Afrique subsaharienne. Deuxièmement, elle examine l'effet des variables institutionnelles, telles que la stabilité politique et le contrôle de la corruption, sur la qualité des infrastructures.

Pour la méthodologie, un modèle ARDL dynamique de panel est utilisé via l'approche PMG (Pooled Mean Group) pour analyser la relation à court et long terme. Les méthodes FMOLS (Fully Modified Ordinary Least Squares) et DOLS (Dynamic Ordinary Least Squares) sont également appliquées pour tester la robustesse des résultats.

Le plan de travail s'articule comme suit : la première partie analyse l'évolution récente de la qualité des infrastructures de transport et des indicateurs macroéconomiques en Afrique subsaharienne. La deuxième partie présente une revue de la littérature tandis que la troisième détaille la méthodologie adoptée. En fin, la quatrième discute des résultats. Enfin, la conclusion proposera des implications pour les politiques économiques.

1. Etat des lieux de la qualité des infrastructures de transport en Afrique subsaharienne

D'après les statistiques de la CNUCED, l'évolution du taux de croissance du Produit Intérieur Brut (PIB) par habitant en Afrique subsaharienne entre 2012 et 2019 peut être divisée en trois phases distinctes. La première phase, de 2012 à 2014, se caractérise par une croissance soutenue du PIB, stimulée par l'augmentation des investissements dans les ressources naturelles et les infrastructures, ainsi que par la forte consommation des ménages. Pour la Banque mondiale (2014), cette période a été particulièrement dynamique dans les pays riches en ressources naturelles, tels que la République démocratique du Congo et la Sierra Leone. La deuxième phase, couvrant 2014 à 2016, est marquée par un ralentissement significatif de la croissance du PIB par habitant, principalement lié à l'effondrement des cours du pétrole amorcé à la mi-2014. Cette crise conjoncturelle a fortement affecté les finances publiques des principaux pays exportateurs de pétrole, notamment le Nigeria, l'Angola et les pays de la zone CEMAC (Communauté Économique et Monétaire de l'Afrique centrale). La dernière phase, de 2016 à 2019, correspond à une reprise relativement modérée de l'activité économique dans la région. Le taux de croissance du PIB par habitant est ainsi passé de -1,54% en 2016 à 0,19% en 2019¹, soutenu par le redressement des prix des principaux produits de base et par la mise en œuvre de réformes visant à renforcer l'attractivité des investissements directs étrangers dans plusieurs pays de la région.

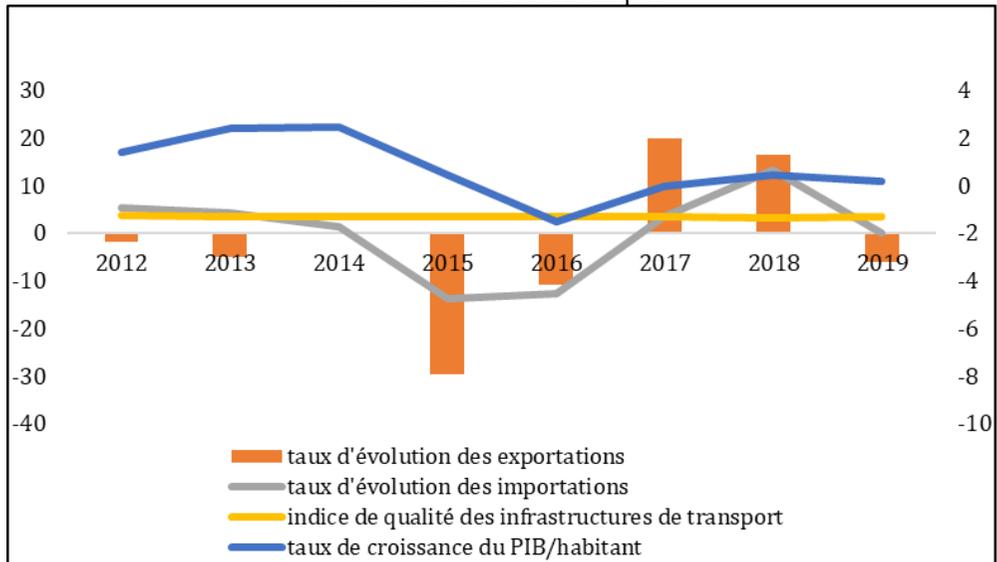
Parallèlement, entre 2012 et 2019, les exportations et les importations de l'Afrique subsaharienne ont suivi une trajectoire similaire à celle du PIB par habitant. Les exportations ont diminué de 5,9% en 2019, après des progressions respectives de 16,4% et 19,8% en 2018 et 2017. Les importations ont également reculé de 0,2% en 2019, contre une hausse de 3,4% en 2017 et 2018².

Afin de stimuler ces échanges, les pays d'Afrique subsaharienne doivent investir dans des infrastructures de transport de haute qualité, permettant une meilleure fluidité des échanges extérieurs. Dans ce contexte, le Forum économique mondial (FEM) a développé un indicateur évaluant la qualité des infrastructures de transport dans chaque pays. Cet indicateur, construit sous forme de variable qualitative à sept modalités, est converti en score de performance compris entre 0 et 7 (figure1), le score le plus élevé reflétant la meilleure situation. À l'échelle de l'Afrique subsaharienne, l'indice agrégé est passé de 2,4 points en 2012 à 3,5 points en 2019, soit une progression de 1,1 point.

¹ Auteurs, statistiques CNUCED

² Auteurs, statistiques CNUCED

Figure 1 : Évolution de l'indice de qualité des infrastructures de transport et quelques indicateurs macroéconomiques



Source : Auteurs, base de données FEM et CNUCED

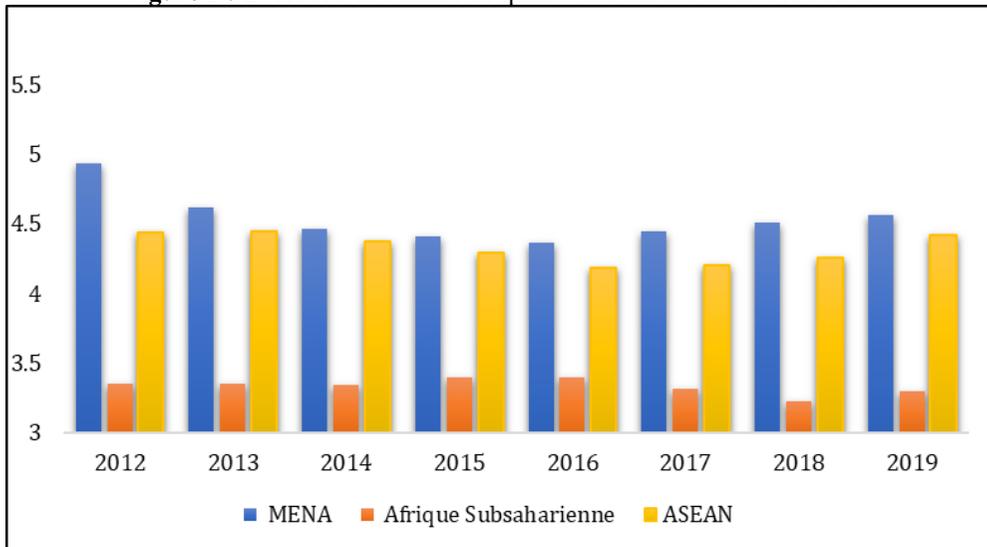
1.1. La qualité des routes

La figure 2 illustre une évolution relativement faible de l'indice de qualité des routes en Afrique subsaharienne entre 2012 et 2019. En 2020, la Namibie (5,3), le Rwanda (5,1), l'Île Maurice (4,7), l'Afrique du Sud (4,5) et la Tanzanie (4,1) sont les cinq pays ayant enregistré les scores les plus élevés de l'indice de qualité des infrastructures routières dans la région³. À l'inverse, dans les pays à faible revenu, la qualité des infrastructures routières demeure insuffisante, limitant la connectivité et freinant le développement des exportations. C'est le cas notamment de la Mauritanie et du Tchad, dont les scores respectifs s'établissent à 2 et 1,9 point en 2020, soit en dessous de la moyenne africaine (3,43). Cette insuffisance constitue un obstacle pour certaines entreprises, les contraignant à se limiter au marché local.

Par ailleurs, la qualité des infrastructures routières est généralement supérieure dans les pays du Moyen-Orient et d'Asie du Sud-Est par rapport à ceux d'Afrique subsaharienne. Selon la BAD (2010b), le réseau routier dans cette région est estimé à 204 km pour 1000 km² de superficie, soit 3,6 km de routes pour 1000 habitants. Ces valeurs restent cependant inférieures à la moyenne considérée comme normale, estimée à 944 km pour 1000 km², soit 7 km de routes pour 1 000 habitants.

³ Données CNUCED

Figure 2 : Évolution de l'indice de qualité des infrastructures routières



Source : Auteurs, base de données Forum Economique Mondial (FEM)

1.2. La qualité des ports

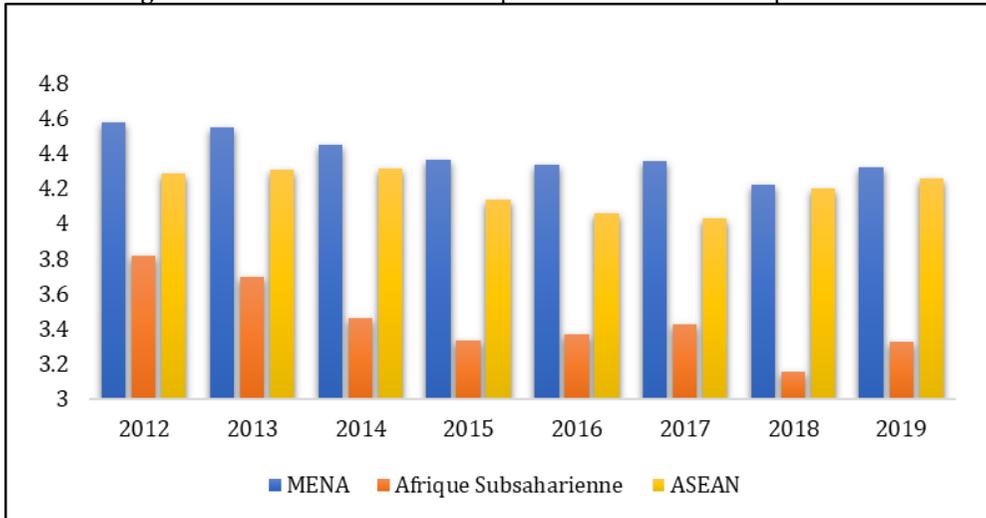
L'Afrique est confrontée à d'importants problèmes liés à la capacité des installations portuaires existantes, ainsi qu'à des coûts de manutention élevés. Selon la BAD (2010b), ces coûts représentent en moyenne 50% en Afrique, les plus élevés comparativement à d'autres régions du monde.

Les ports constituent un élément crucial pour le développement du commerce dans plusieurs pays, compte tenu de la dépendance du continent aux exportations de matières premières et aux importations de produits alimentaires. Selon la Commission Économique pour l'Afrique (2016), plus de 90% des échanges mondiaux transitent par les ports maritimes. Cependant, malgré d'importants investissements, le développement des ports africains reste très contrasté. Selon le rapport ACF (2020), l'Égypte, l'Afrique du Sud et le Maroc sont les seuls pays à avoir accueilli plus de conteneurs en 2018, représentant à eux seuls 51% des volumes transitant en Afrique. La productivité des ports africains demeure faible : aucun port du continent ne figure dans le top 20 des ports les plus performants au niveau mondial (Observatoire Europe-Afrique, 2020).

Le score moyen de l'indice de qualité des ports en Afrique subsaharienne a reculé de 3,8 à 3,3 points entre 2012 et 2019, soit une baisse de 13,1%. Comme pour les infrastructures routières, la qualité des infrastructures portuaires en Afrique subsaharienne reste inférieure à celle de la région MENA (Moyen-Orient et Afrique du Nord). Au cours de la dernière décennie, les pays de la zone MENA ont investi entre 3% et 5% de leur PIB annuel dans les infrastructures portuaires et aéroportuaires. Néanmoins, cette

région fait également face à des problèmes logistiques. Selon la BAD (2019), le coût des installations portuaires en Afrique du Nord est estimé à 40%, supérieur à la norme mondiale, en raison de longues durées d'entreposage des conteneurs, de délais de traitement prolongés et de retards dans l'obtention des autorisations de mouvement des navires.

Figure 3 : Évolution de l'indice de qualité des infrastructures portuaires

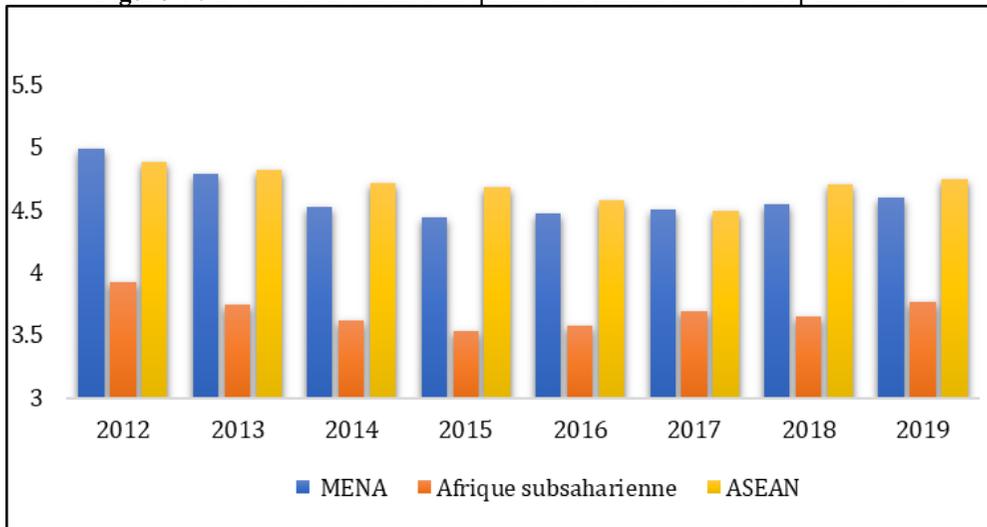


Source : Auteurs, base de données Forum Economique Mondial (FEM)

1.3. La qualité des aéroports

La qualité des infrastructures aéroportuaires constitue un levier fondamental pour le développement économique et social en Afrique. Toutefois, entre 2012 et 2015, l'indice de qualité des infrastructures aéroportuaires en Afrique subsaharienne a enregistré une tendance à la baisse, restant en dessous de la moyenne des pays du Moyen-Orient et de l'Afrique du Nord (MENA) ainsi que de celle des pays d'Asie du Sud-Est. Entre 2016 et 2019, une amélioration relative de l'indice de qualité des aéroports a été observée (figure 4). Le secteur aérien des pays d'Afrique subsaharienne peine cependant à se développer de manière significative, en raison de contraintes politiques et financières, des plans d'ajustement imposés par le Fonds Monétaire International (FMI), de la pauvreté et des conflits internes et internationaux.

Figure 4 : Évolution de l'indice de qualité des infrastructures aéroportuaires



Source : Auteurs, base de données Forum Economique Mondial (FEM)

Dans la mesure où le nombre de passagers devrait augmenter en Afrique Subsaharienne, des mesures allant dans l'optique de renforcer les infrastructures aéroportuaires devraient être initiées par les pays. En effet, le nombre d'aéroports est relativement faible et, la plupart d'entre eux commencent à vieillir.

2. Revue de la littérature

2.1. Approche théorique

Sur la base des hypothèses de la nouvelle théorie du commerce international (Feenstra, 2004 ; Helpman et Krugman, 1985) et de la nouvelle économie géographique (Fujita et al. 2001), l'amélioration de l'environnement des transports constitue une condition nécessaire pour la compétitivité des exportations régionales. En effet, la nouvelle économie géographique souligne l'existence d'imperfections de marché liées aux économies d'échelle et aux préférences hétérogènes des consommateurs. Selon cette approche, la taille du marché régional influence positivement la spécialisation productive grâce aux rendements d'échelle croissants et à la réduction des coûts de transport. La baisse des coûts logistiques renforce ainsi les gains de productivité liés aux économies d'agglomération, améliorant la compétitivité et l'intensité du commerce extérieur. Ces analyses théoriques ont été appuyées par Fujita et Mori (2005), Konishi (2000) et Krugman (1993), et corroborées empiriquement par Becchetti et Rossi (2000), Cosar et Fajgelbaum (2016), Diaz et al. (2013) ainsi que Roberts et Tybout (1997). La spécialisation et l'activité d'exportation dans les secteurs échangeables tendent à se concentrer autour des plateformes internationales, des districts industriels et des zones

franches d'exportation, reflétant un avantage géographique et un meilleur accès aux marchés.

Par ailleurs, plusieurs travaux issus de la théorie de la croissance endogène ont mis en évidence le rôle catalyseur des infrastructures sur la croissance économique (Romer, 1986 ; Lucas, 1988 ; Barro, 1990), en lien avec les externalités positives générées sur l'ensemble de l'économie. Selon Eustace et Fay (2007), une infrastructure de qualité stimule la croissance, et inversement, la croissance accroît la demande d'infrastructures. Le système de transport, les communications et l'énergie constituent des facteurs infrastructurels déterminants pour la structure des coûts commerciaux, la compétitivité internationale et le développement économique. La logistique et la facilité des échanges jouent un rôle essentiel pour rehausser le niveau de développement des États. À ce titre, Perez et Wilson (2012), s'appuyant sur l'indice de performance logistique de la Banque mondiale, soutiennent que les pays ayant de meilleures performances logistiques enregistrent une croissance plus rapide des échanges, un accroissement économique accéléré et une diversification des exportations.

Enfin, pour Krugman (1980), la baisse des coûts de transport découlant de réseaux d'infrastructures performants élargit le marché et augmente le volume des transactions. Pour sa part, Abdo (2014) souligne que les infrastructures peuvent générer des forces centripètes accentuant les écarts liés à l'intensité capitalistique. L'analyse du cadre institutionnel (North, 1994) montre également que la qualité des infrastructures influence la dynamique des exportations. Cependant, plusieurs travaux indiquent qu'une infrastructure seule ne suffit pas à faciliter les échanges et à stimuler le développement économique, car des déficiences administratives et réglementaires (douanes, bureaux d'immigration) peuvent engendrer des goulots d'étranglement. Dans cette perspective, un cadre institutionnel solide reste essentiel pour inciter et soutenir les comportements économiques positifs (Robinson, 2008 ; Tebellini, 2007).

2.3. Approche empirique

Depuis le début des années 90, de nombreuses études empiriques ont confirmé l'existence d'une relation positive entre l'investissement public dans les infrastructures et la production économique. Dans son ouvrage fondateur, Aschauer (1989) montre que les infrastructures publiques produisent des rendements marginaux très élevés, pouvant atteindre 100% par an. Ces résultats ont été confirmés par Agénor (2011) et Straub (2008). En Afrique, N'Guessan (2010) a estimé que les coûts de transport routier représentent 24% et 23% du total des coûts de transport au Mali et au Niger respectivement, obligeant les entreprises à adopter des stratégies de stockage réduisant leur compétitivité et leurs opportunités de croissance.

D'autres études ont analysé l'effet des infrastructures de transport sur le commerce extérieur. Limão et Venables (2001) soulignent que la médiocrité des infrastructures peut représenter jusqu'à 40% des coûts de transport pour les pays côtiers et 60% pour les pays enclavés. Nicolini (2003), à partir de données de panel sur des régions européennes, montre l'importance de la densité du réseau de transport sur les flux d'exportation de textile et de mécanique. Matthee et Naude (2008), utilisant un modèle Tobit, illustrent que la taille du marché intérieur et la distance au port le plus proche influencent les exportations manufacturières sud-africaines.

