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Return on Investment (ROI) Framework for Mandatory Upskilling of Delhi NSQF Trainers in the Implementation of the National Education Policy

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Abstract

The National Education Policy (NEP) places renewed emphasis on vocational education, competency-based learning, and the professional development of educators and trainers responsible for delivering skill-oriented curricula. Within this reform landscape, the National Skills Qualifications Framework (NSQF) serves as a foundational architecture for aligning vocational education with industry-relevant competencies. However, the effective operationalization of NSQF under NEP depends significantly on the capacity and preparedness of trainers, particularly in urban public education systems such as Delhi. Mandatory upskilling of NSQF trainers has therefore emerged as a critical policy instrument, necessitating substantial public investment. Despite this, systematic approaches for evaluating the returns on such investments remain underdeveloped within education management scholarship.

This paper proposes a comprehensive theoretical framework for assessing the Return on Investment (ROI) of mandatory upskilling initiatives for NSQF trainers in Delhi within the context of NEP implementation. Drawing upon human capital theory, training evaluation models, and public sector value frameworks, the study conceptualizes ROI as a multidimensional construct encompassing economic, educational, and systemic outcomes. The framework delineates cost structures, outcome pathways, benefit valuation mechanisms, and stakeholder perspectives relevant to vocational trainer development. By situating ROI analysis within the governance and implementation dynamics of education reform, the paper advances a management-oriented lens for evaluating trainer upskilling initiatives in public vocational education systems. The study contributes to the literature on education management and technical and vocational education and training (TVET) by offering a structured evaluative model that supports evidence-based decision-making, accountability, and sustainable policy implementation under NEP.

Keywords: Return on Investment; National Skills Qualifications Framework; National Education Policy; Trainer Upskilling; Education Management; TVET

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1. INTRODUCTION

The transformation of education systems to align with evolving labor market demands has positioned vocational education and skill development at the center of national policy agendas worldwide. In India, this transformation is institutionalized through the National Education Policy (NEP), which articulates a long-term vision for integrating vocational education into mainstream schooling and higher education. A

central pillar of this vision is the emphasis on competency-based education, lifelong learning pathways, and the professional development of educators and trainers responsible for delivering skill-oriented curricula.

The National Skills Qualifications Framework (NSQF) plays a critical role in operationalizing this vision by providing a standardized, outcome-oriented framework that integrates vocational and general education. NSQF seeks to ensure coherence across training providers, qualifications, and industry requirements through clearly defined levels of knowledge, skills, and responsibility. However, the realization of NSQF's objectives is contingent not merely on policy design but on the institutional capacity of trainers who translate policy into practice.

In urban public education systems such as Delhi, the scale and complexity of NSQF implementation under NEP present significant managerial and governance challenges. Trainers operating within schools, industrial training institutes, and affiliated vocational centers are required to adapt to revised curricula, updated assessment methodologies, industry-aligned competencies, and learner-centric pedagogies. Consequently, mandatory upskilling of NSQF trainers has become a policy imperative rather than an optional professional development activity.

While substantial public resources are allocated toward trainer upskilling initiatives, questions concerning the efficiency, effectiveness, and value of such investments remain insufficiently addressed in education management research. Traditional evaluations of training programs in education often focus on participation rates, satisfaction levels, or short-term learning outcomes, offering limited insight into the broader returns generated by these investments. This gap is particularly evident in the context of public sector vocational education, where benefits accrue across multiple stakeholders and manifest over extended time horizons.

Return on Investment (ROI) analysis has long been employed in management and human resource development literature as a tool for linking training expenditures to measurable outcomes. However, its application within public education systems, especially in relation to vocational trainer development, remains conceptually underexplored. Education systems operate within governance structures that prioritize public value, social outcomes, and systemic quality enhancement, necessitating a reconceptualization of ROI beyond narrow financial metrics.

Against this backdrop, the present paper addresses the following research problem: **How can the return on investment of mandatory NSQF trainer upskilling initiatives be theoretically conceptualized and evaluated within the context of NEP implementation in Delhi?** The objective of the study is not to measure ROI empirically, but to develop a robust theoretical framework that can guide policymakers, administrators, and researchers in systematically assessing the value generated by trainer upskilling investments.

Positioned as a conceptual paper within education management and TVET scholarship, this study makes three primary contributions. First, it integrates human capital theory and training evaluation models with public sector education reform imperatives to reconceptualize ROI in vocational trainer development. Second, it proposes a structured framework that delineates costs, outcomes, and benefits across multiple stakeholder groups involved in NSQF implementation. Third, it situates ROI analysis within the broader governance and accountability discourse surrounding NEP, thereby linking managerial evaluation tools with policy implementation dynamics.

The remainder of the paper is organized as follows. The next section presents a comprehensive review of the theoretical and policy literature relevant to NSQF, NEP, trainer development, and ROI in education

and training contexts. This is followed by the development of the proposed ROI framework and its conceptual components. Subsequently, the paper discusses the application of the framework to the specific context of mandatory NSQF trainer upskilling in Delhi. The final section outlines the implications for education management practice and policy, identifies limitations, and suggests directions for future empirical research.

2. Methodological and Epistemological Positioning of the Study

2.1 Nature and Purpose of the Study

This study adopts a **conceptual and theory-building research design**, consistent with established traditions in education management, public policy, and technical and vocational education and training (TVET) scholarship. Rather than generating or analyzing primary empirical data, the purpose of the study is to develop a theoretically grounded framework that enables systematic evaluation of return on investment (ROI) for mandatory trainer upskilling initiatives under large-scale education reform.

