

# A Strategic Performance Model for Maximizing ROI in Engineering Education through Institutional Capability Human Capital and Global Project Engagement

Mayur Qumer Collins<sup>1</sup> and Estrella Galbraith<sup>2\*</sup>

<sup>1,2</sup>Western Sydney University, Rydalmere, Australia

<sup>1</sup>[mayur.collins@westernsydney.edu.au](mailto:mayur.collins@westernsydney.edu.au), <sup>2</sup>[e.galbraith@westernsydney.edu.au](mailto:e.galbraith@westernsydney.edu.au)

## Abstract

*This study proposes a strategic performance improvement model for maximizing Return on Investment (ROI) in engineering education, focusing on faculty development, institutional capacity, and global consulting engagement. In the face of growing expectations for higher education institutions to function not only as educators but also as economic contributors and international service providers, the proposed model offers a structured framework to align training and development with measurable institutional and economic outcomes. The model is grounded in a systems-thinking approach that integrates input-process-output-outcome analysis, enabling engineering education providers to optimize internal capabilities while engaging in high-value external projects. Core components of the model include structured faculty development programs, interdisciplinary research integration, international consulting under bilateral and multilateral development partnerships, and mechanisms for knowledge capital creation and diffusion. A qualitative case study methodology was employed to develop and validate the model. Data was drawn from institutional project reports, international training records, and performance outcomes from multiple global development programs across technical education institutions. Thematic analysis was used to identify key enablers and barriers to ROI maximization, with insights validated through triangulation across program evaluation documents and faculty engagement outcomes. Findings highlight the importance of sustained investment in human capital, institutional autonomy, and strategic partnerships for achieving ROI in public education contexts. The model is designed for replication and adaptation by universities, polytechnic institutions, and government training agencies, particularly those operating in resource-constrained environments with global ambitions. By reframing education as a high-value strategic investment, this paper contributes to business-oriented educational reform discourse and offers actionable strategies for leaders, policymakers, and development agencies aiming to maximize impact, efficiency, and global competitiveness in engineering education.*

**Keywords:** *Return on Investment (ROI), Strategic Performance Model, Institutional Capability, Global Project Engagement, Faculty Development, Human Capital Investment, International Development Consulting, Public Sector Innovation*

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\*corresponding author

## 1. Introduction

In today's knowledge-based economy, higher education institutions—particularly those in the engineering and technical education sector—are increasingly viewed as strategic assets for national productivity and innovation. As governments and industries seek to address complex workforce challenges and technological disruption, there is growing demand for universities and vocational education providers to deliver measurable returns on public and private investments in education [1][2]. In Australia, this shift is particularly evident in the evolving role of public institutions in driving workforce capability, supporting advanced manufacturing, and engaging with global markets through consultancy, research, and training exports [3]. Traditionally, the performance of education providers has been measured by graduation rates, research outputs, and student satisfaction. However, a broader view is emerging—one that recognises the Return On Investment (ROI) of education in terms of long-term human capital development, institutional competitiveness, and international project engagement [4][5]. This is especially critical in engineering education, where the pace of technological change demands continual curriculum renewal, interdisciplinary teaching, and faculty capacity building aligned with industry and global development needs [6].

This paper presents a strategic performance improvement model that reframes engineering education institutions as investment-focused entities capable of delivering economic and reputational ROI through structured development initiatives. The model is grounded in systems thinking and draws from institutional case-based evidence across global development programs. By aligning internal training and development programs with externally funded consulting and development projects, institutions can generate scalable impact—both domestically and internationally. Using a qualitative methodology supported by thematic analysis, the research identifies the key drivers that enable institutions to build a high-performing workforce, engage in global partnerships, and contribute to knowledge capital formation. The model has relevance for policymakers, education leaders, and development partners seeking a replicable approach to scaling education ROI in a fiscally constrained environment.

In the context of Australia's post-pandemic higher education landscape and its renewed focus on innovation, skills, and international education, this study offers a timely contribution to business-aligned education strategy. It aims to inform future policy and institutional decisions regarding faculty development, organisational autonomy, internationalisation, and the commercialisation of educational services.

### 1.1. Objectives

This study sets out to address a fundamental question facing technical and higher education providers in Australia and globally: how can institutions maximise the Return On Investment (ROI) from their training and development programs while aligning with broader strategic, economic, and internationalisation goals?