En utilisant des mesures distinctes d'infrastructure, routes, chemins de fer, télécommunications, ports et aéroports NordÅs et Piermartini (2004) constatent que les infrastructures aéroportuaires ont l'impact le plus significatif sur le commerce extérieur. Iwanow et Kirkpatrick (2009) confirment l'effet positif des infrastructures et de la facilitation du commerce sur les exportations. Behar et al (2009) montrent qu'une amélioration d'un écart-type dans la logistique peut accroître les exportations d'environ 46% pour un pays en développement de taille moyenne. De même, Cizkowicz et al. (2013) indiquent que l'accès à la mer favorise les exportations régionales polonaises de produits agricoles et alimentaires, tandis qu'Albarran et al. (2013) soulignent, via un modèle probit dynamique, l'effet positif des améliorations de transport intérieur sur la probabilité d'exportation des Petites et Moyennes Entreprises (PME) espagnoles.

Enfin, Rehman et al. (2020), utilisant un modèle ARDL et l'estimateur Pooled Mean Group (PMG) ainsi que des tests de cointégration (Pedroni, 2004), montrent que l'agrégat et les sous-indices d'infrastructures (transports, télécommunications, énergie, secteur financier) exercent un impact significatif à long terme sur les exportations et le déficit commercial dans certains pays asiatiques. D'autres travaux fondés sur des modèles de gravité confirment que la qualité et la proximité des infrastructures logistiques (frontières, ports, routes) influencent positivement les flux d'exportation, notamment dans les provinces turques et en Espagne (Artuc et al., 2014 ; Bensassi et al., 2015 ; Cosar et Demir, 2016), avec un effet plus marqué pour les industries sensibles au facteur temps.

3. Méthodologie

Dans le cadre de la présente étude, pour évaluer la relation à court et à long terme entre la qualité des infrastructures de transport et les exportations en Afrique subsaharienne, le modèle ARDL en panel dynamique est appliqué. Cependant, partant du modèle de Pesaran et al. (1999), Louyza et Ranciere (2004) ont utilisé la technique d'estimation ARDL (p,q), en incorporant la régression dynamique en panel hétérogène dans le modèle de correction d'erreur. De façon explicite, le modèle ARDL se présente comme suit :

$$\Delta(y)_{it} = \sum_{j=1}^{p-1} \gamma_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij} \Delta X_{i,t-j} + \varphi_i \left((y_{i,t-1}) - (\beta_0^i + \beta_1^i (X_{i,t-1})) \right) + e_{it} \quad (1)$$

$$(y)_{it} = \beta_0^i + \beta_1^i X_{it} + \mu_{i,t} \text{ où } \mu_{i,t} \sim I(0) \quad (2)$$

Ainsi, y désigne la variable dépendante (qualité des routes, qualité des aéroports, qualité des ports), X est le vecteur des variables indépendantes (taux de croissance du produit intérieur brut par habitant, exportations, contrôle de la corruption et stabilité politique), γ et δ représentent respectivement les coefficients de court terme des variables dépendantes et indépendantes retardées, β est le vecteur des coefficients à long terme et φ désigne le coefficient d'ajustement de l'équilibre à long terme.

Ainsi, la relation entre les différentes variables dépendantes et les variables indépendantes peut être spécifiée de la manière suivante :

Première équation avec comme variable dépendante l'indice de qualité des routes

$$IQR_{it} = \alpha_{it} IQR_{it-1} + \gamma_{1i} TXPIB/H_{it} + \gamma_{2i} TXPIB/H_{it-1} + \beta_{1i} EXP_{it} + \beta_{2i} EXP_{it-1} + \beta_{3i} CC_{it} + \beta_{4i} CC_{it-1} + \beta_{5i} STP_{it} + \beta_{6i} STP_{it-1} + \eta_t + \eta_t + v_t + \varepsilon_{it} \quad (3)$$

Deuxième équation avec comme variable dépendante l'indice de qualité des ports (IQP)

$$IQP_{it} = \alpha_{it} IQP_{it-1} + \gamma_{1i} TXPIB/H_{it} + \gamma_{2i} TXPIB/H_{it-1} + \beta_{1i} EXP_{it} + \beta_{2i} EXP_{it-1} + \beta_{3i} CC_{it} + \beta_{4i} CC_{it-1} + \beta_{5i} STP_{it} + \beta_{6i} STP_{it-1} + \eta_t + \eta_t + v_t + \varepsilon_{it} \quad (4)$$

Troisième équation avec comme variable dépendante l'indice de qualité des aéroports (IQA)

$$IQA_{it} = \alpha_{it} IQA_{it-1} + \gamma_{1i} TXPIB/H_{it} + \gamma_{2i} TXPIB/H_{it-1} + \beta_{1i} EXP_{it} + \beta_{2i} EXP_{it-1} + \beta_{3i} CC_{it} + \beta_{4i} CC_{it-1} + \beta_{5i} STP_{it} + \beta_{6i} STP_{it-1} + \eta_t + \eta_t + v_t + \varepsilon_{it} \quad (5)$$

Les modèles autorégressifs à retards échelonnés ou distribués sont avantageux par rapport aux modèles statiques, car ils facilitent le calcul des élasticités à court et à long terme.

3.1. Choix de l'estimateur

Dans le cas d'un panel hétérogène dynamique, l'estimateur MG (groupe moyen) ainsi que l'estimateur à effets fixes et aléatoires sont les méthodes les plus fréquemment utilisées. Selon Pesaran et Smith (1995),

l'estimateur MG estime, séparément, l'équation pour chaque groupe, sans tenir compte des similitudes de certains paramètres entre les différents groupes. L'estimateur à effets fixes et aléatoires, quant à lui, varie en fonction du groupe tandis que tous les autres coefficients et variances d'erreur sont limités à être les mêmes.

Dans le cadre de la présente étude, pour prendre en compte de façon simultanée la mise en commun et la moyenne, l'estimateur Pooled Mean Group (PMG) est utilisé. Le choix de cet estimateur se justifie par le fait que les coefficients à court terme et les variances d'erreur varient d'un groupe à l'autre, tandis que les coefficients, à long terme, sont constants. En outre, pour Pesaran et al. (1997), il semble moins convaincant de supposer que les variations à court terme et les variances sont les mêmes d'un groupe à l'autre. Contrairement à l'estimateur MG, celui de PMG restreint les coefficients à long terme pour qu'ils soient homogènes. En effet, l'homogénéité du coefficient de pente à long terme est utile lorsqu'il y a des raisons de penser que la relation d'équilibre à long terme entre les variables est similaire d'un pays à l'autre. L'estimateur MG n'impose aucune restriction sur les coefficients aussi bien à long terme qu'à court terme.

3.2. Source et analyses descriptives des données

Cette étude couvre 32 pays d'Afrique Subsaharienne sur la période de 2009 à 2019. Ainsi, sept variables sont utilisées telles que la qualité des infrastructures routières (QIR), la qualité des infrastructures aéroportuaires (QIA), la qualité des infrastructures portuaires (QIP), les exportations, le taux de croissance du PIB/habitant, le contrôle de la corruption et la stabilité politique. Les séries utilisées sont tirées de la base de données du Forum Economique Mondial (FEM), de la Banque Mondiale (BM) et de la Conférence des Nations-Unies pour le Commerce et le Développement (CNUCED).

Le résumé des statistiques descriptives de cet échantillon de travail est consigné dans le Tableau (1). Sur la base des indicateurs de qualité des infrastructures de transport, celui des aéroports (7,7 points) a la valeur maximale la plus élevée, avec un écart type de 0,9, comparativement à l'indice de qualité des routes (5,8 points) et de l'indice de qualité des ports (5,6 points). En outre, au cours de la période sous revue, le taux de croissance du PIB par habitant de l'Afrique subsaharienne est évalué à 1,9% en moyenne, alors que les exportations, exprimées en % du PIB, sont estimées à 22,2% sur la même période. Pour les indicateurs de bonne gouvernance, notamment la stabilité politique et le contrôle de la corruption, la valeur moyenne est ressortie respectivement à -0,4 et -0,5.

Tableau 1 : Statistiques descriptives des variables

Variabes	Observation	Moyenne	Ecart type	Minimum	Maximum
IQR	352	3,336	0,862	1,900	5,830
IQP	352	3,545	0,828	1,370	5,640
IQA	352	3,790	0,909	1,000	7,710
TXPIB	352	1,877	3,478	-15,891	19,939
EXPO	352	22,159	1,379	18,589	25,567
STAP	352	-0,398	0,824	-2,211	1,111
CCOR	352	-0,482	0,664	-1,485	1,211

Source : Auteurs, base de données Forum Economique Mondial et Banque Mondial

3.3. Tests de stationnarité des séries

Pour vérifier la stationnarité des variables du modèle, le test de CIPS ($Z(t\text{-bar})$) de Pesaran (2007) pour les racines unitaires est effectué. Ainsi, le test indique que l'indice de qualité des routes, l'indice de qualité des ports, l'indice de qualité des aéroports, la stabilité politique et le contrôle de la corruption sont stationnaires en différence première. En revanche, le test révèle une stationnarité en niveau du taux de croissance du PIB et des exportations. Par conséquent, dans la mesure où les séries n'ont pas le même ordre d'intégration, les tests de cointégration sont effectués pour vérifier l'existence d'une relation à long terme entre les variables.

Tableau 2 : Résultats du test de racine unitaire de Pesaran (2007)

Variables	En niveau	En différence première	Conclusion
	Constante et tendance	Constante et tendance	
IQR	0,3658	-4,6660***	I (1)
IQP	0,8033	-5,7956***	I (1)
IQA	0,7624	-5,5848***	I (1)
TXPIB	-4,4517***		I (0)
EXPO	-5,5894***		I (0)
STPO	-1,4982	-7,2787***	I (1)
CCOR	0,0955	-5,6339***	I (1)

Source : Auteur, base de données Forum Economique Mondial et Banque Mondiale

3.4. Tests de cointégration en panel

Pour tenir compte de la dépendance transversale des séries, les tests de cointégration en panel de seconde génération tels que le test de Pédroni (2004) et celui de westerlund (2007) sont utilisés. Cependant, dans les deux tests, l'hypothèse d'absence de cointégration est rejetée. Les résultats découlant de ces tests montrent l'existence d'une relation de cointégration à long terme entre les séries.

Tableau 3 : Résultat du test de cointégration entre les séries

	Test de Pédroni (2004)					
	IQA		IQP		IQR	
	t-statistic	p-value	t-statistic	p-value	t-statistic	p-value
Modified PP t	6,804	0,000	7,263	0,000	6,573	0,000
PP- t	-0,042	0,483	-0,734	0,231	-0,272	0,392
ADF-t	-4,105	0,000	-3,835	0,000	-4,720	0,000
	Test de westerlund (2007)					
Variance ratio	4,448	0,000	5,927	0,000	4,8533	0,000

Source : auteurs, base de données Forum Economique Mondial et Banque Mondiale

4. Discussion des résultats et tests de robustesse

4.1. Interprétations des résultats

Les résultats montrent qu'à long terme, les variables dépendantes, à savoir la qualité des routes, des ports et des aéroports, sont influencées positivement par les variables explicatives. Ainsi, les exportations, le contrôle de la corruption et la stabilité politique exercent un effet positif et statistiquement significatif sur la qualité des infrastructures de transport en Afrique subsaharienne sur la période 2009–2019. Par ailleurs, un effet positif et significatif, au seuil de 10%, est observé entre le taux de croissance du PIB par habitant et l'indice de qualité des infrastructures de transport, avec un impact plus marqué sur la qualité des ports.

Dans les trois modèles étudiés, relatifs respectivement à la qualité des infrastructures portuaires, des routes et des aéroports, le coefficient estimé des exportations est positif et significatif aussi bien à long terme qu'à court terme. Ce résultat souligne l'importance des infrastructures de transport pour le développement du commerce extérieur des pays d'Afrique subsaharienne. Il corrobore les conclusions de Rehman et al. (2020) et de Bensassi et al. (2015). Récemment, Rahman et al. (2021), utilisant les méthodes des moindres carrés ordinaires (OLS) et du pseudo maximum de vraisemblance de Poisson (PPML) sur la période 1999–2018, ont également confirmé l'existence d'une relation positive entre les infrastructures de transport et la dynamique des exportations dans 21 pays asiatiques.

Par ailleurs, à long terme, les estimations révèlent un effet positif et significatif des indicateurs institutionnels, notamment la stabilité politique et le contrôle de la corruption, sur l'indice de qualité des infrastructures (routes, aéroports et ports). Ces résultats s'alignent sur ceux de Zergawu et al. (2020), selon lesquels l'interaction entre capital infrastructurel et qualité institutionnelle favorise la croissance économique.

À court terme, le coefficient de correction d'erreur (ECM) est négatif et statistiquement significatif. En effet, il renseigne sur la vitesse d'ajustement des variables vers l'équilibre à long terme après un choc transitoire. Sa valeur absolue, inférieure à 1, indique que les variables convergent progressivement

vers la tendance de long terme. Pour l'indice de qualité des ports en Afrique subsaharienne, le coefficient ECM est de 0,18, ce qui signifie qu'environ 18% du déséquilibre initial est corrigé un an après le choc. Pour la qualité des routes et celle des aéroports, le coefficient d'ajustement est estimé respectivement à 17,3% et 15,3%.

Tableau 4 : Résultats des estimations par la méthode ARDL

Variables	IQP	IQR	IQA
	<i>Relation à long terme</i>		
Taux de croissance du PIB	0,043* (0,041)	0,012* (0,038)	0,010* (0,050)
Exportations	0,163*** (0,009)	0,169*** (0,008)	0,186* (0,011)
Contrôle de la corruption	0,215** (0,322)	0,737*** (0,296)	0,662*** (0,385)
Stabilité politique	0,513* (0,251)	0,001* (0,237)	0,083** (0,305)
	<i>Relation à court terme</i>		
Coefficient d'ajustement	-0,185*** (0,033)	-0,173*** (0,032)	-0,150*** (0,032)
Taux de croissance du PIB	0,008 (0,008)	0,002 (0,007)	0,002 (0,008)
Exportations	0,030*** (0,006)	0,029*** (0,006)	0,073* (0,042)
Contrôle de la corruption	0,240 (0,125)	0,824** (0,112)	0,555* (0,127)
Stabilité politique	0,182** (0,098)	0,039 (0,089)	-0,200 (0,100)

Source : auteurs, base de données Forum Economique Mondial et Banque Mondiale

4.2. Tests de robustesse

Compte tenu de l'hétérogénéité des pays sélectionnés, il est probable que l'écart type des séries ne suive pas une distribution normale. Par conséquent, une forte corrélation entre les séries, une hétéroscédasticité et un problème d'endogénéité peuvent apparaître (Utku-İsmihan, 2019 ; Kirubi et al., 2009). Dans le cadre des données de panel, Pedroni (1996) ainsi que Kao et Chiang (2000) ont montré que les méthodes FMOLS et DOLS conduisent à des estimateurs asymptotiquement distribués selon une loi normale centrée réduite. Cependant, en présence de racines unitaires, l'endogénéité des régresseurs peut ne pas être correctement contrôlée avec les moindres carrés ordinaires (MCO).

Pour pallier cette limitation, Pedroni (2004) propose l'utilisation des estimateurs FMOLS et DOLS afin d'obtenir des coefficients de cointégration à long terme. L'estimateur FMOLS, initialement développé par Phillips et Hansen (1990), permet d'obtenir des estimations optimales des régressions de cointégration, en corrigeant les biais dus à l'endogénéité et l'autocorrélation.

Dans le présent travail, afin de tester la robustesse des résultats issus du modèle ARDL, les techniques FMOLS et DOLS ont été appliquées en incluant deux variables supplémentaires : la qualité de la réglementation et l'investissement direct étranger (Habib et al., 2016). Les résultats, présentés au tableau 5, montrent que les estimations FMOLS confirment la majorité des résultats obtenus avec le modèle ARDL sur la période 2009–2019. Ainsi, les variables institutionnelles telles que le contrôle de la corruption, la stabilité politique et la qualité de la réglementation apparaissent comme des déterminants significatifs de la qualité des infrastructures de transport (routes, aéroports et ports).

De même, les estimations par la méthode DOLS indiquent que l'effet des exportations et du contrôle de la corruption est positif et statistiquement significatif, corroborant ainsi les résultats obtenus avec le modèle ARDL.

Tableau 5 : Résultats des estimations par la méthode FMOLS et DOLS (avec ajout de deux variables)

Variables	IQP	IQR	IQA
	<i>Fully Modified Least Squares (FMOLS)</i>		
Taux de croissance du PIB	0,009* (0,005)	0,006* (0,004)	0,003* (0,005)
Exportations	0,017*** (0,004)	0,013*** (0,004)	0,015*** (0,004)
Contrôle de la corruption	0,126** (0,100)	0,413*** (0,085)	0,255** (0,103)
Stabilité politique	0,173** (0,067)	0,033* (0,057)	0,212*** (0,069)
IDE	0,003 (0,004)	0,007* (0,004)	0,001 (0,004)
Qualité de la réglementation	0,245** (0,102)	0,780*** (0,086)	0,573*** (0,105)
	<i>Dynamic Least Squares (DOLS)</i>		
Taux de croissance du PIB	0,060** (0,006)	0,038** (0,013)	0,077* (0,039)
Exportations	0,164*** (0,007)	0,172*** (0,006)	0,181*** (0,007)
Contrôle de la corruption	0,058* (0,241)	0,759*** (0,224)	0,261* (0,263)
Stabilité politique	0,184* (0,159)	0,066* (0,151)	0,185* (0,175)
IDE	0,014 (0,017)	0,019 (0,016)	-0,001 (0,019)
Qualité de la réglementation	0,329** (0,264)	0,293** (0,246)	0,710** (0,289)

Source : auteurs, base de données Forum Economique Mondial et Banque Mondiale

Conclusion

L'objectif de cette recherche était d'évaluer la relation entre la qualité des infrastructures de transport et les exportations dans 32 pays d'Afrique subsaharienne sur la période 2009–2019. À cet effet, un modèle ARDL en panel dynamique, estimé par le biais de l'estimateur PMG, a été utilisé. L'échantillon comprend sept variables principales : l'indice de qualité des routes, l'indice de qualité des ports, l'indice de qualité des aéroports, le taux de croissance du PIB, les exportations, la stabilité politique et le contrôle de la corruption, provenant essentiellement des bases de données du Forum Économique Mondial et de la Banque Mondiale.

Les résultats obtenus indiquent que le coefficient estimé des exportations est positif et statistiquement significatif, aussi bien à court terme qu'à long terme. Cela souligne l'importance de la qualité des infrastructures de transport pour le développement du commerce extérieur en Afrique subsaharienne. Par ailleurs, à long terme, les estimations révèlent une relation positive et significative entre les indicateurs institutionnels (stabilité politique et contrôle de la corruption) et les infrastructures de transport (routes, aéroports et ports). L'utilisation des méthodes d'estimation complémentaires, telles que les moindres carrés entièrement modifiés (FMOLS) et les moindres carrés ordinaires dynamiques (DOLS), a permis de confirmer la robustesse de ces résultats.

Ces résultats ont de fortes implications en termes de politiques économiques pour les autorités des pays d'Afrique subsaharienne. En effet, la dynamisation des échanges commerciaux intra-africain doit passer par un investissement conséquent dans la construction des routes, des ports et des aéroports de très bonne qualité, ce qui permettrait à ces pays d'Afrique subsaharienne de renforcer l'intégration économique africaine, de renforcer la compétitivité des entreprises africaines et de stimuler l'industrialisation régionale. Tout ceci, permettrait d'une part de créer des emplois et d'améliorer le bien-être des populations grâce à une croissance économique plus soutenue. D'autre part, de réduire la pauvreté et les inégalités régionales. Toutefois, la réalisation de ces objectifs dépendra d'une stratégie qui vise à mettre en place des institutions solides capables de lutter efficacement contre la corruption et à assainir le climat politique dans la région.