Conceptual research plays a critical role in advancing management and education theory by clarifying constructs, synthesizing disparate bodies of literature, and proposing integrative models that guide future empirical inquiry. In the context of vocational education reform under the National Education Policy (NEP), conceptual clarity is particularly necessary due to the complexity of governance arrangements, multiplicity of stakeholders, and long-term nature of intended outcomes. The present study responds to this need by offering a structured framework that links trainer upskilling investments with educational, organizational, and public value outcomes.

2.2 Epistemological Orientation

The epistemological orientation of this study is primarily **interpretivist–constructivist**, informed by pragmatic considerations relevant to public sector education management. Knowledge regarding ROI in public education is understood as socially constructed through policy discourses, institutional practices, and stakeholder interpretations rather than as an objective, universally measurable phenomenon.

Within this epistemological stance, ROI is not treated as a purely financial or technical metric but as a **context-dependent evaluative construct** that reflects normative judgments about value, effectiveness, and accountability. This orientation aligns with contemporary education management research, which recognizes that policy outcomes are mediated by institutional contexts, professional agency, and governance structures.

At the same time, the study adopts a **pragmatic orientation** in acknowledging the managerial demand for evaluative tools that inform decision-making. The framework therefore seeks to balance interpretive understanding with practical applicability, offering a model that can be operationalized through empirical methods without presupposing positivist assumptions about causality or measurement.

2.3 Ontological Assumptions

Ontologically, the study assumes that educational systems, policies, and institutional capacities are **socially embedded and dynamically evolving entities**. Trainer competencies, institutional readiness, and policy implementation outcomes are not fixed attributes but emergent properties shaped by interactions among individuals, organizations, and governance mechanisms.

From this perspective, mandatory upskilling initiatives are understood as **interventions within complex adaptive systems** rather than discrete inputs producing linear outcomes. This ontological assumption has

important implications for ROI analysis, as it challenges simplistic cost–benefit calculations and necessitates recognition of non-linear, delayed, and indirect returns on investment.

2.4 Justification for a Conceptual Framework Approach

The choice of a conceptual framework approach is justified on several grounds. First, empirical research on ROI in public vocational trainer development remains fragmented, with limited consensus on appropriate constructs, indicators, or evaluation models. Developing a theoretical framework is therefore a necessary precursor to robust empirical investigation.

Second, the scale and heterogeneity of NEP implementation across states and institutions make context-specific empirical generalization difficult. A conceptual framework provides a flexible analytical tool that can be adapted to diverse institutional settings while maintaining theoretical coherence.

Third, education management journals increasingly recognize the value of high-quality conceptual work, particularly when it addresses pressing policy challenges and offers integrative perspectives. By synthesizing human capital theory, training evaluation models, and public value theory, the present study positions itself within this tradition.

2.5 Methodological Boundaries and Scope

This study deliberately refrains from:

- Estimating numerical ROI values,
- Making causal claims regarding training effectiveness,
- Comparing alternative training interventions empirically.

Instead, its scope is limited to:

- Conceptualizing cost and benefit domains,
- Articulating outcome pathways,
- Proposing theoretically defensible relationships among constructs.

These boundaries are explicitly acknowledged to ensure analytical rigor and transparency, and to position the framework as a guide for subsequent empirical research rather than as a substitute for it.

2.6 Contribution of Methodological Positioning to Education Management Research

By explicitly articulating its epistemological and methodological positioning, the study contributes to education management scholarship in two ways. First, it enhances the credibility and interpretive clarity of the proposed framework, addressing a common critique of conceptual papers that lack methodological transparency. Second, it demonstrates how ROI analysis can be reconceptualized for public education contexts without defaulting to reductive financial metrics.

This methodological positioning sets the foundation for the subsequent literature review and framework development, ensuring coherence between theoretical assumptions, analytical constructs, and policy-oriented objectives.

3. Literature Review

3.1 Human Capital Theory in Education and Vocational Training

Human Capital Theory (HCT), first formally articulated by Becker (1964), posits that investments in education, training, and skills development enhance individual productivity and generate returns for both

organizations and society. In the context of vocational education, HCT provides a foundational lens for understanding the rationale behind mandatory upskilling initiatives for trainers. Trainers themselves represent a **strategic resource**, and their knowledge, pedagogical skills, and occupational competencies directly influence the effectiveness of vocational programs.

Several studies in TVET contexts have highlighted that trainer quality is a significant determinant of learner outcomes, curriculum fidelity, and overall institutional performance. Human capital is not limited to technical competencies but also includes pedagogical skills, assessment literacy, and professional judgment. For example, research by Eraut (2004) and Rauner & Maclean (2007) emphasizes that vocational educators require both **occupational and instructional knowledge**to facilitate competency-based education effectively.

Moreover, HCT suggests that the returns on investment in trainer upskilling are multidimensional. While monetary returns (e.g., improved placement outcomes, cost savings) are one component, non-monetary returns—such as institutional capacity building, learner competency acquisition, and policy alignment—are equally critical. In public education, these non-financial returns often constitute the primary justification for investing in professional development programs.

Critically, HCT has faced some limitations and critiques when applied to public education contexts. First, traditional HCT models assume **linear causality** between investment and returns, which oversimplifies the complex adaptive systems of educational institutions. Second, HCT often prioritizes measurable economic outcomes, potentially underemphasizing public value dimensions such as equity, social inclusion, and systemic capacity development. These critiques are particularly salient for mandatory upskilling initiatives under NEP, where returns are both long-term and multidimensional.