Specifically, the objectives of this paper are to:

1. Develop and present a strategic performance improvement model that integrates systems thinking, institutional autonomy, and faculty capacity-building to improve educational and economic outcomes.
2. Examine the role of global engagement and project-based consulting in enhancing institutional ROI and strengthening international reputation in engineering education.

3. Identify key enablers and barriers to performance optimisation, based on case-based insights from institutions engaged in executive education, international development programs, and cross-sector partnerships.
4. Contribute to the growing discourse on ROI in education, offering a replicable framework for institutional leaders, policymakers, and development stakeholders interested in scalable, investment-driven educational strategies.

## **2. Literature review**

### **2.1. Education as strategic investment**

The shift toward viewing education through a business and investment lens has been well documented across both public policy and academic literature. Education is increasingly framed not only as a public good but also as an economic driver with tangible returns in productivity, employment outcomes, and national innovation capacity [4][5]. In Australia, the higher education sector contributes over \$40 billion annually to the national economy, underscoring the sector's growing importance in trade, workforce development, and international influence [6].

Research has emphasised the need to measure educational ROI not merely by enrolment or completion statistics, but through long-term indicators such as human capital accumulation, research commercialisation, graduate employability, and industry [7][8]. Institutions that align internal capability-building with these performance outcomes are better positioned to demonstrate impact and attract ongoing investment from both public and private sources.

### **2.2. Faculty development and human capital ROI**

Faculty development is central to institutional performance and innovation in engineering education. Studies show that continuous professional development improves instructional quality, facilitates interdisciplinary collaboration, and fosters leadership within academic institutions [9][10]. Longitudinal research further indicates that strategically planned faculty development programs generate long-term organisational value by enabling faculty to contribute to research, curriculum innovation, and industry consulting [11][12].

From a business perspective, human capital investment through faculty development correlates directly with institutional resilience, agility, and global competitiveness. Universities that invest in faculty capability tend to produce more impactful research, secure international funding, and rank higher on global performance indices [6][13].

### **2.3. Global engagement and institutional capability**

Global engagement—particularly through participation in international development projects—has emerged as a key strategy for institutions to expand influence, generate revenue, and demonstrate capability [14][15]. For technical and vocational institutions, collaboration with international development agencies (e.g., ADB, UNDP, World Bank) provides opportunities to export training services, build international partnerships, and showcase best practices in curriculum development and capacity-building.

Studies from higher education systems in New Zealand, Canada, and the UK confirm that global consulting, knowledge exchange, and executive education services are increasingly integrated into institutional business models [16][17]. These models often align closely with

national skills agendas and sustainable development priorities, making them relevant for replication in Australia's evolving tertiary education system.

## **2.4. Barriers and strategic enablers**

Despite strong evidence supporting ROI-focused education strategies, several systemic barriers persist. These include limited institutional autonomy, siloed governance structures, and insufficient integration between academic and commercial functions [1][2]. Furthermore, faculty resistance to change, lack of policy alignment, and weak industry linkages can constrain performance.

Conversely, successful institutions exhibit clear strategic vision, decentralised decision-making, and active engagement with funding agencies and industry stakeholders [18][19]. The presence of high-performing faculty teams and investment in infrastructure and digital technologies also contributes to greater resilience and ROI realisation.

## **3. Research methodology**

This study adopts a qualitative case study methodology to develop and validate a performance improvement model aimed at maximising Return on Investment (ROI) in engineering education institutions. The research is grounded in systems thinking and strategic management theory, with a focus on understanding how institutional capabilities, faculty development, and international project engagement interact to generate measurable educational and economic outcomes.

### **3.1. Research design**

The research design follows a multi-phase, exploratory framework comprising:

1. Document analysis of institutional strategies, international project reports, and faculty development records;
2. Thematic synthesis of findings from global faculty development programs and capacity-building initiatives;
3. Comparative benchmarking of institutional practices against ROI frameworks drawn from business and public administration literature.

This approach enables the integration of both operational and strategic dimensions, capturing how internal investments (e.g., professional development, autonomy, academic leadership) translate into external outcomes (e.g., consultancy revenue, international recognition, and alumni impact).

### **3.2. Data sources**

The study draws from a curated dataset comprising:

1. Internal institutional documentation from publicly funded engineering and technical education institutions engaged in international projects, training exports, and executive education;
2. Project performance reports submitted to international development partners (e.g., UNESCO, ADB, World Bank, AusAID);
3. Peer-reviewed publications and evaluation reports from academic staff involved in interdisciplinary educational initiatives;

4. Secondary sources including government education strategies, workforce development plans, and policy reviews relevant to the Australian tertiary education sector.