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Stratégies de gestion de la souffrance au travail en situation de risques psychosociaux chez les enseignants du primaire public de la région de l'Extrême-Nord, Cameroun

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Résumé

La présente recherche porte sur les stratégies de gestion de la souffrance au travail chez les enseignants du primaire public. Elle part du constat selon lequel les enseignants dans l'exercice de leur profession peinent à trouver des stratégies appropriées pour gérer leur souffrance au travail. L'objectif général est de déceler les différentes stratégies déployées par les enseignants du primaire public pour gérer leur souffrance au travail en situation de risques psychosociaux. Pour atteindre cet objectif, l'échantillonnage par choix raisonné de quarante-deux participants issus des six départements de la Région de l'Extrême-Nord du Cameroun a permis de recueillir les données. Le récit de vie de chacun des participants a permis de recueillir des données pouvant mettre en exergue le vécu des enseignants en souffrance. L'analyse diachronique de ces données collectées révèle trois périodes importantes de la vie des travailleurs dont le début de la carrière, le plein exercice et la continuité, qui sont chacune jonchées de souffrances particulières et auxquelles différentes stratégies sont déployées pour la gestion. Ces stratégies incluent l'inertie au travail, l'évitement, le déni de la réalité, sublimation et l'isolement. Nous recommandons aux enseignants de développer une attitude résiliente et aux pouvoirs publics d'apporter leur soutien tant psychologique que matériel pour réduire la souffrance des professionnels de la craie.

Mots clés: Stratégies, gestion, souffrance au travail, risques psychosociaux et enseignants

Strategies of Managing Suffering at Work in Situations of Psychosocial Risks Among Public Primary School Teachers in the Far North region, Cameroon

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Abstract

This study focuses on strategies for managing suffering at work among public primary school teachers. It starts from the observation that teachers in the exercise of their profession struggle to find appropriate strategies to manage their suffering at work. The general objective is to identify the different strategies deployed by public primary school teachers to manage their suffering at work in situations of psychosocial risks. To achieve this objective, a sample by reasoned choice of forty-two participants from the six departments of the Far North region of Cameroon was selected, making it possible to collect data. The life story of each participant made it possible to collect data that could highlight the experiences of teachers who are suffering. The diachronic analysis of this collected data reveals three important periods in the life of the workers, including the start of career, full employment, and continuity, which are each littered with particular suffering and to which different strategies are deployed in management. These strategies include work inertia, avoidance, denial of reality, sublimation, and isolation. We recommended that teachers develop a resilient attitude and that the public authorities provide both psychological and material support to reduce the suffering of chalk professionals.

Keywords: Strategies, management, work suffering, psychosocial risks and teachers

Introduction

Le milieu professionnel subit des mutations qui ont des incidences sur les conditions de travail au point d'entamer le bien-être des travailleurs. Les enseignants en général et ceux du primaire en particulier, font face à des réalités qui les font souffrir. Les conditions de travail associé à la complexité de la tâche contribuent à accentuer les risques psychosociaux. Cependant, les

enseignants doivent y faire face et trouver des stratégies pour gérer cette souffrance afin de pouvoir continuer d'exercer.

Dans la théorie psychodynamique du travail, Dejours (2012) reconnaît la possibilité de ressentir du plaisir à travailler et il est présenté comme le symbole de la liberté de chacun, le seul instrument qu'on a pour atteindre son épanouissement personnel et son autoréalisation. Il procure à celui qui l'exerce une sorte de liberté quant à son existence au-delà des pressions mentales et de celles de sa société. En effet, l'exercice d'un travail quelconque procure du bonheur à celui qui l'exerce du fait du revenu qu'il rapporte et lui permet de subvenir à ses besoins au quotidien mais aussi de celui de sa famille. Par ailleurs, l'environnement de travail permet à l'individu d'accéder au bonheur au regard des possibilités qu'il lui offre pour lui permettre d'atteindre ses objectifs professionnels (Fleury-Bahi, 2010).

Des études menées sur les travailleurs en milieu professionnel au Cameroun montrent qu'ils vivent des situations de souffrance du fait de la surcharge de travail. On se rend compte dans la réalité quotidienne que beaucoup de travailleurs croupissent sous des contraintes professionnelles qui les asservissent et les empêchent de s'épanouir véritablement. Au Québec, les enseignants débutants dans une perspective collaborative surpassent les contraintes professionnelles qui les font souffrir en développant leur capacité d'agir sur leur milieu (Moussay et Méard, 2011). Ils utilisent ainsi des moments de rencontres pour échanger leurs différentes expériences pour l'actualisation et le déploiement de leurs ressources intrinsèques pour surmonter leur souffrance vécue au travail. C'est en faisant équipe que les savoirs et l'expérience de l'un et de l'autre ont permis l'émergence de nouvelles solutions (Doucet et Bourassa 2016). Les travaux de Manga *et al.* (2020) sur le *burn out* et les facteurs associés chez les enseignants des établissements secondaires publics à Douala révèlent que la prévalence du *burn out* est de 78,8 % ; ce taux est associé aux facteurs socioprofessionnels.

Cependant, peu d'investigations ont été menées sur les enseignants du primaire de la région de l'Extrême-Nord du Cameroun qui présente des spécificités au niveau des structures d'encadrement comme les salles de classes et du climat qui jouent en défaveur des activités liées à l'apprentissage.

Au regard de ce qui précède, il y a lieu de se rendre compte que le vécu des enseignants sur le terrain contraste avec la théorie psychodynamique de travail de Dejours (2012). Cette étude pose le problème de choix de stratégies de gestion de la souffrance au travail en situation de risques psychosociaux. Elle permet de déceler les différentes stratégies de gestion de la souffrance au travail et de les discuter au regard de la littérature existante. Elle proposera aussi un protocole de gestion de la souffrance pouvant aider les enseignants en souffrance afin de choisir des stratégies adaptées à leur vécu.

Revue de la littérature

Le travail en contexte de risques psychosociaux

Dejours (1993) définit le travail comme un lieu de production de soi et des rapports sociaux. Ainsi, le travail n'est plus qu'addition de gestes professionnels concrets, il devient un espace de signification entre le sujet et le champ social, soit l'« être » et le « faire ». Dejours (2006) distingue le travail prescrit du travail réel. Le concept de travail prescrit représente les attentes des supérieurs envers leurs employés. Le travail réel quant à lui, représente la capacité des participants à satisfaire aux exigences patronales, la façon dont ils interprètent la réalisation de ces exigences et les répercussions de ces exigences sur leur travail. La souffrance pour sa part est la réaction affective qui accompagne la douleur (Syllami, 2010). Elle représente la valeur supplémentaire de la douleur que l'homme dans sa capacité de résignation n'a pu absorber. Elle est de ce fait le sentiment consigné dans un bloc plus vaste et plus étendu qui devient un réservoir en attendant de trouver des voies d'expulsion ou d'éradication, eu égard aux ressources internes disponibles au moment des faits.

L'expression risques psychosociaux désigne les risques pour la santé mentale, physique et sociale engendrés par les conditions d'emploi et les facteurs organisationnels et relationnels susceptibles d'interagir avec le fonctionnement mental (Jacquelin et Gollac, 2012). Ces risques proviennent de l'organisation du travail, du contenu des tâches, des conditions de vie au travail ainsi que des relations interpersonnelles au travail. L'enseignant dans l'exercice de sa profession est appelé à trouver des moyens pour gérer sa souffrance au travail afin de ne pas subir ses affres.

Stratégies de gestion de la souffrance au travail des enseignants

Dans la gestion de la souffrance des enseignants au travail, les stratégies employées sont des stratégies de gestion collectives d'une part et des stratégies dites individuelles d'autre part.

Veyrac et Dumas (2015) en étudiant le cas d'enseignants se déclarant eux-mêmes en difficulté, proposent trois axes d'accompagnement: développer la confiance en soi, la reconnaissance par l'écoute et l'auto-analyse. Janot-Bergugnat et Rascle (2008) pour leur part, après avoir identifié des sources de stress, pointent quelques pistes de prévention que sont: accompagner les enseignants dans le travail individuel et collectif, redéfinir le temps et les activités des enseignants, penser la place du corps à l'école (rythmes biologiques), aménager des lieux de convivialité, gérer les ressources humaines de façon préventive, redéfinir les rôles des inspecteurs et modifier le mode de recrutement. Poirel et Houde (2019) révèlent qu'en mettant en place une approche d'intervention centrée sur les sources primaires et en faisant participer le collectif des travailleurs tant dans la recherche des sources

que dans celles des solutions que l'on peut effectivement venir en aide aux enseignants en souffrance.

La gestion de la souffrance au travail des enseignants via des stratégies individuelles de défense occupent une place de choix. Dans cette logique, les stratégies d'affrontement de la souffrance au travail liées à la résilience prennent en compte des modes de fonctionnement cognitifs et social connus sous le nom de schèmes (Dejours, 2009). Ainsi, Vergnaud (1994) distingue des situations pour lesquelles le sujet dispose un répertoire, à un moment donné de son développement des compétences nécessaires pour un traitement relativement immédiat. Il repère ainsi des situations pour lesquelles le sujet ne dispose pas de toutes les compétences nécessaires, ce qui l'oblige à un temps de réflexion et d'exploration, à des hésitations, à des tentatives frustrées qui conduisent éventuellement à des échecs et à la souffrance. Les travaux de Poirel et Houde (2019) en milieu scolaire permettent de tirer des leçons et de guider les futures interventions. Pour eux, les principales interventions sur la santé présente en milieu scolaire visent d'abord à outiller les personnes à affronter les difficultés professionnelles. Il en est ainsi parce que les interventions primaires impliquent de faire participer l'ensemble du collectif dans la prévention via une remise en cause des conditions des pratiques organisationnelles et de l'organisation du travail (Maranda *et al.*, 2014).

Méthodologie

La méthode phénoménologique est celle choisie dans le cadre de cette recherche. Cette méthode propose d'abord de saisir un objet à étudier qui est la souffrance au travail, ensuite la cueillette de témoignages auprès des enseignants qui acceptent de participer à l'étude. Puis l'analyse et le regroupement du contenu de données sous forme d'unités de significations exprimés en langage scientifique. Enfin, le dégagement de la structure du phénomène étudié, suivi d'une discussion des résultats obtenus au regard d'autres résultats existants (Meyor, 2005). Nous utilisons l'approche qualitative à visée compréhensive puisqu'elle permet de creuser le phénomène de souffrance en profondeur pour mieux le comprendre. (Dejours, 2010) souligne que l'approche qualitative devrait davantage être utilisée dans les milieux de travail car le résultat de l'action ne permet pas de juger quelqu'un, mais elle se contente de comprendre un phénomène en profondeur.

La population d'étude est constituée de l'ensemble des enseignants de la Région de l'Extrême-Nord du Cameroun, c'est-à-dire de l'ensemble d'enseignants des six départements qui la constitue. L'échantillonnage par choix raisonné convient pour notre étude dans la mesure où les participants répondent à des critères que nous avons prédéfinis. Ils sont tous de nationalité Camerounaise, enseignants de formation et en exercice dans un établissement d'enseignant public et jouissant d'une ancienneté d'un an au moins et

présentant des signes de souffrance au travail. L'échantillon de cette étude est de 42 enseignants issus des six départements de la région de l'extrême-Nord. La sélection de cet échantillon a suivi la procédure de sélection suivante: 150 enseignants choisis parmi les volontaires de tous les départements à raison de 25 enseignants par département, ont répondu au test d'évaluation de la détresse psychologique adapté de Lovibond et Lovibond (1995). À l'issue de ce test, 73 enseignants ayant montré un niveau de détresse élevé ont été présélectionnés pour une entrevue. Cependant, au cours de nos échanges, un échantillon de 42 enseignants a suffi pour atteindre la saturation théorique. Ces enseignants sont issus des six départements de la région de l'Extrême-Nord répartis comme suit: 7 proviennent du département du Diamaré, 8 département du Logone et Chari, 7 du département du Mayo-Danay, 6 du département du Mayo-Kani, 7 du département du Mayo-Sava et 6 du département du Mayo-Tsanaga. En effet, la saturation est atteinte lorsque dans les propos recueillis chez les enseignants interviewés, il y a répétition presque identique des mêmes informations recueillies chez les premières personnes interviewées.

Le récit de vie comme outil de collecte de données nous produit une description fine et approfondie d'un phénomène, d'un parcours, d'une situation à partir d'un récit qu'un sujet fait de sa vie ou d'une partie de sa vie (Bertaux, 2010). L'enregistrement des récits de vie s'est fait à l'aide d'un dictaphone de manière à permettre à chacun des participants de s'exprimer librement sur les stratégies employées pour gérer sa souffrance au travail. Pour cela, il a été recommandé aux participants de découper leur récit de vie en des séquences précises marquant des événements particulier de leur carrière: le début de la carrière, l'exercice de la profession proprement dite et la fin de la carrière éventuellement. La retranscription s'est faite immédiatement après les entrevues afin de reproduire de façon juste les informations tout en se repassant le film de l'entrevue. Le choix pour l'analyse diachronique, se justifie par le fait que les enseignants qui font l'objet de notre étude ont traversé des périodes de vie avant d'arriver à cette situation de souffrance. Ces périodes sont marqués par une succession d'évènements ayant contribué à la survenue de la souffrance. L'analyse diachronique permet ainsi de percevoir la souffrance au travail des enseignants comme un processus évolutif qui subit des modifications pendant la période d'exercice de la profession. Cette souffrance est gérée selon des stratégies appropriées aux facteurs ayant engendrés ladite souffrance.

Résultats et discussion

Les résultats issus de la collecte des données de terrain ont fait l'objet de l'analyse diachronique. Suivant la diachronie des événements qui ont marqué la carrière des enseignants ayant livrés leurs récits de vie, il y a lieu de prendre en compte des périodes majeures dans le vécu des enseignants. Ces

périodes permettent de déceler les stratégies mises en place par ces enseignants pour la gestion de leur souffrance.

Tableau : Récapitulatif de succession des évènements contribuant à la survenue de la souffrance

Période de travail	Attitudes et vécue du travail	Indicateurs	Stratégie de gestion
Début de la carrière	-Choix par défaut	-sentiment d'inutilité	-inertie
	-Choix par complaisance	-sentiment d'être contrarié	-inertie
	-Choix forcé	-sentiment d'être étouffé	-dénier de la réalité
Plein exercice de la profession	-difficulté d'exercice	-sentiment d'inefficacité	-sublimation
	-Malaise dans l'exercice	-sentiment d'incompétence	-évitement
	-Pénibilité du travail	-sentiment de fatigue	-isolement
Continuité dans la carrière	-travail sans efforts	-sentiment d'être amorti	-dénier de la réalité
	-travail sans implication	-sentiment d'être épuisé	-dénier de la réalité
	-irrégularité au travail	-sentiment d'être essoufflé	-isolement

Source : Résultats de l'enquête de terrain (Décembre, 2024)

L'analyse diachronique fait ressortir trois périodes importantes de la vie des travailleurs que sont: le début de la carrière, le plein exercice et la continuité dans l'exercice de la profession. Elles sont chacune jonchées de souffrances particulières, auxquelles différentes stratégies sont déployées pour gérer la souffrance correspondante.

Stratégies de gestion de la souffrance au travail en début de carrière

L'inertie face à la souffrance vécue au travail est la stratégie adoptée par la plupart des enseignants qui se retrouvent dans l'enseignement parce qu'ils ont fait un choix par défaut ou un choix par complaisance. Cette stratégie est employée par les enseignants pour surmonter les affres de la souffrance à laquelle ils sont confrontés. C'est pour cela que le participant P3 affirme « *Avec toutes ces difficultés, nous ne faisons pas cas de ce que nous subissons puisqu'il n'y a pas eu un choix plus meilleur à nos yeux* ». Ils éprouvent un sentiment d'inutilité dans l'exercice de leur travail. Bien qu'ils affirment que cette posture les met dans une position de victime, ils pensent qu'il n'y a pas eu d'autres choix à faire en début de carrière. Les enseignants ayant choisis par complaisance l'enseignement se trouvent aussi être en train d'employer l'inertie comme stratégie de gestion de la souffrance au travail. En effet, le participant P23 affirme: « *nous ne pouvons rien faire que de garder le silence et continuer de travailler même si nous ne sommes pas satisfaits* ». En réalité, les enseignants ayant fait un choix par complaisance, éprouvent le

sentiment d'être contrariés dans l'exercice de leur travail au regard de leur vécu professionnel.

Le déni de la réalité est une stratégie de gestion de la souffrance au travail employée par les enseignants ayant été contraints dans leur choix par divers facteurs. Ce mode de gestion de souffrance est employé par les enseignants moins expressifs et qui ont tendance à intérioriser leur ressenti. C'est le cas du participant P10 qui s'exprime en ces termes : « *Mais bon !!! On fait avec les réalités du terrain et on tient le coup, sans se plaindre, même si dans le secret on gémit* ». Cela rend compte de l'état d'esprit dans lequel ce dernier se trouve au moment de l'entrevue. Les enseignants qui emploient le déni de la réalité éprouvent le sentiment d'être étouffé au fond d'eux, mais supportent en faisant bon usage des ressources intrinsèques dont ils disposent pour gérer les défis récurrents auxquels ils sont confrontés.

Stratégies de gestion de la souffrance en plein exercice du travail

Les enseignants ayant traversés inévitablement des périodes de turbulence dans l'exercice de leur profession, changent des stratégies de gestion de leur souffrance afin de s'adapter aux nouvelles exigences qui ont changé avec l'expérience. La première catégorie de participants qui estime que le travail d'enseignant est difficile par endroit opte pour la sublimation. Face à ces réalités, certains d'entre eux essaient de s'adapter comme le participant P32 qui livre ses impressions en ces termes: «*Pour gérer la souffrance, on cherche à s'adapter en trouvant d'autres centres d'intérêts comme voies de contournements*». Ils éprouvent à cet effet le sentiment d'être inefficaces dans l'exercice de sa profession d'enseignant, c'est pourquoi il cherche à s'accrocher sur d'autres aspects du travail qui les procurent satisfaction afin que des solutions aux souffrances émergent d'elles-mêmes.

La gestion de la souffrance par évitement intervient au cours du processus d'évolution dans la carrière enseignante. Après avoir essayé de gérer la souffrance par l'inertie, ces enseignants éprouvent le sentiment d'être incompetents à un moment donné de leur carrière. Ils mettent sur pied une stratégie d'évitement et abandonnent par moment les apprenants à leur triste sort afin de ne pas faire face aux réalités du travail. C'est pour cela que les propos de la participante (P31) retiennent notre attention, lorsqu'elle affirme: «*Devant cette réalité, il m'arrive souvent d'être découragée et d'abandonner par moment les enfants pour éviter les fréquents maux de tête* ». Cette participante trouve ainsi une stratégie pour s'en passer de la souffrance. Elle le fait en réponse au découragement, mais aussi pour préserver sa santé.

Les enseignants du primaire qui s'isolent dans l'exercice de son travail mettent sur pied une stratégie de gestion de la souffrance qui tend à minimiser ses effets dans leur vécu quotidien. Le participant P2 révèle sa stratégie en ces termes: «*on essaye de fonctionner comme on peut, il nous arrive de ne même*

pas considérer ce qui nous entoure ». Pour ce participant et pour beaucoup d'autres, il leur est impossible de gérer tous les faits relatifs à leur travail, c'est pourquoi ils se contentent de s'isoler de tout ce qui le fait souffrir.

Stratégies de gestion de la souffrance en lien avec la continuité ou non dans la profession

Le choix des enseignants de gérer leur souffrance par le déni de la réalité s'explique par le fait qu'ils font table rase de la souffrance qu'ils endurent et ainsi, ils trouvent une certaine quiétude même au milieu des vagues tumultueuses de la profession. C'est d'ailleurs ce que le participant P5 laisse transparaître dans ses propos lorsqu'il s'exprime en ces termes: *«Mais avec le temps, j'ai fini par aimer le travail et je peux endurer comme ça malgré les difficultés rencontrés... »*. Il y a lieu de remarquer qu'en dépit des situations difficiles rencontrées, ce participant développe de l'endurance au point de s'y habituer et fonctionner sans subir les effets de la souffrance au travail.