Despite these limitations, HCT provides a **robust theoretical foundation** for conceptualizing trainer upskilling as an investment. It underscores the importance of systematic resource allocation, competency enhancement, and performance evaluation as mechanisms to realize both institutional and societal benefits.

3.2 ROI Theory in Public Sector and Education Contexts

Return on Investment (ROI) analysis originated in corporate finance but has been increasingly adapted to public sector and educational contexts. Phillips (1997, 2003) introduced a model for ROI in training that incorporates not only direct costs and financial returns but also intangible benefits, such as improved knowledge, skills, and organizational performance. In vocational education, ROI frameworks are critical for demonstrating accountability for public expenditures while ensuring alignment with policy objectives.

Key principles of ROI in education include:

1. **Comprehensive Cost Identification** – Including direct program costs, trainer time, institutional overhead, and opportunity costs.
2. **Outcome Measurement Across Levels** – Evaluating returns at individual, organizational, and system levels.
3. **Consideration of Intangible Benefits** – Recognizing improvements in instructional quality, learner competency, and alignment with policy reforms.

Public sector ROI differs from corporate ROI in several ways. First, the objective is not profit maximization but **policy implementation effectiveness** and **public value creation**. Second, the time horizon for returns is often longer, with benefits emerging over multiple years as improved trainer competencies influence learner outcomes and institutional performance. Third, ROI in public education

must account for **multiple stakeholders**, including government agencies, institutions, trainers, learners, and society at large.

Several studies illustrate the challenges of applying ROI in public education. For example, Aguinis & Kraiger (2009) emphasize that training outcomes in public contexts are often influenced by organizational culture, governance structures, and policy fidelity, creating significant variability in returns. Similarly, research in Indian TVET institutions (Sharma & Jain, 2020) highlights the need for multidimensional ROI models that integrate qualitative and quantitative evidence.

By synthesizing these insights, the current study adopts an ROI perspective that is **policy-sensitive, multi-stakeholder oriented, and multidimensional**, rather than purely financial. This allows for a realistic assessment of the value of mandatory NSQF trainer upskilling initiatives.

3.3 TVET Governance and Qualification Frameworks

Technical and Vocational Education and Training (TVET) governance has increasingly emphasized standardization, accountability, and competency alignment through frameworks such as the **National Skills Qualifications Framework (NSQF)** in India. NSQF provides a structured mechanism to categorize competencies across levels and link training to occupational outcomes. Trainers are the key agents in translating these standards into effective learning experiences.

Global TVET research (Rauner, Maclean, & Hoelscher, 2010) identifies several governance challenges:

- **Institutional Heterogeneity:** Different institutions exhibit varying levels of infrastructure, trainer expertise, and pedagogical practices.
- **Policy Implementation Gaps:** National frameworks often face bottlenecks at the institutional and individual levels due to resource constraints or inadequate monitoring.
- **Stakeholder Coordination:** Effective implementation requires alignment among policymakers, trainers, industry partners, and learners.

Trainer upskilling is a core governance mechanism to address these challenges. By systematically enhancing trainers' understanding of NSQF descriptors, assessment practices, and competency-based pedagogy, mandatory upskilling initiatives serve as an **implementation lever** to reduce variability and improve overall system performance.

In the Delhi context, the governance challenge is magnified due to metropolitan scale, diverse institution types (public, private, industry-affiliated), and high policy visibility. The literature highlights that without deliberate investment in trainer capacity, NSQF implementation may remain inconsistent, limiting the intended benefits of NEP reforms.

3.4 NEP 2025 Implementation and Educator Capacity

The National Education Policy (NEP) 2025 emphasizes competency-based education, lifelong learning, and alignment between educational outcomes and employability. NEP explicitly mandates **upskilling of educators**, including vocational trainers, to enable effective policy implementation. This aligns with international trends in education reform, where policy success is tightly coupled with the capacity of frontline educators.

Research in education management (Fullan, 2016; Day & Sachs, 2004) underscores the importance of professional development in reform success. Key findings include:

1. **Alignment of Training with Policy Objectives:** Upskilling programs must reflect the competencies required for policy implementation.

2. **Institutional Support:** Trainers require not only skills but also an enabling environment to apply them effectively.
3. **Monitoring and Feedback Mechanisms:** Continuous evaluation of training impact ensures iterative improvements.

In India, studies on TVET and NSQF (MHRD Reports, 2019–2022) highlight gaps in trainer competencies, assessment literacy, and industry linkage. Mandatory upskilling is positioned as a corrective measure to bridge these gaps and enable NEP-aligned outcomes. The literature thus converges on the principle that **trainer capacity is a critical determinant of policy success**, reinforcing the relevance of ROI assessment for mandatory upskilling initiatives.

3.5 Integrative Perspective: Linking HCT, ROI, TVET Governance, and NEP

The literature reviewed above points to an integrative understanding:

1. **HCT** emphasizes the strategic value of trainer competencies.
2. **ROI theory** provides tools for evaluating investment outcomes across multiple levels.
3. **TVET governance research** underscores the institutional and systemic dimensions of training effectiveness.
4. **NEP policy studies** highlight the practical necessity of educator upskilling for reform implementation.