L'isolement se présente comme un mode de gestion de la souffrance employé par les enseignants à bout de souffle. C'est dans ce sillage que s'inscrit les propos du participant P11 qui affirme: *« Je fais comme je peux, il m'arrive d'être là à l'école par moment et de disparaître de temps en temps »*. Ce participant dans sa manière d'exercer, cherche un moyen de s'isoler de son cadre de travail pour se soustraire de la souffrance. Le participant P26 soutient ceci: *«Pour la continuité, je crois qu'en côtoyant d'autres réalités, je quitte dès que je trouve une issue»*. Ce participant va jusqu'à scruter le vécu des autres professions au point de vouloir recourir à l'ultime solution d'un travailleur en détresse. Cela est une marque du niveau d'insatisfaction le plus élevé d'un professionnel dans le cadre de son travail.

Discussion des résultats

Au regard de l'analyse des résultats de notre étude, il ressort que les enseignants du primaire public de la région de l'Extrême-Nord du Cameroun déploient plusieurs stratégies pour gérer leur souffrance au travail dont l'inertie, le déni de la réalité, l'évitement, la sublimation et l'isolement face à la souffrance qui sont tout de même discutables.

Stratégie de gestion de la souffrance par l'inertie

L'inertie est employée comme stratégie de gestion de la souffrance au travail par les enseignants pour répondre au sentiment d'inefficacité qu'ils éprouvent en rapport avec leurs interactions aussi bien avec les élèves ou les parents d'élèves dans l'exercice de leur profession. Ils restent inertes parce qu'ils évitent de se faire ridiculiser en attendant de trouver de nouvelles stratégies et réagir autrement. C'est ainsi que, Vergnaud (1994) relève des situations de travail dans lesquelles le sujet doit agir à un moment donné du

développement de ses compétences. Il dispose à cet effet d'un répertoire de ressources qui lui permettent de traiter immédiatement les situations qu'il vit, en faisant au préalable un inventaire de ses ressources disponibles. Ce temps de réflexion et d'exploration l'oblige à rester inerte, sans rien faire au début de cet inventaire. Cette période de réflexion est généralement suivie des hésitations et des frustrations qui peuvent se solder par des échecs. Il s'agit là d'une stratégie de gestion de la souffrance qui sied aux enseignants qui font leur premier pas dans la profession ou qui sont entrés nouvellement en contact avec la réalité de travail qui fait souffrir.

Dans le même ordre d'idées, Hannan et Freeman (1984) soulignent que, l'inertie des enseignants constatée en situation de travail est employée pour faire face à la bureaucratisation et la formalisation des organisations, qui conduisent à une résistance au changement et au maintien du statut. Étant donné que l'enseignant dans son mode de fonctionnement est conditionné à suivre les instructions venant de sa hiérarchie, il procède par ce mutisme même quand il est en face des parents d'élèves. Cet inertie loin d'être une marque d'approbation est plutôt un moyen de retenu révérencieux à l'endroit des parents d'élèves.

Par contre, Gernet et Dejours (2009) pensent qu'il existe chez le travailleur en situation de difficultés une large gamme de possibilités lui permettent de gérer la souffrance au travail. Elles sont liées à la résilience et prennent en compte des modes de fonctionnement cognitifs et sociaux connus sous le nom de schèmes. Ces schèmes universellement efficaces pour toutes formes de souffrance en milieu de travail, permettent au sujet en souffrance d'entreprendre différentes actions en fonction de la situation en question. Les schèmes présentent l'avantage qu'ils ne fonctionnent pas selon des stéréotypes, mais chaque séance d'actions est tributaire des paramètres de la souffrance. Pour lui, les enseignants, face à la souffrance au travail due aux attitudes discourtoises des apprenants disposent d'un large spectre de stratégies pouvant la contrecarrer. Ils décident donc de mettre en œuvre l'une ou l'autre des stratégies en fonction des réalités qu'ils vivent dans leurs interactions au travail.

Certains choisissent aussi de partager leurs craintes et peurs avec leurs collègues plus expérimentés et plus anciens qu'eux, ou encore s'impliquer fortement pour se conformer aux exigences de leur hiérarchie. C'est ainsi que Hérou et Lantheaume (2008) soutiennent l'idée selon laquelle l'investissement pédagogique et l'engagement dans les activités de la vie de l'établissement sont des moyens d'atténuer la souffrance liée au sentiment de dévalorisation. En contribuant ainsi à l'élargissement des tâches au sein de l'établissement, ce trop-plein d'engagement protège des défaillances éventuelles. Puisque le métier n'est tenu par aucune limite en dehors de celles attendues de chacun,

l'enseignant qui s'engage totalement en dehors du cadre exigé augmente sa valeur comme un enseignant modèle.

En outre, Rascle et Bergugnat (2016) pensent que dans le cadre de la gestion de la souffrance au travail, il faut mettre l'accent sur une approche globale et contextuelle de manière à engager tous les membres de la communauté éducative à pallier aux maux qui minent ce secteur. Il s'agit d'impliquer tous les intervenants de la chaîne éducative afin qu'ils apportent leur contribution quant à la gestion de la souffrance vécue par les enseignants dans l'exercice de leur profession. Cette stratégie vise à réfléchir à la fois sur les pratiques d'enseignements, mais aussi sur les comportements des élèves en milieu scolaire. Elle est à visée compréhensive de l'école et se fonde sur le modèle écologique qui permet d'agir sur l'environnement considéré comme un microsystème qui a un impact direct sur les individus. Il met à l'avant le rôle des adultes c'est-à-dire des parents qui influent sur le comportement des jeunes et leur perception de l'école.

Stratégie de gestion de la souffrance par le déni de la réalité

Le déni de la souffrance consiste à se convaincre soi-même d'une vie imagée, qui trouve son fondement dans l'esprit de celui qui l'emploie. C'est pourquoi Les enseignants qui éprouvent le sentiment d'être négligés, optent pour cette stratégie afin de surmonter leur souffrance. Suivant cette logique, Yelnik (2016) pense pour sa part que les enseignants qui souffrent du fait d'un sentiment d'abandon par leurs collègues dans l'exercice de leur profession emploient le déni de la réalité comme stratégie de gestion. Ils refoulent ainsi les actions destructrices de leurs collègues qui pourraient générer en eux un sentiment de culpabilité et se donnent de suivre un modèle de travail moins exigeant envers eux-mêmes afin d'échapper aux réalités vécues dans le cadre de leur travail. Aussi, Duarte (2019) pour sa part, propose une stratégie de gestion de la souffrance au travail qu'il nomme stratégie individuelle des "œillères volontaires" et qui repose sur la suspension partielle de la capacité de penser. Cette stratégie connue également sous le nom de "faire l'autruche", repose sur le refus intentionnel de voir une partie de la réalité. Le sujet fait ainsi recours à un rétrécissement de la conscience intersubjective, caractérisée par une conservation de la sensibilité et de l'intérêt pour autrui dans le monde proximal, celui de l'environnement intersubjectif proche et direct du sujet. Cependant, dans la zone distale qui correspond au monde à distance du sujet, on assiste à une indifférence affective à peu près totale.

Par contre, certains enseignants estiment qu'il est plutôt profitable de trouver des moyens de mettre hors d'état de nuire les situations susceptibles de leur faire souffrir. C'est pourquoi, Nadja *et al.*, (2011) en se penchant sur la résilience du personnel enseignant, met à l'avant la culture de l'excellence des institutions scolaires. Il met un accent particulier sur les élèves afin

d'impulser en eux une idée nouvelle, plus respectueuse des institutions et du personnel enseignant. Ainsi, au lieu de se convaincre de l'inexistence de la souffrance des enseignants due aux conduites désinvoltes des apprenants, on s'efforce de les recadrer afin qu'ils ne soient plus des facteurs de souffrance, mais plutôt une source de motivation pour les enseignants dans leurs interactions mutuelles. En suivant cette logique, Cohen *et al.* (2015) estiment que dans un environnement scolaire où règne l'insécurité, les enseignants devraient davantage développer des stratégies visant à promouvoir des programmes d'intervention et de support centrés sur l'apprenant. Ces stratégies permettront ainsi de prévenir chez le personnel enseignant la survenue de comportements à problèmes. Il souligne ainsi la nécessité d'une participation active des parents pour l'implémentation de ces mesures. Ainsi, l'action conjuguée des enseignants avec les parents contribuera à assainir les milieux scolaires où prolifèrent les conduites à risques, qui accentuent la souffrance des enseignants pendant l'exercice de leur profession.

Stratégie de gestion de la souffrance au travail par l'évitement

Les enseignants en optant pour cette stratégie jouent le jeu de la rationalité afin d'économiser les ressources intrinsèques qu'ils disposent pour affronter d'autres réalités dans l'exercice de leur profession. Hérou et Lantheaume (2008) pensent que la stratégie de gestion de la souffrance par l'évitement est adaptée dans un milieu de travail où les parents d'élèves manquent de collaborer avec le personnel enseignant. L'évitement de la souffrance dans ce contexte est perçu comme un désengagement vis-à-vis de son engagement initial dans l'encadrement des élèves. En effet, le sentiment d'être ridiculisé par les parents d'apprenants qui sont sensés soutenir les enseignants dans l'exercice de leur tâche, les fait souffrir. Face à cette souffrance, l'évitement apparaît comme une panacée pour ces professionnels de la craie qui y voient une échappatoire face à la souffrance vécue au travail. C'est dans cet ordre d'idées que s'inscrit la pensée de Fréry (2020), lorsqu'il suggère l'évitement comme stratégie de gestion de la souffrance au travail. Selon lui, en situation d'incertitude chez les travailleurs comme les enseignants du primaire qui exercent dans un environnement où les rivalités naissent facilement, l'évitement est conseillé. L'évitement comme stratégie de gestion de la souffrance au travail due au sentiment de rivalité qui peut naître, permet ainsi de donner l'apparence d'une coloration unique à l'ensemble d'un collectif de travailleurs qui milite pour une même cause, quant aux actions à entreprendre pour endurer la souffrance sans que celle-ci ne laisse des conséquences néfastes sur la continuité dans l'exercice de la profession.

Cependant, il existe d'autres enseignants qui estiment qu'il faut agir sur l'environnement dans lequel ils exercent et le transformer à leur guise. Ainsi, Rasclé et Bergugnat (2016) soutiennent pour leur part, qu'au lieu de

jouer à l'évitement, l'enseignant peut travailler sur le climat social qui prévaut. Ainsi, en faisant un inventaire du niveau de satisfaction des élèves et des parents, il peut se contenter de se réjouir des résultats engrangés à son actif. Ces résultats contribuent à la hausse de l'estime de soi du fait de sa contribution pour la réussite des élèves et de la fierté qu'il éprouve d'avoir contribué à procurer aux parents d'élèves. En effet, ces auteurs estiment qu'il faut tenir compte du service rendu pour gérer la souffrance au travail résultant de l'hostilité du milieu dans lequel l'on exerce.

Stratégie de gestion de la souffrance au travail par sublimation

L'analyse des résultats révèlent qu'il existe des enseignants qui privilégient la sublimation de la souffrance comme stratégie de gestion de la souffrance au travail. C'est dans cet ordre d'idées que Helou et Lantheaume (2008) suggèrent aux enseignants d'établir une liste d'issues pour échapper aux défis du métier et ainsi de souffrir moins dans l'exercice de la profession d'enseignant. Parmi ces issues, on retrouve l'implication active dans les activités pédagogiques, l'investissement dans les tâches comme le théâtre et l'informatique. Pour ces auteurs, il convient pour les enseignants de trouver des moyens de distraction permettant de relativiser les difficultés de la profession. C'est ainsi que ces derniers vont momentanément et progressivement oublier le sentiment d'être injustement traités dans l'exercice de leur profession.

Nadja *et al.* (2011) vont plus loin et démontrent qu'en situation de souffrance, les enseignants moins résilients, n'ayant pas la possibilité de réagir face à l'insécurité se résignent à maintenir de bonnes relations avec la population hôte en usant des paroles ironiques dans leur interactions avec elles. Ces interactions sont de nature à maintenir la sérénité et de les permettre de continuer à exercer malgré l'environnement hostile. Cette stratégie de gestion de la souffrance au travail bien qu'efficace ne peut être employée que pour un intervalle de temps relativement court. Il en est ainsi parce que ces enseignants finissent par laisser transparaître le sentiment d'être abandonnés et insatisfaits jusqu'au point de vouloir abandonner ce métier d'enseignement pour d'autres ministères. Ils soulignent que cette stratégie de gestion de la souffrance est une pratique très rependue chez les enseignants du système public.

Toutefois, il existe des enseignants qui vivent les mêmes réalités, mais qui adoptent des stratégies différentes. C'est pourquoi, Bocchi *et al.*, (2014) relève que les enseignants du primaire accordent beaucoup d'importance à l'appréciation faite par leurs élèves. Conscient de la mission laborieuse qu'ils ont à accomplir, ils prennent pour socle d'encouragement l'attitude des apprenants à leur égard. De même, le soutien de la part de leurs collègues contribuent à renforcer le climat de confiance qu'ils ont en exerçant leur

profession et cela constitue pour ces derniers un facteur essentiel sur lequel ils s'appuient pour gérer la souffrance au travail. En effet, ils mettent de l'avant le travail collaboratif entre collègues pour surpasser les obligations professionnelles parfois contraires aux normes prescrites. Ainsi, au lieu de souffrir de l'action de la hiérarchie, ces enseignants profitent de la culture protectrice mise sur pied dans ce corps de métier pour surmonter les défis liés à leur profession. Demaegd (2020) pense qu'il est indispensable pour le travailleur de se faire habiliter par l'expérience pénible de l'échec au travail et endurer la souffrance au point de ne plus parvenir à dormir, puis se frayer une voie de transformation à cette souffrance. Cette expérience rend le travailleur apte à surmonter les obstacles et instaure en lui une véritable intimité avec la résistance du réel. Cette habilitation qu'il qualifie de "corpspropriation" en plus d'être cognitive, repose sur la sensibilité, sur la perception sensible de l'environnement et du monde. Elle n'est pas seulement une façon d'interagir avec le monde de travail, mais en retour, elle a un effet mutatif sur le sujet puisqu'elle le transforme et le modèle au point de faire changer la perception qu'il a de son environnement de travail.

Stratégie de gestion de la souffrance au travail par l'isolement

L'isolement comme stratégie de gestion de la souffrance au travail est choisie par certains enseignants du primaire par soucis de préserver des rapports sains dans le cadre de leur travail. Ainsi, Veyrac et Dumas (2015) pensent que les enseignants qui ne sollicitent pas de l'aide dans l'exercice de leur profession ont l'origine de leurs souffrances enfouies dans des facteurs aussi bien internes, qu'externes. Ils parviennent tout de même à s'attribuer une part de responsabilité dans la survenue de leurs souffrances, même si elles sont vécues comme douloureuses et démobilisatrices. Ainsi, ils vont utiliser l'isolement comme stratégie de gestion de la souffrance afin de trouver des moyens de se réorganiser et revenir en charge. Ladreyt *et al.*, (2014) souligne que l'isolement au travail est utilisé comme stratégie de gestion de la souffrance lorsque la charge de travail, les émotions et plus généralement les aspects intensifs de la cognition et leurs modes de régulation sont épuisés. Ainsi, le travailleur se sent obligé de faire recours à l'isolement en milieu de travail pour essayer de se maintenir et ainsi continuer d'exercer. Il s'agit là d'une stratégie de dernier recours que les travailleurs emploient pour préserver leur équilibre psychique et leur santé mentale.

Cependant, il existe des enseignants qui militent en faveur d'une réaction différente de l'isolement. Dejours (2004) propose une gestion de la souffrance au travail plutôt orientée vers une diminution de son engagement vis-à-vis de son travail. Il préconise un désengagement au travail lorsque ce dernier est au-delà des normes prescrites et par conséquent, non proportionnel à la rémunération. Il soutient son point de vue par l'idée selon laquelle, les

travailleurs les plus impliqués dans leur tâche et qui ont mis beaucoup d'ardeur dans l'exécution de ce qui leur est confié soient les plus exposés au suicide. Il en est ainsi parce qu'un engagement bien nourri conduit à une fragilité psychique et par conséquent à une décompensation ou un suicide. Pour lui, les désengagés, ceux qui font le minimum en travaillant, ne se suicident pas lorsqu'ils entrent en disgrâce d'où la nécessité de s'armer psychologiquement pour ne pas subir des décompensations en milieu professionnel au point de penser au suicide.

Poirel et Houde (2019) estiment qu'il faut envisager une stratégie préventive de sorte que les enseignants soient outillés à l'avance sur les éventuelles souffrances en milieu de travail. Ils pensent pour leur part qu'il faut pendant la formation des enseignants, développer les compétences professionnelles des enseignants, augmenter les capacités de résistance à la souffrance afin qu'ils ne subissent pas ses effets. Il faut pour cela, accentuer les modules de formations sur les réalités de la souffrance professionnelle probantes, afin qu'ils ne soient pas surpris de sa survenue de la souffrance une fois sur le terrain. C'est ainsi qu'ils pourront tenir face aux défis des milieux professionnels conformément à leur engagement. Au regard des différentes situations vécues au travail et des différentes stratégies de gestion de la souffrance déployées sur le terrain, nous proposons le protocole de gestion de la souffrance au travail suivant, qui peut être adapté en fonction des réalités vécu par chaque professionnel.

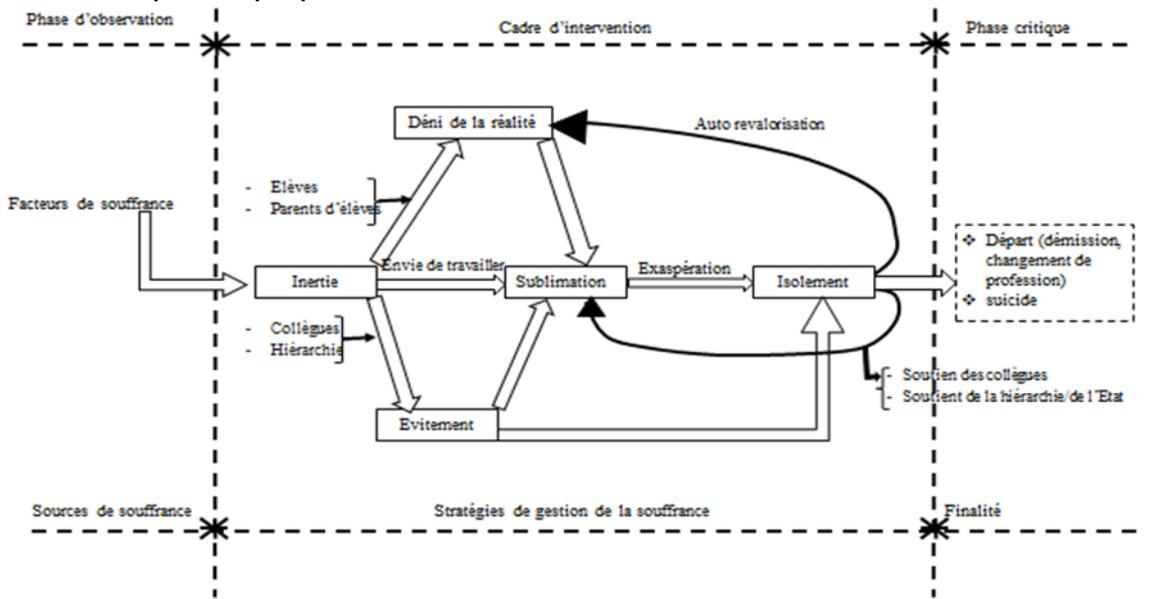


Figure : Protocole de gestion de la souffrance au travail
 (Enquête de terrain, Décembre 2024)

Plusieurs stratégies de gestion de la souffrance au travail sont déployées par les enseignants dont les plus employées sont: l'inertie, l'évitement, le déni de la réalité, la sublimation et l'isolement. La stratégie privilégiée chez la plupart d'enseignants en souffrance en début de carrière est l'inertie face à la souffrance. Il en est ainsi parce qu'étant nouveau dans la profession, la plupart d'entre eux prennent du temps pour observer et comprendre le fonctionnement de la profession. Ils vont à cet effet rester inertes, sans rien entreprendre. Cette stratégie de gestion sied avec les enseignants ayant fait un choix par défaut et par complaisance. Par contre, ceux ayant été contraint de choisir d'enseigner, vont employer le déni de la réalité. Au fil du temps, on remarque que parmi ceux ayant opté pour l'inertie pour gérer la souffrance, certains d'entre eux privilégient la sublimation, alors que ceux ayant effectué un choix forcé, vont opter pour l'évitement. Mais compte tenu du fait que la situation perdure, ceux ayant opté pour la sublimation pendant le plein exercice de leur travail ainsi que ceux ayant privilégié l'évitement vont passer au déni de la réalité; pendant que les partisans du déni migrent vers l'isolement. Il y a lieu de réaliser que ces stratégies de gestion de la souffrance diffèrent les unes des autres et évoluent en fonction du temps mis dans l'exercice de la profession. Toutes ces migrations ne visent qu'un seul objectif qui est la gestion de la souffrance en fonction de son évolution. Ainsi, notre étude induit cinq hypothèses libellées comme suit:

- **H1:** Les enseignants du primaire public gèrent leur souffrance au travail par l'inertie
- **H2:** Les enseignants du primaire public gèrent leur souffrance au travail par le déni de la
- **H3:** Les enseignants du primaire public gèrent leur souffrance au travail par la sublimation.
- **H4:** Les enseignants du primaire public gèrent leur souffrance au travail par l'évitement
- **H5:** Les enseignants du primaire public gèrent leur souffrance au travail par l'isolement.

Conclusion

Au terme de notre recherche qui a porté sur les stratégies de gestion de la souffrance au travail en situation de risques psychosociaux chez les enseignants du primaire public, il a été question de déceler les différentes stratégies déployées ces derniers. Nous avons sélectionnés des enseignants en souffrance pour prendre part à cette recherche en utilisant le test de détresse psychologique de Lovibond et Lovibond (1995) qui met en exergue la dépression, l'anxiété et le stress. Après la collecte des données auprès des enseignants issus des six départements de la région de l'Extrême-Nord du

Cameroun, nous avons analysé le verbatim recueillis. Il ressort de l'analyse diachronique du verbatim des différentes personnes ayant pris part à l'entrevue que les enseignants déploient plusieurs stratégies pour gérer leur souffrance au travail. En fonction des situations vécues, ils emploient l'inertie face à la souffrance, le déni de la réalité, l'évitement, la sublimation et l'isolement. Chacune de ces stratégies peut varier au fil du temps et des circonstances qui prévalent et migrer d'une stratégie vers d'autres stratégies plus adaptées. Compte tenu de tout ce qui précède, nous recommandons aux enseignants de faire preuve d'abnégation et de résilience afin de pouvoir exercer leur tâche; aux différents acteurs que sont les élèves et les parents d'élèves d'apporter leur soutien aux enseignants pour faciliter leurs tâches, aux pouvoirs publics de tout mettre en œuvre pour accompagner les enseignants dans l'accomplissement de leur mission. Il sera judicieux dans l'avenir de se pencher sur les moyens de prévenir la souffrance chez les travailleurs en amont.

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L'Impact de l'Enseignement Explicite sur l'Éducation Marocaine : Une Analyse Critique et Bibliométrique

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Résumé

Au Maroc, l'enseignement explicite (EE) a été mis en œuvre pour la première fois dans les écoles pionnières. Il s'inscrit dans le processus de réforme majeur visant à restructurer en profondeur le système éducatif national. C'est une approche pédagogique structurée, centrée sur la clarté des objectifs, la modélisation, la pratique guidée et le retour systématique sur les apprentissages. Ce travail critique explore les tendances de l'EE via une

analyse descriptive, analytique, comparative et bibliométrique. L'analyse des résultats empiriques a prouvé l'efficacité de ce modèle grâce à de nombreuses méta-analyses. Au Maroc, selon CSEFRS, cette approche a conduit à une amélioration significative des niveaux d'apprentissage des élèves, surtout en mathématiques (67 %) et en langue française (62 %), comparativement à la langue arabe (50 %). Les progrès diminuent toutefois dans les niveaux supérieurs (CE4, CE5 et CE6) (26 % à 55 %). Cependant, les analyses comparatives ont montré que ce modèle est non convaincant et l'accompagnement pédagogique est très limité et de faible qualité (60 /100). En effet, l'EE se confronte aux principes des réformes éducatives : la Vision stratégique 2015-2030 (CSEFRS, 2015), la Loi-cadre 51-17 (MENPS, 2019) et la Feuille de route 2022-2026 (MENPS, 2022) qui misent sur la créativité, la différenciation pédagogique, l'inclusion et l'autonomie de l'enseignant, de l'apprenant et l'établissement. Orienté autour de l'enseignant, ce modèle (standardisé et uniforme) se focalise sur l'acquisition des compétences de base au déterminant du développement de la pensée critique, la curiosité et de la découverte et de l'innovation. Pour maximiser son impact, l'EE doit, d'une part, être corollaire à un EE des comportements et une gestion de classe (interventions préventives et correctives). D'autre part, il doit toujours être complété par des phases de pratique guidée et autonome, qui favorisent l'initiative, la réflexion et la créativité des apprenants. Par conséquent, une approche hybride et combinée de l'EE et de l'approche d'investigation ou par découverte semble la plus adaptée pour répondre aux besoins complexes d'apprentissage, facilitant la transition d'un apprentissage assisté vers l'autonomie. Compte tenu des données bibliométriques et empiriques, il est clair aussi, que l'ouverture aux apports des neurosciences et de la psychologie cognitive permet de renforcer ce modèle.

Keywords: Enseignement explicite -École pionnières - Guidance-Constructivisme-Bibliométrie- Analyses critiques

The Impact of Explicit Teaching on Moroccan Education: A Critical and Bibliometric Analysis

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Abstract

In Morocco, explicit teaching (ET) was implemented for the first time in pioneering schools. It is part of the major reform process aimed at deeply restructuring the national educational system. It is a structured pedagogical approach, focused on clarity of objectives, modelling, guided practice, and systematic feedback on learning. This critical work explores ET trends through descriptive, analytical, comparative, and bibliometric analysis. The analysis of empirical results has proven the effectiveness of this model through numerous meta-analyses. In Morocco, according to CSEFRS, this approach has led to a significant improvement in students' learning levels, especially in mathematics (67%) and French (62%), compared to Arabic (50%), although progress decreases in higher grades (CE4, CE5, and CE6) (26% to 55%). However, comparative analyses have shown that this model is unconvincing and the pedagogical support is very limited and of low quality (60 /100). Indeed, ET faces the principles of educational reforms: the Strategic Vision 2015-2030 (CSEFRS, 2015), the Framework Law 51-17 (MENPS, 2019), and the Roadmap 2022-2026 (MENPS, 2022), which focus on creativity, pedagogical differentiation, inclusion, and the autonomy of the teacher, the learner, and the institution. Oriented around the teacher, this model

(standardised and uniform) focuses on the acquisition of basic skills as a determinant of the development of critical thinking, curiosity, and discovery and innovation. To maximise its impact, ET must, on one hand, be correlated to ET of behaviours and classroom management (preventive and corrective interventions). On the other hand, it must always be complemented by phases of guided and autonomous practice, which promote initiative, reflection, and creativity among learners. Therefore, a hybrid and combined approach of EE and investigation or discovery seems the most suitable to meet complex learning needs, facilitating the transition from assisted learning to autonomy. Given the bibliometric and empirical data, it is also clear that openness to the contributions of neuroscience and cognitive psychology helps to strengthen this model.

Keywords: Explicit, Teaching-Pioneer, Schools-Guidance, Constructivism, Bibliometrics, Critical analyses

Introduction

Les évaluations nationales et internationales classent régulièrement le système éducatif marocain parmi les moins performants en matière d'acquis scolaires. Face à ce défi, le ministère de l'éducation nationale, du préscolaire et des sports (MENPS) a annoncé la conduite d'une réforme du système en profondeur, selon une Feuille de route (MENPS, 2022) en 12 engagements concernant l'élève, l'enseignant et l'établissement. Au cœur de cette transformation se trouve le programme « écoles pionnières », une initiative systémique agissant sur l'ensemble des composantes fondamentales du système éducatif. Pour atteindre son objectif, ce programme s'appuie sur deux piliers pédagogiques complémentaires : une approche curative, incarnée par la méthode Teaching at the Right Level (TaRL) pour combler les lacunes accumulées, et une approche préventive, fondée sur L'EE, afin de garantir une acquisition solide et progressive des nouveaux savoirs.

Le programme Teaching at the Right Level (TaRL), initialement mis en place par l'ONG indienne Pratham, est basé sur une pédagogie de remédiation permettant d'adapter les apprentissages au niveau réel des élèves et, ainsi, leur permettre d'acquérir de manière rapide les compétences de base en lecture et en mathématiques (Pratham, 2015). Dans le cadre de la réforme éducative marocaine, ce levier a été introduit en septembre 2023 dans les écoles pionnières, concernant près de 63000 élèves. En renforçant l'efficacité de la pédagogie et en l'adaptant au contexte national, le Maroc a contextualisé ce modèle international en l'enrobant d'EE (EE) théorisé par Gauthier et Bissonnette (Gauthier et Bissonnette, 2023). Cette articulation symbolise, en quelque sorte, la « marocanisation » de la démarche, puisqu'elle associe remédiation différenciée et structuration pédagogique progressive. Mais cette

initiative est-elle en harmonie avec les finalités du système éducatif marocain pour coller ainsi parfaitement à la philosophie de la stratégie Vision 2015-2030 ?

Importance de l'étude

L'EE est un modèle pédagogique structuré autour de la délégation graduée de responsabilité. Il repose sur des étapes allant de la modélisation à l'application, et se fonde sur une transmission directe des savoirs par l'enseignant (Rosenshine, 2012). Cependant, son efficacité et sa pertinence dans le contexte éducatif marocain soulèvent de nombreux débats, notamment au regard des orientations de la Vision Stratégique 2015-2030 (MENPS, 2015), de la Loi-cadre 51-17 (MENPS, 2019) et de la Feuille de route ((MENPS, 2022). Néanmoins, au Maroc, aucune recherche n'a encore analysé ce sujet.

À l'échelle internationale aucune étude n'a analysé de manière bibliométrique ce champ en utilisant les logiciels bibliométriques comme des outils principaux d'exploration et de cartographie des publications scientifiques. Une telle approche permettrait de quantifier l'évolution des productions scientifiques, d'en identifier les tendances dominantes, et de disposer de données actualisées facilitant l'analyse de la dynamique de recherche dans ce domaine.

Méthodes

La méthodologie adoptée pour réaliser ce travail repose dans un premier temps sur une analyse documentaire approfondie et sur une démarche descriptive, analytique et comparative des textes de référence des réformes de l'éducation à savoir la Loi-cadre 51-17 (MENPS, 2019), la Vision stratégique (CSEFRS, 2015) et la Feuille de route 2022-2026 (MENPS, 2022) avec le dispositif relatif à la mise en œuvre de l'EE dans les écoles pionnières Marocains. Sans oublier la confrontation de l'analyse du dispositif et la discussion de l'EE aux paradigmes et aux théories explicatifs en matière d'éducation. Dans un deuxième temps, cette recherche mobilise une analyse bibliométrique afin d'étudier quantitativement les tendances scientifiques, les auteurs, institutions les plus influents et la distribution géographique des publications scientifique concernant l'EE. Cette analyse permet donc de comprendre la structuration et l'évolution de ce domaine de recherche en identifiant les sujets émergents, les acteurs clés et l'influence globale des publications. Pour cela, nous avons utilisé les logiciel VOSviewer, Bibliomertix et Publish comme des outils principaux d'exploration et de cartographie des publications scientifiques. En se basant sur de la base de données Scopus, Google Scholar et Web of Science. Ensuite nous avons identifié un ensemble de mots-clés pertinents (explicit instruction" OR

"explicit teaching" OR "direct instruction" OR "explicit pedagogy" OR "explicit strategy instruction"), que nous avons appliqués aux mots-clés, aux titres aux résumés des articles entre 2010 et 2025. Nous avons créé des cartographies de données à partir de sources de bases de données préparées. Il existe trois formes de cartographie des données : réseau, densité et visualisation superposée.

Résultats

Analyse documentaire et comparative

L'EE est né de la recherche sur l'efficacité de l'enseignement. C'est la synthèse d'un grand nombre d'observations et d'expérimentations qui ont porté au jour des facteurs associés à une meilleure réussite des élèves et qui ont été organisées en un ensemble cohérent de pratiques (Rosenshine, 2009). Il est issu des recherches effectuées sur les pratiques de l'enseignement efficace. Un courant de recherche qui a pour objectif d'identifier les interventions pédagogiques les plus efficaces pour favoriser l'apprentissage des élèves ayant un trouble d'apprentissage dans les matières de base, telles que la lecture, l'écriture et les mathématiques. L'EE est la formalisation d'une stratégie d'enseignement structurée en étapes séquencées et fortement intégrées. (Gauthier et al., 2013).

Pour Hughes et ses collaborateurs (2017), l'EE est un ensemble de stratégies pédagogiques soutenues par la recherche, utilisées pour planifier et offrir un enseignement qui fournit le soutien nécessaire à un apprentissage réussi grâce à la clarté du langage utilisé et de l'objectif poursuivi, et à la réduction de la charge cognitive. Cet enseignement favorise l'engagement actif de l'élève en exigeant des réponses fréquentes et variées, suivies d'une rétroaction positive et corrective appropriée et aide à la rétention à long terme par l'utilisation de stratégies de révision ciblées. (Gauthier & Bissonnette, 2023).

L'EE : Étapes et démarche pédagogique

Selon Gauthier, Bissonnette et Richard (2013), l'EE est structuré en trois étapes complémentaires : le modelage, la pratique guidée ou dirigée, et la pratique autonome. Cette progression est cruciale, permettant aux élèves de progresser de manière sécurisée et efficace vers la maîtrise des apprentissages.

1. Le modelage : L'enseignant modélise la tâche à accomplir. Il exécute la tâche devant les élèves, tout en verbalisant ses pensées et ses stratégies. C'est le moment où l'élève observe et écoute attentivement pour comprendre le "comment" et le "pourquoi" de l'apprentissage.
2. La pratique guidée : également nommée pratique dirigée. Sous la supervision de l'enseignant, les élèves réalisent la tâche. L'enseignant

pose des questions, fournit des indices et offre une rétroaction continue pour s'assurer que les élèves acquièrent la bonne démarche.

3. La pratique autonome : Une fois la pratique guidée maîtrisée, l'élève s'exerce de manière indépendante pour consolider les acquis.

En plus de ces phases, la démarche comprend également l'ouverture de la leçon (présentation des objectifs et justifications de l'apprentissage) et la clôture de la leçon (synthèse des acquis et liens avec les connaissances antérieures).

L'EE : Fondements théoriques et preuves d'efficacité

Dans l'étude de Good et Grouws (1979), des enseignants formés aux pratiques d'enseignement efficace en mathématiques ont montré une application significativement plus fréquente de ces méthodes, entraînant une amélioration des résultats des élèves par rapport au groupe contrôle. Une méta-analyse de Stockard et al (2018) sur 328 études a révélé des effets positifs de l'EE sur divers domaines, équivalents aux écarts de réussite entre groupes sociaux. Hattie (2009) a confirmé ces résultats en identifiant l'EE comme très efficace. Kamil et al (2008) ont identifié l'EE du vocabulaire et des stratégies de compréhension comme les plus probants, tandis que Gersten et al (2009) ont mis en évidence l'EE et les heuristiques de résolution de problèmes comme les interventions efficaces en mathématiques pour les élèves avec troubles d'apprentissage. Guilmois (2015) a également démontré l'efficacité de l'EE en mathématiques dans des zones prioritaires en Martinique, montrant des résultats supérieurs par rapport aux méthodes socioconstructivistes.

L'EE dans le contexte marocain

Offrir aux cibles un système éducatif de qualité pour l'apprentissage des savoirs et des compétences, Le système éducatif marocain, selon le MENPS (MENPS,2022) est caractérisé par une faible performance des acquis scolaires, face à ce défi, MENPS a annoncé une réforme en 12 engagements concernant l'élève, l'enseignant et l'établissement. En effet, l'un des pilotes de cette réforme est les écoles pionnières qui fonctionnent selon une approche systémique caractérisée par des curatives via le programme TaRL pour remédier aux déficitaires des élèves et préventif via le programme EE pour garantir l'enseignement de qualité et ce, en suivant les recommandations de « Global Education Evidence Advisory Panel » (GEEAP, 2023) préconisant l'enseignement structuré en fonction de leur rapport coût-efficacité

Discussion

Analyse critique de l'EE

Le processus de l'EE commence par la modélisation où l'enseignant démontre la tâche en énonçant les étapes à voix haute, suivi par une pratique

guidée où enseignant et apprenants collaborent. Cela débouche sur une pratique autonome où les apprenants appliquent leurs connaissances de manière indépendante. Cependant, ce schéma est considéré comme limitatif car la modélisation peut freiner l'engagement des élèves, entraînant un manque de motivation et d'intérêt, et un modèle répétitif ne favorise pas une meilleure compréhension des connaissances.

Selon l'Organisation de Coopération et de Développement Économique (OCDE,2018), une critique majeure de l'éducation est sa tendance à adopter une approche uniforme «one size fits all » qui ne tient pas compte de la diversité des rythmes et styles d'apprentissage. Howard Gardner (1991) soutient que chaque individu a une façon unique d'apprendre, et que les systèmes éducatifs sont souvent biaisés en faveur des intelligences verbales et logiques, excluant d'autres formes d'intelligence. Cette standardisation peut entraîner l'échec d'élèves dont les aptitudes ne correspondent pas aux modèles dominants. Gardner propose de diversifier les méthodes d'enseignement et les évaluations pour favoriser l'équité. De plus, Michel Huteau (2021) souligne que l'efficacité d'une technique d'enseignement dépend du profil de l'apprenant, avec des approches directrices favorisant certains types d'élèves, tandis que d'autres apprennent mieux dans des environnements plus participatifs.

Huteau (2021), inspiré par Sternberg et Kolb, définit différents types d'apprentissage (concret, abstrait, actif, réfléchi, global, analytique) qui servent à résoudre les problèmes. Il critique l'approche pédagogique explicite pour sa négligence de cette diversité, nuisant aux apprenants autonomes tout en aidant ceux en difficulté. Huteau et Gardner (1991) soulignent les limites d'un enseignement standardisé, qui, bien qu'efficace pour les étudiants nécessitant un cadre structuré, restreint les opportunités d'évolution pour ceux capables d'apprentissage réflexif. Huteau recommande une pédagogie différenciée, prenant en compte les spécificités individuelles et sociales, pour remédier aux inégalités exacerbées par des méthodes non différenciées, comme la réforme du collège unique de 1975, qui a accru les disparités parmi les élèves issus de milieux défavorisés (Huteau, 2021). La Vision stratégique 2015-2030 prône un enseignement différencié pour garantir une éducation de qualité à chaque individu, tenant compte de l'hétérogénéité des étudiants. Cela inclut la remédiation pédagogique, qui nécessite une attention individuelle pour chaque étudiant. Une pédagogie efficace doit trouver un équilibre entre orientation et indépendance, structure et souplesse, et répondre aux différentes caractéristiques cognitives, motivationnelles et émotionnelles des élèves, transformant l'éducation en une médiation entre diverses intelligences et les attentes d'un apprentissage durable.