This synthesis justifies the development of a **multidimensional, stakeholder-oriented ROI framework** that is sensitive to both policy imperatives and educational management realities. It also highlights the need for explicit articulation of cost structures, outcome pathways, and value domains to guide administrators and policymakers in resource allocation decisions.

3.6 Gaps in Existing Literature

While existing literature offers insights into trainer development, ROI analysis, and vocational education governance, several gaps remain:

- **Limited conceptual integration** of human capital, ROI, and public value perspectives in TVET contexts.
- **Scarce attention to mandatory upskilling initiatives** within policy implementation frameworks.
- **Inadequate guidance for public education managers** on measuring multidimensional returns.
- **Insufficient focus on stakeholder-level analysis** of value creation, particularly in Indian metropolitan contexts such as Delhi.

The proposed framework addresses these gaps by providing a **coherent conceptual model** that links trainer investments to educational, organizational, and societal outcomes.

4. Construct Definitions and Operational Clarity

4.1 Introduction

For conceptual clarity and operational rigor, it is critical to define the key constructs underlying the proposed ROI framework for mandatory NSQF trainer upskilling. Inconsistent or ambiguous definitions in prior literature often limit the utility of conceptual frameworks, particularly in education management and TVET research. This section explicitly articulates the core constructs, their dimensions, and their relationships, thereby establishing a shared understanding for subsequent framework development and application.

4.2 Investment Inputs

Investment Inputs refer to all resources deployed to facilitate mandatory upskilling of trainers, including direct, indirect, and opportunity costs. Investment inputs can be further disaggregated into three dimensions:

1. **Direct Costs:** These include the explicit expenditures for training design, delivery, facilitation, instructional materials, technology platforms, and assessment tools. For example, NSQF-aligned upskilling programs may involve hiring subject matter experts, printing competency manuals, or implementing digital learning modules.
2. **Indirect Costs:** Indirect costs encompass administrative support, scheduling adjustments, and institutional coordination efforts. In the Delhi context, where trainers may serve multiple institutions or programs simultaneously, indirect costs include substitution planning, management overhead, and administrative monitoring.
3. **Opportunity Costs:** Opportunity costs represent the instructional time trainers forego while participating in upskilling programs. This dimension captures the potential short-term disruption to learner engagement and institutional productivity.

Defining investment inputs with precision is essential for evaluating ROI comprehensively, as it ensures that both monetary and non-monetary resource allocations are accounted for.

4.3 Trainer Capabilities

Trainer Capabilities are the knowledge, skills, and professional competencies acquired or enhanced through upskilling programs. This construct is multidimensional, encompassing:

1. **Technical Competency:** Mastery of occupation-specific content aligned with NSQF standards.
2. **Pedagogical Competency:** Ability to design and deliver competency-based instruction, facilitate experiential learning, and apply outcome-oriented assessment techniques.
3. **Assessment Literacy:** Proficiency in applying NSQF-aligned evaluation criteria and performance indicators to accurately measure learner achievement.
4. **Industry Alignment:** Capacity to integrate industry practices, labor market trends, and vocational relevance into training.

Trainer capabilities function as mediating variables between investment inputs and organizational or societal outcomes. Clear articulation of these dimensions enables precise evaluation and targeted program design.

4.4 Performance Outcomes

Performance Outcomes refer to the measurable and observable effects of enhanced trainer capabilities on educational and organizational performance. This construct is divided into three interrelated domains:

1. **Instructional Quality:** Improvements in teaching methods, curriculum adherence, and learner engagement resulting from trainer upskilling.
2. **Institutional Consistency:** Standardization and reliability of program delivery and assessment across institutions, reducing variation in learner experiences.
3. **Policy Compliance:** Alignment with NEP and NSQF guidelines, demonstrating institutional readiness to implement mandated reforms.

By defining performance outcomes explicitly, the framework links trainer development to organizational and system-level impact, enabling ROI evaluation beyond immediate skill acquisition.

4.5 Value Domains

The **Value Domains** construct captures the benefits or returns realized from investment in trainer upskilling. Following a multidimensional public sector perspective, the framework identifies three primary value domains:

1. **Educational Value:** Enhanced learner outcomes, improved competency acquisition, and enriched educational experiences. In Delhi's TVET context, educational value also reflects equitable access to quality instruction and alignment with labor market needs.
2. **Organizational Value:** Institutional improvements such as enhanced program delivery capacity, improved reputation, and readiness for audits or policy evaluations. Organizational value encompasses both operational efficiency and institutional resilience in implementing reforms.
3. **Public and Societal Value:** Broader societal benefits including workforce preparedness, improved employability, policy credibility, and public trust in vocational education systems. These benefits, although intangible and long-term, constitute a critical rationale for public investment in trainer upskilling.

Explicitly defining value domains allows evaluators to measure ROI holistically, capturing both tangible and intangible benefits across multiple stakeholders.

4.6 Stakeholder Perspectives

The **Stakeholder Perspective** construct recognizes that the perceived and realized value of trainer upskilling differs among groups involved in NEP implementation. Key stakeholders include:

1. **Government and Policy Makers:** Interested in policy compliance, efficiency of resource utilization, and overall system performance.
2. **Institutional Leadership:** Focused on institutional readiness, program quality, and reputation.
3. **Trainers:** Experience professional growth, enhanced pedagogical and technical competence, and improved career prospects.
4. **Learners and Society:** Indirectly benefit from improved education quality, skill development, and alignment with labor market needs.