Contradictions avec la réforme éducative au Maroc (Tableau 1)

L'EE au Maroc présente des limitations en matière de différenciation des élèves et du développement de compétences critiques et créatives, ce qui semblera contraire aux objectifs de réforme visant à promouvoir une société de la connaissance. Il est conseillé d'adopter un enseignement multiple qui intègre l'EE tout en offrant aux enseignants une plus grande liberté d'adaptation. La Vision Stratégique 2015-2030 et la Loi-cadre 51-17 (Tableau 1) privilégient un modèle pédagogique basé sur l'autonomie et l'innovation, indiquant que l'EE entrave la transition vers une pédagogie interactive. La Feuille de Route 2022-2026 (Tableau 1) appelle également à une flexibilité pédagogique, ce qui va à l'encontre de l'approche méthodique actuellement préconisée.

L'EE et modelage

L'EE présente plusieurs limites qui doivent être soulignées. D'une part, en mettant l'accent sur l'imitation, le modelage peut réduire les occasions de découverte autonome et limiter le développement de la pensée critique et de la créativité (Bruner, 1996). En effet, une utilisation excessive peut générer une dépendance vis-à-vis de l'enseignant, freinant le développement de l'autonomie et de la responsabilité chez l'apprenant (Rosenshine, 2012). De plus, il tend à uniformiser les démarches cognitives, en réduisant la diversité des stratégies mobilisées par les élèves. Enfin, s'il sécurise les apprentissages initiaux, il ne suffit pas à lui seul pour garantir l'appropriation en profondeur des connaissances. Pour être efficace, il doit être complété par des phases de pratique guidée et autonome, qui favorisent l'initiative, la réflexion et la créativité (Archer & Hughes, 2011). De même, l'élève ne dispose d'aucune structure le soutenant dans la production de pensée créative, étant donné que l'activité scolaire devient moyenne sans fin : il convient de rappeler ici que la finalité de l'éducation ne réside pas dans la simple fabrication d'un « élève-robot » marocain capable de répondre aux enquêtes nationales ou internationales (PISA, PNEA, TIMSS, PIRLS...) pour le comparer à un « élève-robot » Coréen, mais bien au-delà de cela.

L'EE et accompagnement pédagogique

Le Conseil Supérieur de l'Éducation, de la Formation et de la Recherche Scientifique (CSEFRS) a montré que l'efficacité des réformes éducatives au Maroc, en particulier dans le cadre des « écoles pionnières », reste freinée par un accompagnement pédagogique jugé très insuffisant. Les rapports d'évaluation indiquent un score moyen de 60/100 au niveau national, avec une forte disparité entre le milieu urbain (68) et rural (48), ce qui montre de profondes inégalités territoriales (CSEFRS, 2023).

L'Observatoire National du Développement Humain (ONDH, 2024) affirme que l'inspecteur devrait être « le point focal, le médiateur et l'accompagnateur » entre les services centraux et les équipes pédagogiques. Toutefois, Hamdani (2024), dans son étude qui a ciblé 925 enseignants des écoles pionnières dans les 12 régions du Maroc, déclare que seuls 27% estiment que les formations dispensées par les inspecteurs sont de bonne qualité, tandis que 40,1 % qui jugent ces formations de faible qualité en raison de leur caractère théorique, du temps insuffisant et d'une surcharge des programmes, cela peut entraîner une résistance naturelle au changement (Mastafi, Mabrou, & Balle, 2018). En effet, La formation continue joue un rôle crucial pour surmonter ce frein, mais elle demeure souvent insuffisante ou inadéquate face à la l'introduction de pratiques pédagogiques radicalement différentes de celles qu'ils adoptent depuis longtemps ce qui peut perturber leurs routines et sécurités professionnelles.

Comme le souligne l'UNESCO (2021), la réussite des réformes ne peut être garantie que si les inspecteurs jouent un rôle de facilitateurs et de formateurs, et non des contrôleurs menaçants. Ce repositionnement constitue une condition essentielle pour réduire les inégalités, améliorer la qualité des apprentissages et favoriser une école marocaine équitable et innovante.

Une autre étude empirique au Maroc réalisée par (Ben el Maati M, 2025) confirme que 77% et 79% (n =109) affirme que les enseignants stagiaires ou récemment recrutés ne disposent pas des connaissances nécessaires en EE, qui est indispensable pour la réussite de la réforme. Une telle lacune dans le niveau de préparation des enseignants est principalement due au manque de modules sur l'EE dans les programmes de formation des enseignants. Par conséquent, nous suggérons la nécessité urgente de modifier les programmes et les méthodes de la formation des enseignants et de mieux relier la théorie à la pratique à travers des environnements pédagogiques innovants.

Tableau 1 : Critiques de l'EE et recommandations

Dimensions	Réformes (Loi-cadre, Feuille de route, Vision stratégique)	Enseignement explicite	Recommandations
Centricité de l'apprenant	Loi-cadre (art. 28) : L'apprenant est au centre de l'action éducative et acteur principal dans la construction des apprentissages	Centricité de l'enseignant, qui peut miner l'autonomie et l'activisme de l'apprenant.	Permettre des approches actives – constructiviste et différenciée.
Diversification pédagogique	Vision stratégique 2015-2030 : Passage d'une pédagogie de transmission à une pédagogie interactive, développement de	L'EE mène à quelques mémorisations, au détriment de la pensée critique.	Encourager l'hétérogénéité et l'hétérogénéisation de l'activité pédagogique en fonction des apprenants et des contextes.

	l'esprit critique, de la créativité et de l'innovation.		
Inclusion et équité	Feuille de route 2022-2026 : Mise en avant de l'éducation inclusive et différenciée, accompagnement des élèves à besoins spécifiques.	L'EE est trop uniforme et ne tient pas compte de l'hétérogénéité des classes, des groupes et des besoins spécifiques	Pour garantir l'égalité des chances, il est nécessaire d'investir massivement dans le développement de la différenciation pédagogique et de renforcer l'éducation inclusive.
Autonomie et gouvernance	Loi-cadre (art. 39) : Autonomie des établissements sur la base du projet d'établissement ; Vision stratégique : décentralisation et innovation pédagogique.	L'EE limite la liberté des enseignants et même suit des séquences standardisées qui ne sont pas toujours adaptables aux contextes locaux	Pour y remédier, il est nécessaire d'accorder plus de latitude aux enseignants et aux établissements pour que les enseignants puissent adapter leurs méthodes aux réalités locales.
Enseignement préscolaire	Vision stratégique ; l'enseignement préscolaire est considéré comme la base essentielle de toute réforme éducative favorisant l'équité et l'égalité des chances et facilitant les parcours scolaires et de formation	L'EE n'a pas une vision claire de cette dimension. En effet le préscolaire impacte directement les performances des élèves de niveau primaire	Adopter une approche holistique qui prend en compte tous les cycles
Pensée critique et créativité	Loi-cadre : Préambule et Article 3 (développement de l'esprit critique, innovation, société de la connaissance) ; Article 28 (renouvellement des curricula, diversification des approches). Vision stratégique : levier 12 (modèle pédagogique diversifié et innovant).	L'EE permet une errance et une mémorisation mécanique, exigeant une compréhension superficielle et limitant la créativité, la pensée critique et l'innovation.	Renforcer des approches constructivistes et actives qui favoriseront l'esprit critique, la créativité et l'innovation, en donnant davantage de latitude pédagogique aux enseignants pour changer leurs pratiques
Autonomie de l'apprenant et société de la connaissance	Loi-cadre : Préambule (modèle pédagogique orienté vers l'intelligence, autonomie, citoyenneté). Vision stratégique : transition d'une pédagogie magistrale vers l'apprentissage autonome et interactif.	L'EE favorise le maintien de la forte dépendance entre l'élève et l'enseignant, ce qui restreint la capacité de l'élève à construire son savoir, à produire une connaissance et à s'intégrer activement dans la société de la connaissance.	Il s'agit plus de promouvoir des pratiques pédagogiques tournées vers l'apprenant et qui encouragent son autonomie et la production de la connaissance, son intégration active dans la société de la connaissance.

Diversification et adaptation des approches	Loi-cadre : Article 28 (diversification et adaptation des approches pédagogiques). Vision stratégique : levier 12 (flexibilité et diversité des approches).	En faisant du modèle de l'EE une méthode générique, il sacrifie la diversité et l'adaptation aux besoins et aux contextes	Ce point de vue souligne l'importance de définir un cadre des approches pédagogiques et de former les enseignants à différents modèles et les laisser les pratiquer et les réajuster typologiquement ou méthodologiquement selon le contenu et le contexte de l'apprentissage.
Approches	Pédagogie par compétence	L'adoption d'une approche centrée sur le morcellement des activités, des contenus, des objectifs et sur l'accumulation des connaissances,	Versus la concentration sur l'approche par compétences et sur les habilités de la réflexion, de l'esprit critique et des intelligences multiples.
Liberté pédagogique et différenciation	Feuille de route 2022-2026 : Engagement 7 – offrir aux enseignants une plus grande liberté dans la gestion des rythmes d'apprentissage et des méthodes pédagogiques ; promouvoir l'adaptation aux besoins des apprenants.	L'EE implémente une approche uniforme strictement codifiée – et, par la même, il supprime entièrement la liberté et la différenciation pédagogique.	Donner aux enseignants une autonomie réelle pour diversifier les pratiques pédagogiques et ajuster les approches à la réalité des contextes locaux et des spécificités des étudiants. Exiger des autorités scolaires qu'elles garantissent ces valeurs dans toutes les écoles.
Qualité des apprentissages	Loi-cadre : Article 3 (développement de l'excellence, de l'esprit critique et de l'innovation). Vision stratégique : amélioration de la qualité de la relation éducative, centrée sur l'apprenant acteur de ses apprentissages.	Compréhension superficielle, dépendance excessive à l'enseignant, qualité et profondeur des apprentissages	Il faut, bien au contraire, promouvoir des pédagogies actives (analyse, comparaison, critique, déduction) pour garantir une compréhension profonde et transférable.
Société de la connaissance et innovation	Loi-cadre : Préambule et Article 3 (transition vers une société de production et de diffusion des connaissances). Vision stratégique : ouverture sur la recherche, les sciences, les technologies et l'innovation.	L'EE forme des apprenants consommateurs de savoirs, incapables de produire ou d'innover.	Développer des approches qui favorisent la production de savoirs, la recherche, l'innovation et l'esprit entrepreneurial dès l'école.

Source : Ministère de l'Éducation Nationale Maroc
(Loi-cadre, Feuille de route et Vision stratégique) <https://www.men.gov.ma>

Évaluation externe

L'évaluation externe du projet des « écoles pionnières » réalisée par le CSEFRS met en évidence des limites de l'EE et du modèle pédagogique. Même si c'est bien organisé, l'EE a été d'une part, inefficace pour couvrir sur le plan taxonomique, des niveaux de complexité allant de la connaissance jusqu'à la résolution de problème. Après s'être stabilisées au niveau des exigences en CE2, les performances se sont à peine améliorées, voire ont diminué chez les élèves âgés, scolarisés en CE5 et CE6, en arabe et en mathématiques, où moins de 40 % des élèves atteignent les objectifs attendus au CE5 et CE6 (CSEFRS, 2023). Cela explique fortement les raisons parmi lesquelles un groupe d'élèves -par contrainte - a fui les écoles pionnières pour des écoles publiques « non-pionnières » ou vers des écoles privées dont les directeurs ne sont pas encore convaincus par cette approche, bien que les écoles publiques et privées soient encadrées et accompagnées par le même inspecteur pédagogique qui croit en l'efficacité et l'efficacité du modèle prodigieux. Semble-t-il !

Les données analysées (Figure 1) proviennent des prétests et post-tests administrés par le ministère en septembre et novembre 2023, ainsi que d'une enquête de l'INE-CSEFRS de mai 2024, impliquant 8 726 élèves de CE2 à CE6 (CSEFRS, 2023). L'étude évalue le rôle de l'EE dans l'amélioration des compétences en arabe (mots ou plus, paragraphe ou plus, histoire ou plus) en français (mots ou plus, texte ou plus) et en mathématiques (addition ou plus, multiplication ou plus, soustraction ou plus, division ou plus) en comparant les résultats de début et fin d'année. Les élèves montrent des progrès en arabe, avec 50% de succès moyen ; l'amélioration est notable au CE2 (58%) mais diminue au CE6 (45%). Environ 40% maintiennent le même niveau, et 4 à 14% subissent une baisse de performance, surtout en CE6. En français, les taux d'amélioration vont de 58 à 71%, le CE2 atteignant 71%, mais 35% stagnent. En mathématiques, deux tiers des élèves progressent, avec des taux de 72% au CE2, réduits à 61% au CE6. Ces résultats suggèrent que l'approche pédagogique (EE) a mieux répondu aux besoins des élèves appartenant aux deux premiers niveaux du primaire. Néanmoins, d'autres facteurs doivent être considérés pour expliquer cette dynamique, tandis que les performances des autres niveaux se stabilisent ou diminuent légèrement.

Dans ce cadre, les enseignants pionniers ayant participé à une autre enquête au Maroc (Hamdani (2024) ont souligné les bénéfices d'une mesure systématique des apprentissages fondée sur l'EE. Cependant, ils ont aussi identifié des limites, notamment le manque d'autonomie dans la gestion des cours, centralisés et uniformisés, ce qui entrave leur capacité d'adaptation aux spécificités locales. En outre, l'approche adoptée favorise un morcellement des contenus au détriment de l'apprentissage par compétences et du développement de l'esprit critique. Une autre étude au Maroc (Jirou et al.,

2025) qui vise à comparer l'efficacité de l'EE et de la démarche d'investigation, a démontré que l'EE est une méthode d'enseignement efficace pour l'acquisition des connaissances et bénéficie à la gestion de la classe et au rôle de l'enseignant. Néanmoins, cette méthodologie a ses limites : d'une part, elle affecte parfois négativement la mémoire et l'application pratique et d'autre part, elle diminue le désir de développer des compétences supérieures, telles que la pensée critique. Dans une certaine mesure, une approche trop restrictive nuit clairement à l'imagination des enfants. En conséquence, il semble qu'une approche hybride, qui consiste à combiner EE et approche d'investigation, serait la plus logique ; en outre, il ne faut jamais oublier l'importance de la formation continue et de l'accompagnement institutionnel.

Cette situation met en évidence, d'une part, le caractère peu efficace de l'EE pour soutenir une progression durable des compétences, en particulier pour les niveaux les plus avancés, et d'autre part, il ne permet pas d'apporter une remédiation adaptée aux élèves présentant un retard d'apprentissage important, ce qui conduit à l'accumulation des lacunes. C'est là où se manifeste la différence entre un EE et la pédagogie différenciée (préconisée par la Vision Stratégique) qui pose le problème d'amener les élèves non pas à un point déterminé (comme nous le faisons en fonction de nos programmes actuels), mais chacun à son plus haut niveau de compétence (Perrenoud, 1997). Alors l'une des limites les plus manifestes de cet enseignement est son incapacité à garantir un progrès soutenu et durable, surtout en ce qui concerne les élèves d'un niveau élevé.

Cela souligne la nécessité d'apporter des ajustements pédagogiques ciblés, notamment pour les classes supérieures. L'approche explicite est fondée sur la répétition et le modèle d'une taille unique, ce qui limite fortement la possibilité de personnaliser, de différencier les enseignements en fonction des besoins des élèves (Bissonnette, Sriadi, Hadi, Istiyono et Retnawati, 2023).

L'EE : contenus et /ou comportements

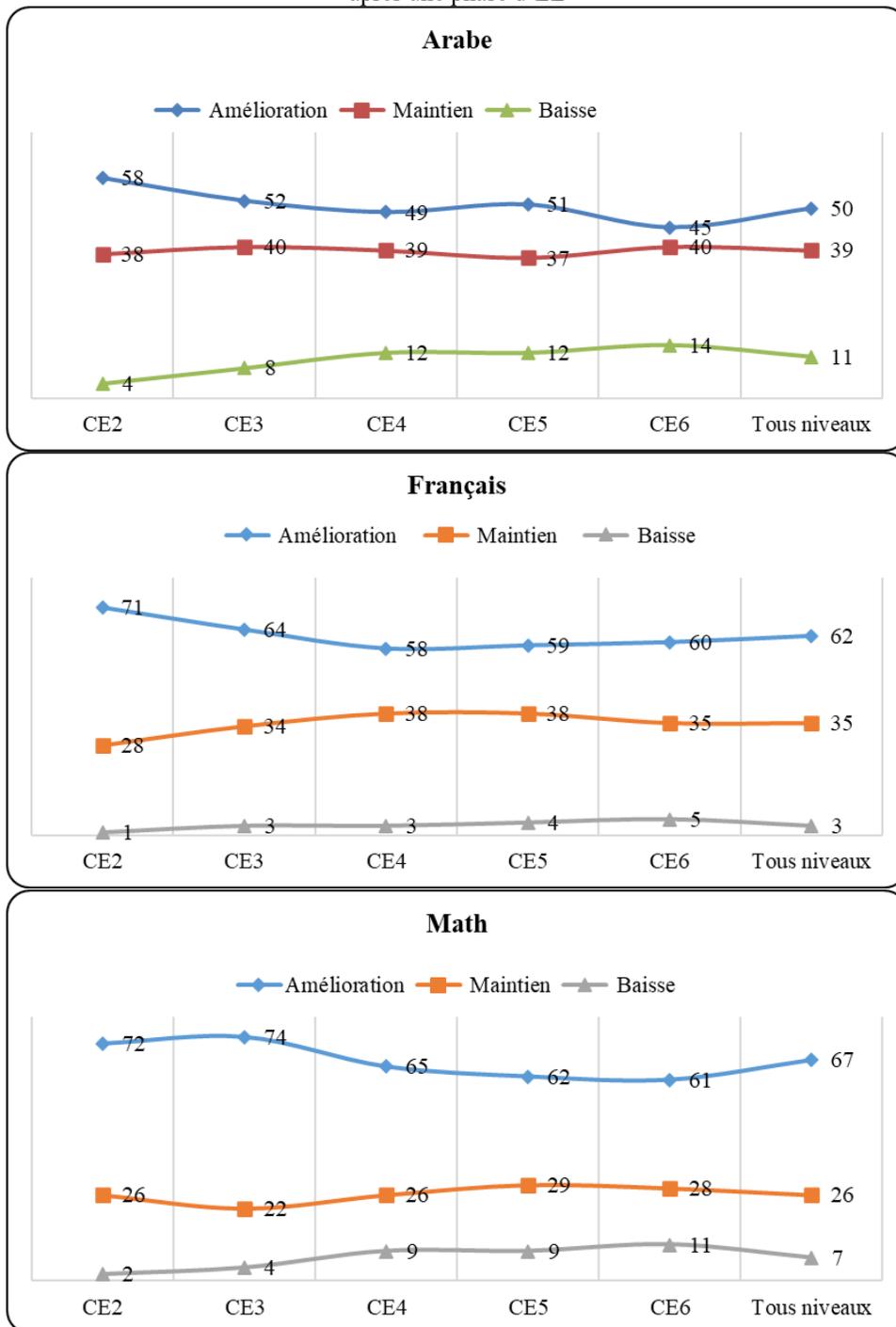
L'EE apparaît donc - selon les concepteurs du référentiel et de guide de l'éducation comme une approche efficace dans l'enseignement disciplinaire des contenus. Ces mêmes auteurs affirment aussi que celui-ci ne peut être efficace que s'il est corollaire à un EE des comportements et une gestion de classe comprenant les interventions préventives (80 %) et correctives (20 %). Comme l'ont souligné Doyle et Lienhart (1986), l'enseignant doit assumer un double agenda : « instruire et gérer », Il doit non seulement enseigner de manière organisée les formes de connaissances, mais également réguler des comportements, des règles et des routines. En effet, les attentes doivent être explicitement formulées positivement, modelées par l'enseignant, pratiquées

par les élèves et consolidées pour éviter tout risque de rechute (Long et Frye, 1985).

L'EE : constructivisme et /ou guidance.

L'EE, qui s'inspire malheureusement du comportementalisme (Meirieu, 2025), se caractérise par un guidage fort où l'enseignant commence par modéliser les savoirs, les élèves s'exercent sous sa direction, puis sous sa supervision avant d'acquérir une certaine autonomie (Gauthier, Bissonnette & Richard, 2013) : ce n'est pas un apprentissage, c'est une succession des tâches. Est-ce que l'EE répond vraiment aux finalités de la charte nationale de l'éducation et de la formation ? Il semble qu'elle ne conduit pas à l'émancipation intellectuelle, mais à une docilité des apprenants et une incapacité de penser par soi-même (Meirieu, 2025). Certes, il pourra être efficace dans les situations où les élèves ont un faible niveau de compétences, le temps disponible est limité, la tâche est nouvelle ou complexe, ou il y a besoin d'une forte structuration des idées maîtresses du curriculum (Gauthier et al., 2013). Dans le cas contraire, il est préférable d'utiliser les approches par découverte. Cependant, enfermer l'acte d'enseigner dans une seule méthode (cours – exercices de compréhension – exercices d'application) est réducteur, car l'hétérogénéité des apprenants est le premier principe de l'école et une méthode unique est vectrice de droits à l'éducation non respectés et un frein à l'émancipation des savoirs. En effet, Il a été constaté que les connaissances sont mieux retenues lorsque l'apprentissage offre aux apprenants une structure leur permettant d'explorer, d'observer et de comprendre par eux-mêmes à travers des mécanismes d'induction guidée, des règles, des principes et des concepts constituant l'objet de l'apprentissage, en expérimentant des situations concrètes (Erradi et al., 2023) que lorsqu'ils reçoivent simplement l'information de manière passive (Alfieri, 2011).

Figure 1 : Évolution des résultats des élèves (n= 8726) entre le pré-test et l'évaluation externe (septembre-mai) selon les niveaux scolaires en arabe, français et mathématique après une phase d'EE



Source : INE-CSEFRS, 2024

Il est également bon de noter qu'en science, certaines connaissances déjà acquises chez les jeunes enfants, les préconcepts, peuvent être à la base de leur résistance à intégrer certaines notions scientifiques (Weisberg, 2013). Une méta-analyse portant sur 53 études montre un effet significatif quand une phase de résolution de problème non familier, même si celle-ci conduit souvent à l'échec, précède l'instruction (Kapur et Sinha, 2021).

L'EE : arguments implicites

Bien que l'EE ait montré une certaine efficacité pour les élèves en difficulté, il ne convient pas d'en faire une panacée. On ne peut en effet affirmer que les élèves doivent d'abord savoir lire, écrire et compter pour construire la pensée critique et la créativité (Willingham, 2007, 2019). C'est réduire la place de l'école à renforcer les inégalités scolaires, car, alors que les élèves qualifiés ont un accès routinier à des savoirs complexes, les élèves marginalisés sont condamnés aux savoirs mécaniques. Ils ont cependant besoin d'une ambition culturelle et de situations d'apprentissage qui leur permettent de construire activement leurs connaissances (Facione, 2015). En effet, comme le rappellent les recherches en sciences de l'éducation, la pensée critique peut émerger à n'importe quel moment, quel que soit leur niveau scolaire, à condition de recourir à la réflexion et à l'argumentation (Facione, 2015). Les perspectives constructivistes s'accordent également à reconnaître que les élèves vulnérables peuvent développer des compétences critiques s'ils résolvent des problèmes et interagissent avec d'autres. Certes il y a plusieurs résultats probants qui plaident pour cette approche, mais il y'en a d'autres qui confirment le contraire : une méta-analyse (Schwartz et al., 2009) souligne que la conduite d'une activité de découverte avant de passer à la guidance favorise davantage le transfert que l'enseignement dirigé. En effet, la méta-analyse menée par Sinha et Kapur (2021) apporte des preuves solides en faveur d'une organisation pédagogique où la résolution de problèmes précède la phase d'explication plus magistrale, et non l'inverse.

L'EE : éducation inclusive

L'EE, centré sur la transmission directe et structurée des savoirs, s'avère efficace pour consolider les apprentissages de base, mais il présente des limites sérieuses lorsqu'il s'agit de promouvoir une éducation inclusive adaptée aux enfants ayant des besoins spécifiques.

En effet, ce modèle pédagogique met l'enseignant au centre du processus et tend à uniformiser les apprentissages, réduisant la différenciation et la créativité pourtant essentielles à l'inclusion (Clanet, 2013). La Vision stratégique 2015-2030 et la Loi-cadre 51.17 rappellent au contraire sur la nécessité l'intégration des enfants à besoins spécifiques, la mise en place de programmes de soutien adaptés et la fourniture de ressources humaines et

matérielles pour assurer leur réussite scolaire (Bourqia, 2016). Or, l'EE, en privilégiant des séquences standardisées de type modelage, pratique guidée et pratique autonome, tend à ignorer la singularité des profils et les besoins différenciés (Gauthier, Bissonnette & Richard, 2013). Les études montrent que l'inclusion nécessite flexibilité, innovation et pédagogie différenciée, comme la pédagogie du projet ou celle de la résolution de problèmes, qui favorisent l'autonomie, la créativité et l'esprit critique des apprenants (Clanet, 2013). De ce fait, le recours exclusif à l'EE peut devenir un obstacle à l'effectivité de l'éducation inclusive, car il ne permet pas toujours d'accompagner les élèves ayant des difficultés, des retards ou des troubles d'apprentissage (Bourqia, 2016).

Le Maroc, en adoptant officiellement l'éducation inclusive, cherche à dépasser ce modèle rigide pour instaurer une école de qualité ouverte à tous, où chaque élève, quel que soit son profil, bénéficie d'un accompagnement équitable (MENPS, 2019). Bien que l'EE, centré sur la transmission directe et structurée des savoirs, soit largement consensuelle, en matière de consolidation des apprentissages de base, de sérieuses limites sont identifiées lorsqu'il s'agit de déployer une éducation inclusive à destination des enfants à besoins spécifiques. En effet, selon Gauthier et Bissonnette (2017) l'enseignant devrait « maîtriser les stratégies dites universelles pour favoriser l'apprentissage des contenus et des comportements auprès d'environ 80% des élèves. L'autre 20% des élèves nécessitent des interventions secondaires et tertiaires réalisées par les services complémentaires de l'école (orthopédagogue, éducateur spécialisé, psychoéducateur, etc.)

L'EE : quels critères ?

Les cinq critères l'efficacité d'une méthode pédagogique selon Hollingsworth, et Ybar (2013) sont la performance, la base scientifique, la planification précise, l'indépendance du niveau d'études et l'approche inclusive. À ces critères s'ajoute, nécessairement, un véritable accord entre les intervenants dans le domaine de l'éducation. Cependant, les informations collectées sur le terrain par Hamdani (2024) au Maroc, indiquent une adhésion précaire : près de la moitié (n= 925) des professeurs pionniers pensent que ces perceptions exposent un manque d'appropriation et de confiance. Il ressort de cette étude aussi que seuls 14,8 % des enseignants innovants dans l'échantillon examiné jugent que les cours PPT « fast food » dispensés par l'école sont de qualité appréciable et captent l'intérêt des élèves grâce à des images et des animations.

L'EE : perspectives et tendances / analyse bibliométrique

L'usage simultané de Google Scholar, Scopus et Web of Science dans cette étude bibliométrique est méthodologiquement justifié, car aucune de ces

bases de données ne recouvre entièrement la production scientifique mondiale ce qui va réduire notamment les biais de sélection et d'améliorer la validité externe.

Base de données web of science

Les citations

Le tableau 2 met en évidence les thématiques dominantes de la littérature sur l'EE. Les 440 occurrences du terme « teaching », avec 225 et 94 pour « teachers » et « teacher », respectivement, confirment que le cœur de l'EE en tant qu'intervention pédagogique est en effet l'enseignant. En même temps, les 166 occurrences de l'expression « learning » et les 115 occurrences du mot « students » soulignent l'orientation primordiale et l'objectif de l'intervention sur l'apprentissage et la performance acquise par les apprenants. Enfin, l'implémentation de 189 pour « explicit » montre le bon usage et la consolidation de cette notion en tant que cadre éprouvé et reconnu dans la recherche dans le domaine de l'éducation.

Tableau 2: Analyse Scientifique des mots les plus fréquents « Enseignement Explicite »

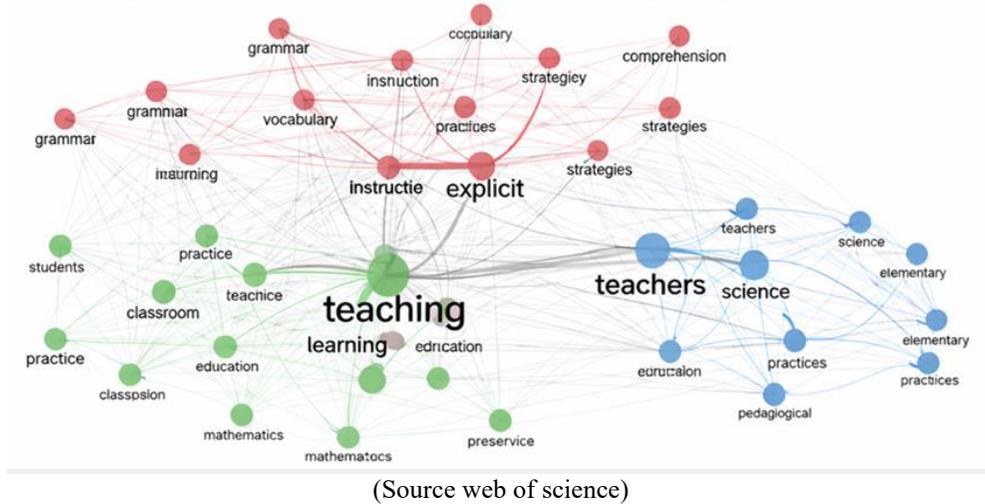
Notions	Teaching	Teachers	Science	Explicit	Learning	Instruction	Education	Students	Nature	Teacher
Occurrences	440	225	197	189	166	146	138	115	99	94

Source : Web of Science

Réseau de co-occurrence des mots-clés généré par le logiciel « Bibliomertix »

Selon le réseau de co-occurrence, il est possible de distinguer trois grandes clusters (Figure 2) : Un cluster « vert » formée autour des mots « teaching », « learning », « education », « students », ces concepts sont liés aux pratiques de classes et aux processus d'apprentissage. Ce cluster recouvre la dimension pédagogique opérationnelle du modèle explicite. Un deuxième cluster « rouge » mettant en relation « explicit » « instruction », « practices », « comprehension », « vocabulary » et « strategies » : Il s'agit de la dimension didactique et méthodologique du modèle explicite. Le troisième « bleu » formé autour de « teachers », « science », « pedagogical » et « pre-service » renvoie à la situation et au rôle de l'enseignant, à sa formation initiale ou professionnelle. Ainsi, la structuration claire du réseau indique un processus de consolidation continue d'EE en tant que cadre théorique cohérent et scientifiquement robuste. La forte distribution des axes de l'éducation des enseignants et des approches disciplinaires suggère que les recherches se tourneront vers l'optimisation des pratiques explicites et leur adaptation aux environnements numériques, y compris la formation initiale et continue des enseignants.

Figure 2 : Réseau de co-occurrence des mots-clés généré par Bibliomertix



La forte centralité de ces nœuds (teaching, explicit, instruction et teachers) prouve que la littérature ne considère pas l’EE comme une simple approche discrète en termes pédagogiques. Il s’agit d’un champ pédagogique intégré unissant des pratiques pédagogiques, la formation continue des enseignants, les enseignements de disciplines particulières et l’apprentissage des élèves.

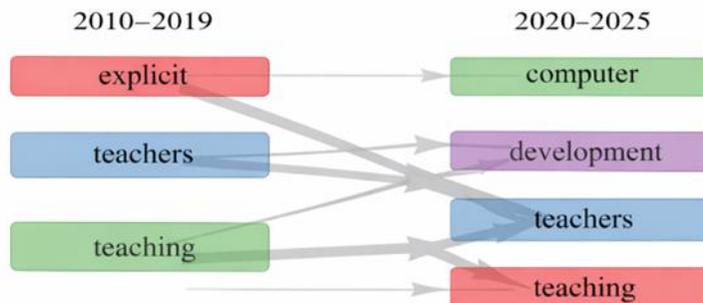


Figure 3 : Évolution thématique (EE) (Source web of science)

La figure 3 résume l’évolution des thèmes de recherche du domaine de l’EE dans deux périodes : la période de 2010 à 2019 et la période de 2020 à 2025. La première période se concentre sur les travaux de recherche thématique en ce qui concerne la conceptualisation de l’EE en tant que tel, le rôle des enseignants et leurs pratiques pédagogiques. La particularité de cette période est la connaissance constante de la base théorique des approches et des études sur l’enseignement et la validation de la pertinence de l’EE. Au contraire, la seconde période ne néglige pas les travaux sur le rôle des enseignants sur l’enseignement. Cependant, la majeure partie est liée aux études les plus appliquées sur le perfectionnement professionnel des

enseignants, la qualité des pratiques pédagogiques et la prolifération des technologies numériques. Par conséquent, dans l'ensemble, on peut qualifier cette tendance de transition d'un intérêt plutôt conceptuel et descriptif à plus opérationnel et innovant pour l'enseignement et l'EE.

Base de données Google scholar

Citations

La figure 4 montre une forte dynamique de l'évolution des citations. De 2010 à 2013, elles atteignent un niveau très élevé, mais en 2012, il y a un pic. Cela s'explique par la grande visibilité scientifique de l'EE à l'époque. En revanche, à partir de 2014, elles diminuent. De même, 2014-2019 indique une variabilité des citations, mais en principe une stabilisation. En revanche, dès 2020, il y a une chute rapide et nette des citations. Après la pandémie, cela s'accroît encore en raison de la priorité de recherche. Enfin, après 2022, les citations deviennent faibles, ce qui indique un intérêt académique mesuré. Cependant, cela ne veut pas dire que l'EE a disparu. Mais il est intégré dans une approche pédagogique générale modernisée.

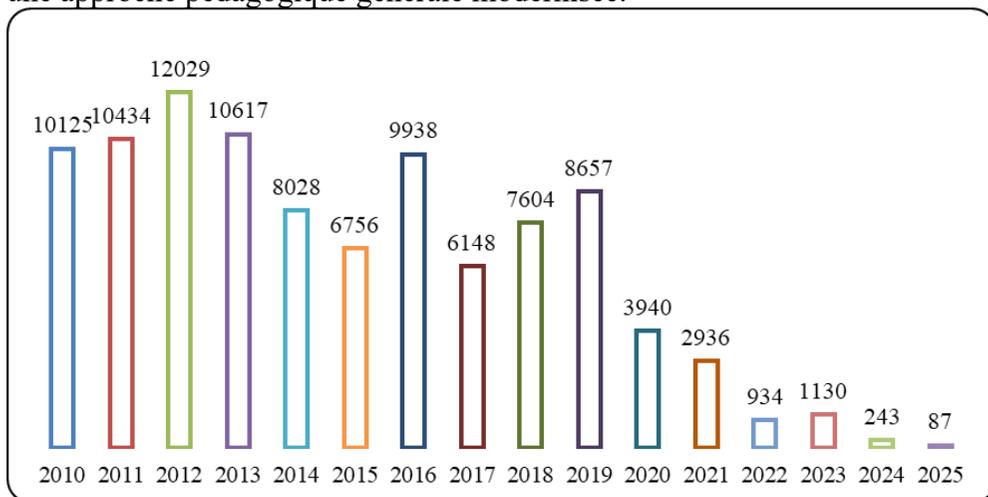


Figure 4 : Nombre de citation par année (source : Google Scholar)

Articles les plus affluents

Du côté de la convergence, les travaux les plus cités (Tableau 3) et autres convergent vers le fait que l'approche pédagogique de l'EE est une approche structurée qui se montre efficace pour favoriser la compréhension, soutenir les apprentissages et garantir la réussite scolaire. En effet, Carless et Boud (2018) notent des points sur la manière dont cette approche clarifie les attentes et soutient les apprenants, bien que ce soit coopératifs et progressifs. De la même manière, Zawacki-Richter (2019) fait valoir la structuration de l'apprentissage, la clarification des objectifs de l'apprentissage et les performances des apprenants, bien que l'enseignement soit menaçant et doive

être mis en œuvre en bonne consultation avec les apprenants concernés. Brevik (2019) rapporte également que l'EE développe les stratégies de compréhension et s'avère une approche réalisable sur le long terme, bien qu'il rencontre des défis comme la variabilité des résultats et une adhésion hésitante. Sur une étude similaire, Islam (2015) note l'efficacité de l'EE en faveur des apprenants en difficulté, même s'il est freiné par le manque de formation des enseignants, les approches différentes et le temps qu'il faut pour la planification. Cela rend la formation continue et la collaboration professionnelle pertinentes. De manière complémentaire, la contribution de l'Institut des Sciences de l'Éducation en États-Unis (2023) à ce sujet ajoute des conceptions sur l'appui culturel qui se rapporte à cette approche, telles que la célébration de l'identité de l'apprenant, son sentiment d'appartenance et la disposition de l'établissement scolaire à intégrer et à coordonner les efforts.

En général, toutes les contributions convergent vers une affirmation de la nécessité d'une démarche progressive, contextuellement sensible et soutenue par la formation continue pour garantir l'efficacité constante du modèle d'EE.

Tableau 3 : Les articles les plus cités sur l'EE

Titre	Auteur principal	Année	Citation
Systematic review of research on artificial intelligence applications in higher education	Olaf Zawacki-Richter	2019	3158
The development of student feedback literacy: enabling uptake of feedback	D. Carless	2018	1461
Culturally Sustaining Pedagogy	Django Paris	2012	1206
Essentials Of Computational Chemistry Theories and Models	M. Keller	2016	1110
Intelligence Unleashed: An argument for AI in Education	R. Luckin	2016	1105
Three Generations of Distance Education Pedagogy.	T. Anderson	2010	1000
Connecting High School Physics Experiences, Outcome Expectations, Physics Identity	Z. Hazari	2010	921
Translational biomarker discovery in clinical metabolomics: an introductory tutorial	J. Xia	2012	855
Technology-enhanced learning and teaching in higher education: what is 'enhanced' and how do we know? A critical literature review	A. Kirkwood	2014	825
Mechanisms of social cognition.	C. Frith, U. Frith	2012	796

Source : Google Scholar

Base de données Scopus

Analyse de co-occurrences des mots clés

Les données extraites par VOSviewer (entre 2010 et 2025) ont ensuite été traitées et regroupées automatiquement par le logiciel en quatre clusters principaux, représentant des réseaux sémantiques entre mots-clés. La carte en réseau (Network Visualisation) (Figure 5) met en évidence les liens entre les concepts à l'aide de lignes reliant les nœuds. La carte extraite de VOSviewer

représente une visualisation des cooccurrences de mots-clés liés à la thématique « explicit instruction / direct instruction / explicit teaching / explicit pedagogy / explicit strategy instruction ». Chaque nœud correspond à un mot-clé, dont la taille reflète sa fréquence d'apparition.