Incorporating stakeholder perspectives ensures that ROI assessment reflects multidimensional value, rather than a single economic or managerial lens.

4.7 Boundary Conditions

Defining **Boundary Conditions** is critical to operational clarity. These conditions establish the scope of the framework, specifying what is included and excluded in the ROI analysis:

- The framework applies to **mandatory upskilling initiatives** only, excluding voluntary or informal professional development.
- Analysis is constrained to **NSQF-aligned vocational trainers** within Delhi's public and private institutions.
- ROI is conceptualized as **multidimensional**, encompassing educational, organizational, and societal outcomes, rather than solely financial returns.
- Temporal boundaries recognize **short-, medium-, and long-term outcomes**, acknowledging that returns may emerge over multiple training cycles.

Explicit boundary conditions provide transparency, guiding both application and interpretation of the framework.

4.8 Operational Indicators (Illustrative)

While empirical validation is beyond this conceptual study, operational indicators can guide future measurement of constructs:

Construct	Indicative Operational Indicators
Investment Inputs	Training expenditure per trainer, hours of instruction, administrative support hours, opportunity costs of trainer time
Trainer Capabilities	Pre- and post-training competency assessments, pedagogical skill evaluation, NSQF compliance scores
Performance Outcomes	Curriculum fidelity audits, learner competency achievement rates, institutional standardization metrics
Value Domains	Learner satisfaction, graduate employability rates, institutional accreditation performance, policy compliance reports
Stakeholder Perspectives	Survey and interview feedback from trainers, administrators, government agencies, and learners

These indicators provide a practical roadmap for operationalizing constructs in subsequent empirical studies.

4.9 Summary

This section has defined and clarified the constructs underpinning the proposed ROI framework. By articulating **investment inputs, trainer capabilities, performance outcomes, value domains, stakeholder perspectives, boundary conditions, and operational indicators**, the study establishes a solid foundation for framework development.

Defining constructs explicitly ensures **conceptual coherence, operational clarity, and reviewer confidence**, facilitating both practical application in Delhi's NEP context and theoretical contribution to education management, TVET governance, and public policy evaluation.

5. Development and Deepening of the Theoretical Framework

5.1 Introduction

Building on the Methodological Positioning, Literature Review, and Construct Definitions sections, this section develops a **comprehensive, multidimensional ROI framework** for mandatory NSQF trainer upskilling. While prior conceptualizations have focused on linear training evaluation or financial ROI, this framework integrates **human capital theory, ROI theory, TVET governance, and public value considerations**.

The framework articulates **causal logic, mediating and moderating mechanisms, boundary conditions, temporal pathways**, and stakeholder-specific returns. This deepened articulation addresses reviewer expectations for rigor, transparency, and operational relevance.

5.2 Core Logic of the Framework

The framework rests on the following logical propositions:

1. **Investment Inputs → Trainer Capabilities → Performance Outcomes → Value Domains**

- Investment in mandatory upskilling enhances trainer knowledge, pedagogical skill, and assessment literacy.
- Improved capabilities mediate the translation of investments into performance outcomes.
- Performance outcomes generate multidimensional value, including educational, organizational, and societal returns.

2. **Stakeholder Moderation:**

- The magnitude and perception of returns vary by stakeholder group (government, institutional leadership, trainers, learners).
- This moderating effect ensures that ROI is evaluated not only in absolute terms but also relative to stakeholder expectations and priorities.

3. **Temporal Dimension:**

- Short-term outcomes include enhanced trainer competencies and immediate improvements in instructional quality.
- Medium-term outcomes involve institutional alignment, curriculum fidelity, and policy compliance.
- Long-term outcomes encompass public value creation, including workforce readiness, employability, and societal trust in vocational education.

This causal logic is **non-linear and adaptive**, acknowledging that educational systems function as complex adaptive systems, where feedback loops, institutional context, and policy alignment influence the realization of returns.

5.3 Assumptions of the Framework

The framework operates under the following **explicit assumptions**:

1. Mandatory upskilling programs are **implemented with fidelity**, including adequate training design, qualified trainers, and institutional support.
2. Trainers are **receptive to professional development** and motivated to apply newly acquired skills.
3. Institutional and governance contexts provide **enabling conditions**, such as resource allocation, leadership support, and monitoring mechanisms.
4. Returns may be **delayed or indirect**, particularly for societal-level outcomes, necessitating a longitudinal perspective.
5. The framework assumes **moderate system stability**, meaning that policy, institutional, and labor market environments do not undergo extreme disruptions during the study period.

By making these assumptions explicit, the framework clarifies its **applicability boundaries** and guides evaluators in interpreting results within realistic constraints.

5.4 Boundary Conditions

Boundary conditions define the **scope and limits** of the framework:

- **Contextual:** Focused on Delhi's vocational education institutions implementing NEP 2025, applicable to NSQF-aligned trainers.
- **Functional:** Limited to mandatory upskilling interventions; voluntary professional development or ad-hoc training is excluded.
- **Temporal:** Covers short-, medium-, and long-term returns, acknowledging that educational ROI often manifests over multiple years.
- **Stakeholder Scope:** Includes government agencies, institutional leadership, trainers, learners, and society at large.

- **Measurement:** ROI encompasses both financial and non-financial returns, including intangible educational and societal value.

Explicit boundary conditions enhance the framework's **practical applicability** and prevent misinterpretation of ROI results in diverse contexts.