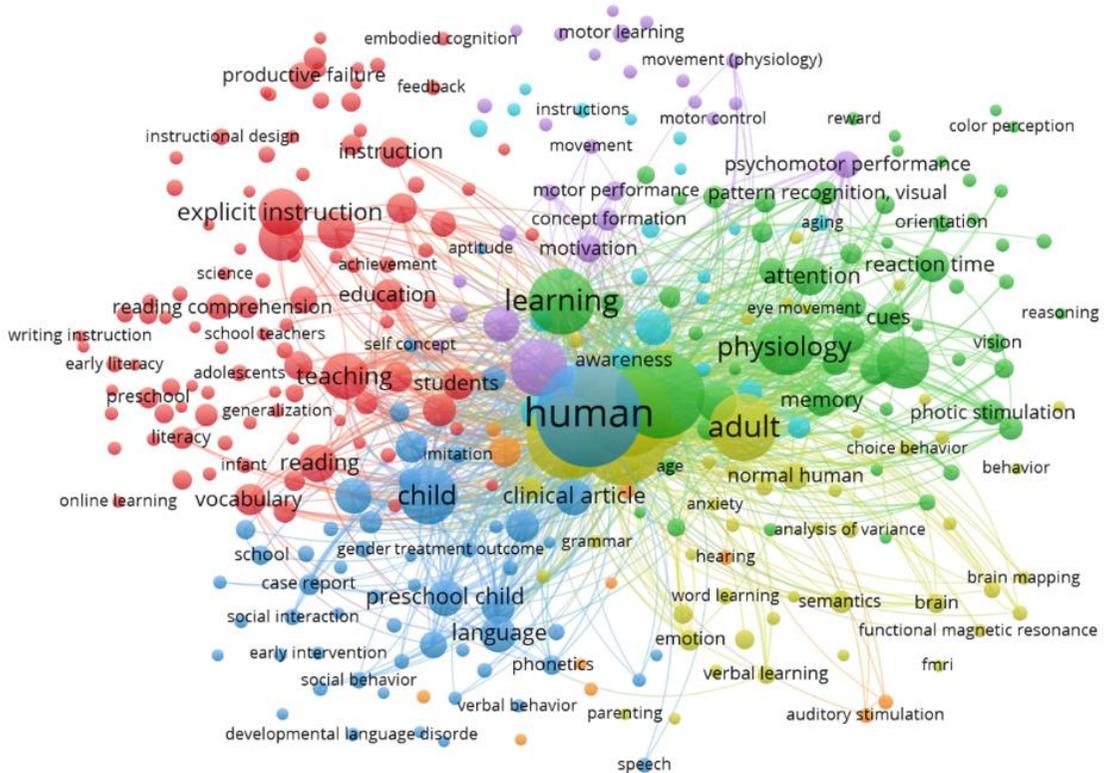


Figure 5 : Aperçu de la co-occurrence des mots-clés des auteurs

Analyse des clusters et visualisations dans VOSviewer

Les couleurs indiquent des clusters thématiques, et les liens montrent les cooccurrences entre termes. Les couleurs attribuées à chaque groupe sont les suivantes : cluster 1 : rouge, cluster 2 : bleu, cluster 3 : violet, cluster 4 : orange et cluster 5 vert. Chaque cluster illustre un ensemble de termes présentant une forte cooccurrence et traduit une proximité thématique au sein du champ de recherche.

Cluster 1

L'analyse du cluster « rouge » révèle des mots clés associés à l'EE « enseignement scolaire, explicit instruction, teaching, reading comprehension, education, vocabulary, preschool, literacy, students, achievement ». Ce cluster regroupe les recherches en sciences de l'éducation centrées sur l'efficacité de l'EE dans les apprentissages fondamentaux. L'EE est considéré comme une méthode structurée améliorant la performance

scolaire. Ce courant correspond exactement à la réforme adoptée au Maroc autant que pilier préventif qui vise à garantir l'acquisition des nouveaux apprentissages à chaque étape de l'enseignement.

Cluster 2

Le cluster bleu, illustrant les mots clés « child, preschool child, language, phonetics, social interaction, early intervention, developmental language disorder », relie l'EE à la rééducation du langage et à la psycholinguistique développementale. Il s'inscrit dans le champ de l'orthophonie, du développement du langage et des interventions précoces. Cette approche peut nous aider à repenser, réviser et améliorer les programmes, les guides et les dispositifs de formation continue –déjà élaborés par le ministre- relatifs au cadre référentiel des classes de l'éducation inclusive afin d'assurer une meilleure équité dans l'accès à la scolarisation pour ces enfants.

Cluster 3

Le cluster vert explore les liens entre les neurosciences cognitives et l'EE, notamment la distinction apprentissage explicite/implicite, la mémoire de travail et l'attention. Il inclut les mots-clés suivants: human, adult, physiology, learning, brain, memory, attention, performance, reaction time, and psychomotor performance. Ce volet a été bien illustré dans le guide pratique de l'EE adressé au MENPS par Clermont Gauthier et Steve Bissonnette. En effet, ces derniers affirment que l'EE trouve aussi son fondement dans la psychologie cognitive, en effet, cette importance réside dans son approche méthodique de l'organisation des apprentissages pour contourner les défauts de la mémoire de travail et intensifier des processus de consolidation des connaissances, découlant de la théorie de la charge cognitive qui stipule que l'apprenant ne peut traiter qu'un nombre limité d'information à la fois 5 ± 2 (Sweller, 1988), d'où l'importance de –pour éviter une surcharge nocive de la mémoire– décomposer un contenu complexe quand la tâche est bien complexe ou lorsqu'il y a de beaucoup d'informations en même temps. Il ajoute que les contenus doivent également être structurés lors de la phase de modelage (Gauthier et al., 2013) et les prérequis activés pour en favoriser l'intégration; et à l'instar de la théorie connexionniste qui conçoit l'apprentissage comme un renforcement des liens neuronaux (Rumelhart & McClelland, 1986), le formateur utilise les processus cognitifs, tels que la répétition, la reformulation et l'organisation sémantique et explicite de manière à démontrer les processus mentaux et renforcer les liens neuronaux (Rumelhart & McClelland, 1986).

Enfin, la phase de pratique autonome révèle la dimension métacognitive de l'apprentissage. En effet, l'élève apprend à planifier, à

contrôler et à évaluer ses stratégies (Veenman et al., 2006). En pensant sur sa façon de penser, l'élève modifie son raisonnement, améliore la qualité de sa performance.

Cluster 4

Le quatrième de couleur orange, dont les mots clés « motor learning, motivation, feedback, movement, embodied cognition, instructional design », se base sur l'approche « embodied cognition ». Malheureusement, cette dernière conception n'a pas suscité l'intérêt de Gauthier et ses collaborateurs, puisqu'elle n'a pas été mentionnée dans le guide de pratique de l'EE malgré son importance considérable. Il s'intéresse à l'application du modèle explicite dans l'apprentissage moteur, en effet, il explore les liens entre cognition, corps et psychopédagogie : il s'agit de la troisième vague de la psychologie cognitive. Ce paradigme est passé de l'étude de traitement de l'information qui conçoit le cerveau comme une machine à traiter l'information « ordinateur » au connexionnisme qui stipule un apprentissage par renforcement et modification de la force des connexions neuronales et enfin à l'incarnation (Embodied Cognition). Cette troisième vague mérite d'être comprise en profondeur, tant son importance est considérable, car certains enseignants pourraient pratiquer inconsciemment les approches et les théories qui en découlent. D'après cette théorie notre corps est essentiel pour la façon dont nous apprenons et comprenons. D'abord, selon Merleau-Ponty (1945) « percevoir et apprendre ne sont jamais des activités uniquement mentales : ils passent toujours par le corps, le geste, l'émotion et la relation avec le monde ». Plus tard certains chercheurs ont démontré que même la lecture et la compréhension des mots activent des zones motrices dans le cerveau de l'observateur : par exemple, lire le verbe « applaudir » active les mêmes aires sensorielles, motrices et émotionnelles du cerveau que bouger une main de cette manière comme si l'on faisait réellement l'action décrite. Par conséquent, l'utilisation des mains par les élèves, pour la représentation de quantités, le dessin de figures géométriques ou la mimique d'une opération, active des représentations motrices qui peuvent faciliter la compréhension abstraite (Goldin-Meadow, 2011).

Dans le cadre de l'enseignement, cela s'interprète par l'idée qu'on apprend plus si on « touche » le savoir, on vit et on exerce que si on vient le recevoir de manière abstraite. L'enseignant, alors, doit utiliser le corps, l'émotion et l'action dans la construction du savoir parce que ce dernier n'est pas un contenu interne, mais il naît ou émerge de l'interaction (processus dynamique) entre le corps et l'environnement. Cela explique bien le rôle de la pédagogie du jeu c'est-à-dire l'utilisation du jeu comme mode d'apprentissage central (Kosmas, 2018) où les élèves s'engagent avec plaisir dans des actes

d'exploration, d'expérience, de manipulation, de risque, de développement de sens et de mouvement.

Cluster 5

Le dernier cluster violet traite la dimension affective et comportementale du processus d'apprentissage explicite (emotion, behavior, parenting, anxiety, social behavior), notamment le rôle du climat scolaire et de la régulation émotionnelle. La mise en œuvre des concepts liés à la théorie béhavioriste est clairement visible dans l'étape du modelage. Cependant, la mise en œuvre optimale de l'enseignement devrait se faire à travers l'intégration de l'EE des comportements, comme le soutiennent les défenseurs de cette approche.

Visualisation de densité co-occurrence de mots-clés

Cette visualisation (Figure 6) a été obtenue, également à partir du corpus Scopus, par VOSviewer. Cette figure montre des zones de co-occurrence de mots-clés, chacun correspondant à un des termes des publications. Les couleurs indiquent la densité des champs de recherches en fonction des co-occurrences : le jaune vif pour les zones les plus co-étudiées, les verts et bleus pour les moins. La carte de densité fait apparaître un champ autour d'un noyau dense, comme « human – learning – éducation) autour duquel se trouvent des pôles appliqués et des pôles scientifiques. La zone gauche vert-clair à vert-foncé, représentée par les mots « explicit instruction, teaching, reading comprehension, education, students, vocabulary, literacy, preschool, online learning », concerne essentiellement des travaux appliqués à la pédagogie explicite en milieux scolaires. On y trouve des travaux sur la lecture et d'écriture et de science, la compréhension, le développement ... et des approches contemporaines comme l'online learning.

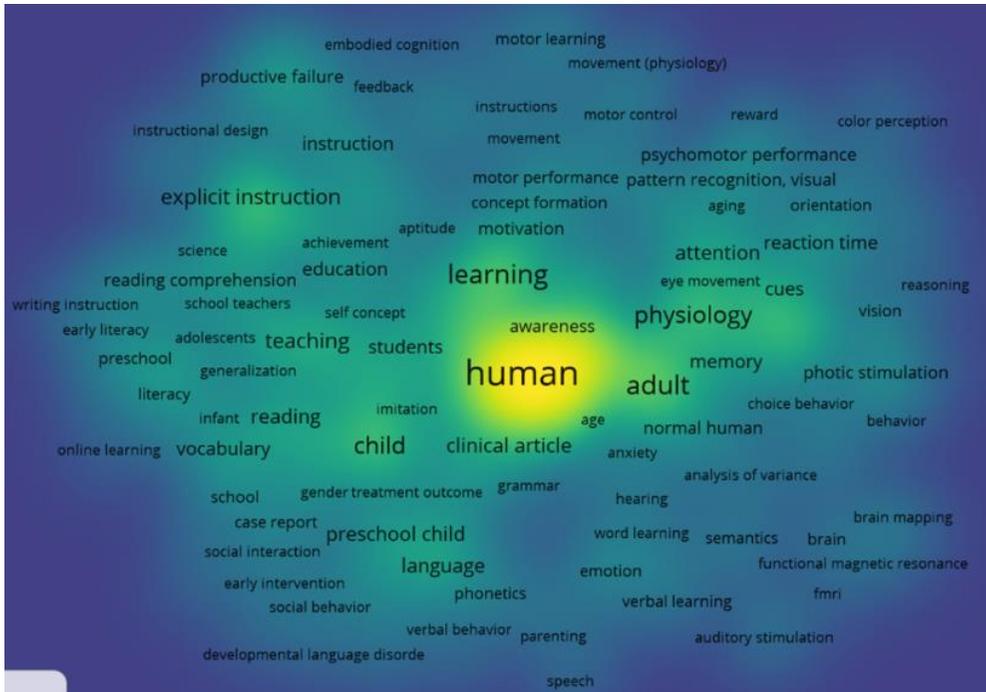


Figure 6 : Carte de visualisation de densité co-occurrence de mots-clés

Analyse de nombre de citations selon les auteurs

L'évaluation de l'impact académique des auteurs et de la maturité des regroupements scientifiques peut être effectuée par l'intermédiaire d'une analyse quantitative des citations (Figure 7) avec une domination notable des auteurs anglo-saxons. Le groupe 1, centré sur la relation entre l'apprentissage par découverte et EE, inclut des auteurs tels que Kapur, Alfieri, Bonawitz et Weisberg dont les publications totalisent environ 3000 citations cumulées, et occupe une place prépondérante dans les articles traitant l'EE comme une phase importante dans l'acquisition initiale des connaissances, tandis que le constructivisme active l'engagement et la créativité.

Le groupe 2, qui représente le constructivisme modéré, totalise approximativement 750 citations et inclut des auteurs tels que Fyfe, Downer, Kamps et Stine-Morrow ; il explore des modèles hybrides c'est-à-dire un équilibre entre guidage et exploration. Sachant que les deux paradigmes ont été traditionnellement opposés.

Le groupement thématique 3 représenté par Decaro et autre, portant sur la cognition et le développement, comptabilise environ 900 citations, intégrant à la fois l'EE et la psychologie cognitive.

Finalement, le groupe thématique 4 dominé par l'auteur Glogger-Frey, portant sur les applications scolaires concrètes de l'EE dans les systèmes

éducatifs tels que la lecture, les math et l'écriture) et totalisant approximativement 430 citations.

Cela dit, nous suggérons le renforcement du modèle explicite des écoles pionnières au Maroc sur la base d'une perspective dynamique et interactionnelle de l'apprentissage qui intègrent les apports de la recherche cognitive. En termes de méthodologie, il est préférable d'utiliser des approches mixtes pour examiner les effets différenciés de l'action du guidage de l'enseignant et de l'indépendance de l'apprenant.

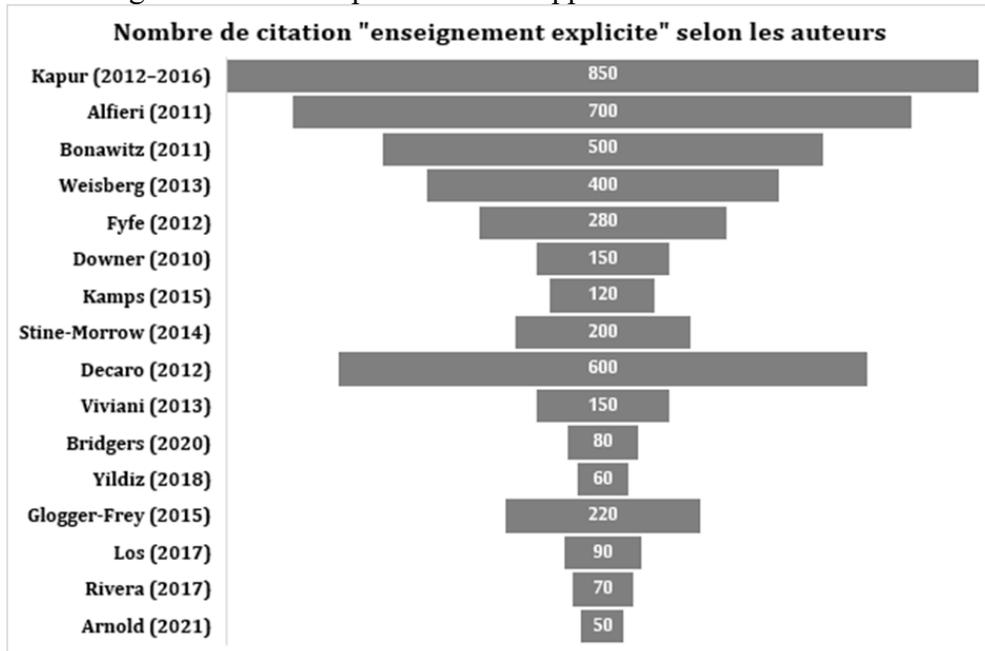


Figure 7 : Nombre de citations selon les auteurs (Source : Scopus)

Analyse de réseau de co-citation des auteurs

Cette analyse présente un réseau de co-citation d'auteurs dans un domaine de recherche, mettant en évidence les relations et influences (Figure 7). Le pôle central est occupé par Kapur, dont les travaux sur « l'échec productif » et l'apprentissage guidé sont fondamentaux. Alfieri (2011), de sa part est une référence clé, en effet, grâce à une méta-analyse, il a conclu que l'EE couplé à une découverte non guidée donne des résultats efficaces.

Les axes de Bonawitz (2011) et Weisberg (2007) explorent la psychologie cognitive du développement. La structure dense centrale indique un champ consolidé, tandis que les nœuds périphériques montrent des contributions récentes. L'analyse bibliométrique révèle un paradigme axé sur le guidage et l'instruction explicite, avec des interactions notables entre les théories de Kapur, Alfieri et Weisberg. En conclusion, le domaine est

Conclusion

L'analyse critique et bibliométrique de l'impact de EE sur l'enseignement des écoles pionnières au Maroc montre que cette approche pédagogique a un fort potentiel pour améliorer la qualité des apprentissages et des performances scolaires. En effet, les données empiriques indiquent que l'EE permet aux élèves de mieux structurer les savoirs et de comprendre les concepts, rendant possible une rétention plus longue et active du savoir. Néanmoins, cependant, cette efficacité est fortement dépendante de la formation de base et de l'accompagnement continu des enseignants ainsi que de leur collaboration étroite et organisée à un soutien institutionnel global. Dans le contexte marocain, une implantation systématique de ce modèle limite potentiellement les objectifs de la réforme, visant à établir une école nouvelle innovante, inclusive ancrée dans la société du savoir et à former des individus dotés d'un esprit critique aiguisé, d'une personnalité indépendante et d'un esprit académique capable de raisonner avec rigueur, méthode et liberté.

Pour maximiser son impact, l'EE doit, d'une part, être corollaire à un EE des comportements et une gestion de classe (interventions préventives et correctives). D'autre part, il doit toujours être complété par des phases de pratique guidée et autonome, qui favorisent l'initiative, la réflexion et la créativité des apprenants. Par conséquent, une approche hybride et combinée de l'EE et de l'approche d'investigation ou par découverte semble la plus adaptée pour répondre aux besoins complexes d'apprentissage, facilitant la transition d'un apprentissage assisté vers l'autonomie. Compte tenu des données bibliométriques et empiriques, il est clair aussi, que l'ouverture aux apports des neurosciences et de la psychologie cognitive permet de renforcer le modèle explicite.

Malgré les limites de la présente étude sur l'impact de EE, liées à la dépendance des bases de données analysées, à la sélection linguistique et temporelle des travaux documentaires elle a bénéficié d'une contribution significative des connaissances en général. Puisqu'elle fournit des éléments de preuve provenant de sources fiables pour comprendre scientifiquement l'efficacité de l'EE. Elle favorise ainsi des réflexions pédagogiques et critiques qui améliorent la qualité des expériences éducatives et l'équité entre les individus. Enfin, de plus avec d'autres priorités, il est préférable de s'appuyer sur des études empiriques pour comparer les groupes d'élèves ayant adhéré à l'EE avec ceux d'approches traditionnelles ou alternatives, à travers des dispositifs expérimentaux (pré-test/post-test et groupes témoins) qui mesurent réellement de la performance académique, de la compréhension, de la rétention et du transfert de l'apprentissage.

Conflit d'intérêts : Les auteurs n'ont signalé aucun conflit d'intérêts.

Disponibilité des données : Toutes les données sont incluses dans le contenu de l'article.

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