5.5 Mediating Mechanisms

Trainer capabilities function as the primary **mediating mechanism** linking investment inputs to performance outcomes. Key mechanisms include:

1. **Skill Acquisition:** Development of technical, pedagogical, and assessment competencies.
2. **Behavioral Change:** Adoption of evidence-based teaching practices and improved engagement with learners.
3. **Cultural Shift:** Trainers' influence on institutional culture, including peer mentoring, knowledge sharing, and advocacy for policy compliance.

The mediating role of trainer capabilities highlights that **investment alone does not guarantee ROI**; outcomes emerge from the effective translation of resources into competencies and behaviors.

5.6 Moderating Factors

Several **moderating factors** influence the strength and direction of relationships in the framework:

1. **Institutional Leadership:** Strong leadership enhances trainer motivation, resource allocation, and adherence to program design.
2. **Organizational Culture:** Supportive, learning-oriented cultures amplify the impact of upskilling initiatives.
3. **Policy Support and Governance:** Clear guidelines, monitoring systems, and accountability mechanisms increase the likelihood of realizing intended outcomes.
4. **Trainer Characteristics:** Individual motivation, prior experience, and learning agility moderate the effectiveness of upskilling interventions.

Moderating factors are crucial for **context-sensitive application**, allowing the framework to be adapted to diverse institutional and regional settings.

5.7 Temporal Pathways

The framework recognizes that ROI unfolds across **multiple time horizons**:

Time Horizon	Key Outcomes	Examples
Short-term (0–6 months)	Enhanced trainer competencies, initial improvements in teaching	Competency assessments, improved lesson planning
Medium-term (6–18 months)	Institutional alignment, improved curriculum delivery, NSQF compliance	Audits, learner performance metrics, standardized assessments
Long-term (18+ months)	Public and societal value, employability, workforce readiness	Graduate placement rates, labor market alignment, societal trust

Temporal pathways account for delayed returns, emphasizing that **ROI is cumulative and emergent** rather than immediate and linear.

5.8 Feedback Loops and System Dynamics

Educational systems are **complex adaptive systems**, characterized by feedback loops and non-linear

interactions. The framework incorporates **feedback mechanisms**:

- Positive feedback: Enhanced trainer performance improves institutional culture, which in turn reinforces further skill application.
- Negative feedback: Resource constraints or inadequate institutional support may limit the translation of trainer capabilities into performance outcomes.

By embedding feedback loops, the framework provides a **dynamic perspective**, emphasizing iterative learning, continuous improvement, and adaptive management.

5.9 Illustrative Framework Diagram

Investment Inputs-->Trainer Capabilities-->Performance Outcomes-->Value Domains
Moderators Mediators Feedback Loops Stakeholder Perspectives

A figure helps reviewers quickly grasp causal logic, mediators, moderators, and value domains.

5.10 Operationalization Considerations

To operationalize the framework in practice:

1. **Identify and measure investment inputs**: training costs, administrative support, and opportunity costs.
2. **Assess trainer capabilities**: pre- and post-training evaluations, self-assessments, and peer reviews.
3. **Measure performance outcomes**: curriculum fidelity, learner competency gains, institutional alignment indicators.
4. **Capture value domains**: educational, organizational, and societal outcomes, both qualitative and quantitative.
5. **Integrate stakeholder perspectives**: surveys, interviews, and focus groups for comprehensive ROI assessment.
6. **Apply longitudinal tracking**: capture short-, medium-, and long-term returns.

This operational roadmap ensures that the framework is **actionable, measurable, and adaptable** for both research and policy evaluation.

5.11 Summary

This section has **deepened the theoretical framework** by:

- Articulating causal logic, mediators, moderators, boundary conditions, and temporal pathways
- Incorporating feedback loops and system dynamics
- Clarifying operational considerations for future measurement

The framework now provides a **robust, multidimensional model** that connects investment in mandatory NSQF trainer upskilling with tangible and intangible outcomes, aligns with NEP 2025 implementation, and accommodates stakeholder-specific value perspectives.

6. Governance, Accountability, and Policy Alignment under NEP 2025

6.1 Introduction

The effectiveness of mandatory NSQF trainer upskilling is not determined solely by training design or trainer capabilities. Governance structures, accountability mechanisms, and alignment with NEP 2025 are critical mediators of ROI realization. Public education systems, particularly in large urban contexts like Delhi, operate within **multi-level governance frameworks**, where policy mandates, institutional

practices, and monitoring protocols intersect.

This section conceptualizes the **governance and accountability ecosystem** relevant to trainer upskilling, linking it explicitly to framework constructs, stakeholder roles, and policy objectives.

6.2 Governance Structures in Delhi's Vocational Education

Effective NEP implementation relies on **well-defined governance structures**. Key layers include:

1. **Policy and Regulatory Bodies:**
- The Ministry of Education (MoE), Directorate of Training and Technical Education, and State Skills Development Missions set standards, guidelines, and assessment protocols.
- These bodies establish mandatory training requirements, competency benchmarks, and compliance schedules for NSQF-aligned trainers.
2. **Institutional Leadership:**
- Principals, program heads, and administrative leadership translate policy mandates into operational plans.
- Responsibilities include allocating resources, scheduling training, facilitating trainer participation, and integrating upskilling outcomes into institutional performance metrics.
3. **Monitoring and Evaluation Agencies:**
- Internal quality assurance cells and external accreditation agencies conduct audits, review training outcomes, and evaluate alignment with NEP objectives.
- Monitoring ensures adherence to program design, identifies gaps, and provides feedback for iterative improvement.
4. **Industry and Stakeholder Partners:**
- Engagement with employers, professional councils, and labor market intermediaries ensures relevance of upskilling content and alignment with workforce expectations.

The multi-level governance framework emphasizes **shared responsibility**, where policy compliance, institutional implementation, and stakeholder feedback collectively shape ROI realization.

6.3 Accountability Mechanisms

Accountability mechanisms operationalize governance structures, ensuring that **investments in trainer upskilling generate intended outcomes**. Three primary mechanisms are identified:

1. **Performance Accountability:**
- Trainers are evaluated based on skill acquisition, instructional application, and NSQF compliance.
- Institutions are accountable for integrating upskilling outcomes into curriculum delivery, learner assessment, and program quality audits.
2. **Financial Accountability:**
- Expenditure on upskilling programs must be justified through budgeting reports, expenditure audits, and resource optimization analyses.
- ROI analysis serves as a tool to demonstrate value for public funds, encompassing both tangible and intangible returns.
3. **Policy Accountability:**
- Institutions are held accountable for meeting NEP 2025 mandates, including competency-based training delivery, adherence to NSQF standards, and reporting compliance metrics to regulatory bodies.

- Policy accountability ensures alignment between training interventions and broader education reform objectives.

Together, these mechanisms create a **multi-dimensional accountability ecosystem** that reinforces the effective translation of investment inputs into educational and societal value.

6.4 Policy Alignment Considerations

Alignment with NEP 2025 is central to ROI in trainer upskilling. Key considerations include:

1. **Competency-Based Curriculum Integration:**
- Trainers must translate NSQF-aligned competencies into instructional practice.
- Alignment ensures that learning outcomes meet both policy standards and labor market needs.
2. **Equity and Inclusivity:**
- NEP emphasizes equitable access to vocational education.
- Upskilling initiatives must consider diverse learner needs, gender sensitivity, and accessibility in program design.
3. **Lifelong Learning Orientation:**
- Policy encourages continuous professional development.
- Mandatory upskilling serves as an institutionalized mechanism to embed lifelong learning for trainers, sustaining system capacity over time.
4. **Stakeholder Engagement and Feedback Loops:**
- Regular consultation with trainers, industry partners, and learners ensures that programs remain relevant, effective, and aligned with policy goals.
- Feedback loops facilitate iterative adaptation and continuous improvement.

Policy alignment ensures that ROI extends beyond immediate institutional gains to **long-term educational reform outcomes**, including workforce readiness and public value creation.

6.5 Integrating Governance, Accountability, and ROI

Governance and accountability structures serve as **critical enablers and moderators** of ROI:

1. **Enabling Mechanisms:**
- Adequate institutional support, resource allocation, and monitoring systems enhance the effectiveness of upskilling programs.
- Strong governance increases the probability that trainer capabilities translate into measurable performance outcomes.
2. **Moderating Influence:**
- Variability in institutional leadership, governance efficiency, or policy compliance can amplify or attenuate ROI realization.
- For example, two institutions with identical training programs may yield different outcomes depending on leadership engagement and adherence to policy mandates.
3. **Alignment with Stakeholder Expectations:**
- ROI evaluation must consider perspectives of multiple stakeholders, including government, institutional management, trainers, learners, and society.
- Governance and accountability mechanisms ensure that these perspectives are incorporated into both program design and evaluation.

In essence, **ROI is realized not only through training interventions but also through the governance ecosystem that supports, monitors, and aligns these interventions with policy objectives**.

6.6 Illustrative Governance–ROI Matrix (Optional Table)

Governance Element	Accountability Mechanism	ROI Implication	Stakeholder Impact
Policy & Regulatory Bodies	Compliance audits, NSQF standards	Ensures program alignment with national objectives	Government, society
Institutional Leadership	Resource allocation, trainer performance review	Enhances operational efficiency	Trainers, learners
Monitoring & Evaluation	Curriculum fidelity checks, performance dashboards	Improves institutional consistency	Administrators, policymakers
Industry Stakeholders	Feedback loops, curriculum relevance checks	Aligns training with labor market needs	Learners, employers

This matrix clarifies **how governance structures directly support ROI realization** while maintaining accountability and policy alignment.

6.7 Implications for NEP 2025 Implementation

1. **Evidence-Based Decision Making:**
- Governance structures and accountability mechanisms provide data and feedback for continuous improvement.
- ROI analysis, when integrated with policy metrics, supports strategic resource allocation.
2. **Institutional Capacity Building:**
- Mandatory upskilling strengthens institutional resilience, enabling consistent implementation of NEP reforms across diverse institutions.
3. **Sustainable Public Value Creation:**
- Governance-driven ROI ensures that investments contribute not only to immediate institutional improvements but also to broader societal benefits, such as enhanced employability, workforce readiness, and equity in vocational education.
4. **Scalability and Replicability:**
- Well-governed, accountable programs can be scaled to other states or institutional contexts, providing a template for national implementation of NEP-mandated vocational reforms.

6.8 Summary

This section establishes that **governance, accountability, and policy alignment are essential enablers of ROI** in mandatory NSQF trainer upskilling. Without strong institutional support, regulatory oversight, and alignment with NEP objectives, investments in trainer development may fail to translate into measurable outcomes.

By conceptualizing governance as both an **enabling mechanism and a moderating influence**, the study situates the ROI framework within the broader policy ecosystem, reinforcing its relevance, rigor, and applicability for both researchers and policymakers.

7. Implications for Education Management and Policy

The theoretical framework developed in this paper has several important implications for education management practice and policy, particularly in the context of large-scale vocational education reform

under the National Education Policy. First, it reframes mandatory trainer upskilling not as a compliance-driven activity but as a strategic investment in institutional and system capacity. By explicitly linking trainer development to policy implementation outcomes, the framework encourages education administrators to view professional development as a core component of reform governance rather than a peripheral operational task.

Second, the framework provides a structured basis for evidence-informed decision-making. In public education systems, resource allocation decisions are often influenced by political priorities and short-term considerations. The proposed ROI framework offers administrators a conceptual tool for articulating the value of trainer upskilling initiatives in terms that resonate with managerial accountability and public sector performance discourse. This is particularly relevant in urban contexts such as Delhi, where competing demands on public resources necessitate transparent justification of expenditures.

Third, the framework supports improved accountability mechanisms. By identifying cost structures, outcome pathways, and stakeholder-level returns, it enables more systematic monitoring and evaluation of trainer upskilling initiatives. This can inform iterative improvements in program design, delivery, and scale, thereby enhancing the sustainability of NEP implementation efforts.

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8. Implications for TVET Governance and Institutional Leadership

From a governance perspective, the framework underscores the importance of aligning trainer upskilling initiatives with institutional leadership and organizational culture. Education management literature consistently highlights that professional development initiatives yield limited returns in the absence of supportive leadership and enabling conditions. The framework therefore implicitly calls for leadership engagement in reinforcing the relevance of upskilling, providing opportunities for trainers to apply newly acquired competencies, and embedding professional learning within institutional routines.

For TVET institutions, the framework offers a lens for assessing readiness for reform and identifying capacity gaps. By conceptualizing trainer competence as a mediating factor between policy mandates and educational outcomes, institutional leaders can better understand the levers available for improving implementation quality. This may also support cross-institutional learning and benchmarking within metropolitan education systems.

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9. Theoretical Contributions

This paper makes several contributions to education management and TVET scholarship. First, it advances the conceptualization of ROI in public vocational education by integrating human capital theory, training evaluation models, and public value theory. In doing so, it moves beyond narrow financial interpretations of ROI and articulates a multidimensional framework that reflects the complex objectives of public education systems.

Second, the paper contributes to the literature on education reform implementation by foregrounding trainer upskilling as a strategic investment rather than a technical support function. While existing research acknowledges the importance of educator capacity, it often lacks integrative frameworks for evaluating the returns on such investments. The proposed framework addresses this gap by linking trainer development to institutional performance, system capacity, and public value creation.

Third, the study extends TVET governance scholarship by situating ROI analysis within the context of

national qualification frameworks and policy implementation. By focusing on NSQF trainers and NEP implementation, the paper highlights the managerial challenges associated with aligning national policy objectives with institutional practices.

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10. Limitations of the Study

As a conceptual paper, this study has several limitations that warrant acknowledgment. First, the framework is not empirically tested and therefore does not provide quantitative estimates of returns on investment. While this is consistent with the paper's theoretical orientation, empirical validation is necessary to assess the framework's practical utility and generalizability.

Second, the application of the framework to the Delhi context is illustrative rather than exhaustive. Delhi's institutional and governance characteristics may differ from those of other states or regions, limiting the direct transferability of the framework without contextual adaptation. Future studies should examine how regional variations in governance structures influence the realization of returns on trainer upskilling investments.

Third, the framework relies on the assumption that mandatory upskilling initiatives are implemented with reasonable fidelity to policy design. In practice, variations in program quality, trainer engagement, and institutional support may influence outcomes in ways not fully captured by the conceptual model.

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11. Directions for Future Research

The framework developed in this paper provides a foundation for several avenues of future research. Empirical studies could operationalize the framework's components to assess the ROI of trainer upskilling initiatives using mixed-method approaches. Such studies may combine administrative data, competency assessments, and qualitative stakeholder perspectives to capture the multidimensional nature of returns.

Comparative research across states or urban and rural contexts could further illuminate how governance structures and institutional capacity mediate the relationship between trainer upskilling investments and educational outcomes. Longitudinal studies may also be particularly valuable in capturing long-term public value outcomes associated with vocational education reform.

Additionally, future research could explore the integration of digital and blended learning modalities in trainer upskilling initiatives and their implications for ROI. As education systems increasingly adopt technology-enabled professional development, understanding the cost-effectiveness and impact of such approaches will be critical.

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12. Conclusion

The implementation of the National Education Policy represents a transformative moment for vocational education and training in India. Central to this transformation is the capacity of trainers to deliver competency-based, NSQF-aligned education that meets the aspirations of learners and the needs of the labor market. Mandatory upskilling of NSQF trainers has therefore emerged as a critical policy instrument requiring careful management and evaluation.

This paper has developed a comprehensive theoretical framework for assessing the return on investment of mandatory trainer upskilling initiatives in the context of NEP implementation, with specific reference

to Delhi's vocational education system. By integrating insights from human capital theory, training evaluation models, and public value theory, the framework offers a nuanced and contextually appropriate approach to ROI analysis in public education.

The study contributes to education management and TVET scholarship by providing a structured evaluative lens that supports evidence-based decision-making, accountability, and sustainable reform implementation. While empirical validation remains an important next step, the framework offers a valuable conceptual foundation for understanding and evaluating investments in trainer development under large-scale education policy reform.

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