Data collection was guided by a purposive sampling strategy, focusing on institutions that had demonstrable success in linking faculty development to international consulting or technical assistance projects.

### 3.3. Analytical approach

Data was analysed using thematic coding and pattern recognition, with the aim of identifying strategic levers, enabling conditions, and process dynamics that contribute to high institutional ROI. The analysis followed a systems-based input-process-output-outcome (IPOO) framework, which allowed for the classification of institutional practices across four domains:

1. Inputs – Faculty development, policy mandates, funding mechanisms;
2. Processes – Training program design, project bidding, interdisciplinary collaboration;
3. Outputs – Completed development projects, curriculum innovations, leadership roles;
4. Outcomes – Enhanced institutional reputation, international visibility, ROI on human capital.

Findings were synthesised into a performance improvement model, with iterative validation through alignment with contemporary frameworks in strategic education management (e.g., Phillips ROI Methodology™, Total Quality Management in education, and dynamic capabilities theory).

[Figure 1] presents a structured overview of the research methodology employed in this study. The diagram illustrates the four key components of the research process—Research Design, Data Sources, Analytical Approach, and Scope and Limitations—highlighting the logical flow from conceptual planning to evaluation and generalisation. This visual model clarifies the systematic, qualitative case study approach used to investigate how institutional strategies in engineering education can maximise Return on Investment (ROI).

Each stage builds upon the previous, starting with document analysis and benchmarking, then moving to the identification of relevant data sources. The analysis phase applies thematic coding within an Input–Process–Output–Outcome (IPOO) framework, culminating in an assessment of the model’s transferability across institutional contexts. This structure reflects best practices in strategic education research and ensures methodological transparency for readers and reviewers.

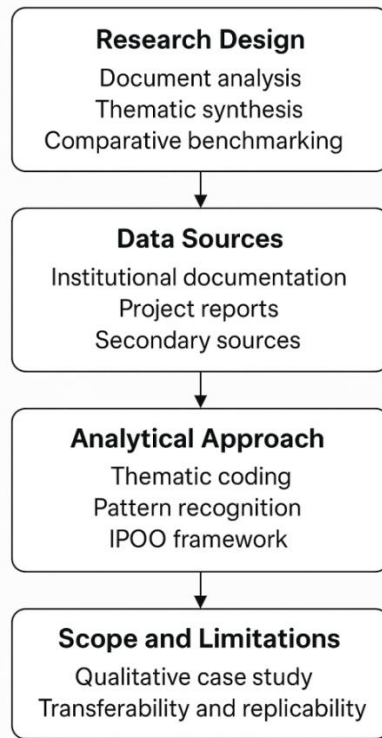


Figure 1. Research methodology framework

### 3.4. Scope and limitations

The case-based approach offers rich insights into institutional strategies for maximising ROI; however, it is not intended to produce statistically generalizable results. Instead, the value lies in the transferability and replicability of the model across similar education systems, particularly those in Australia, Southeast Asia, and the Global South where institutions face comparable pressures to justify public investment and compete globally.

Furthermore, while the study focuses on engineering and technical education, the framework may also be applicable to broader higher education contexts where workforce impact, performance optimisation, and global engagement are strategic priorities.

## 4. Performance Improvement Model

This section presents a performance improvement model designed to enhance institutional effectiveness and maximise Return on Investment (ROI) from training, development, and international project engagement in engineering education. The model draws on systems thinking and is structured as a ten-step cycle encompassing inputs, transformation processes, outputs, and long-term outcomes. It offers a replicable and scalable framework for institutions aiming to enhance educational performance, generate global consulting revenue, and strengthen their human capital base.

The model assumes that engineering and technical education providers function as semi-autonomous organisations within public or hybrid funding systems. It is particularly relevant for institutions seeking to build long-term capability in areas such as executive education, development consulting, and applied research.

Table 1. Ten-step performance improvement model

Stage	Strategic Focus	Key Activities
1. Strategic Faculty Investment	Institutional input	Identify and support high-potential academic staff through structured professional development, leadership pathways, and upskilling aligned with emerging technologies.
2. Global Exposure and Learning	Capability development	Facilitate international training, secondments, and fellowships to enhance faculty expertise in curriculum innovation, consulting, and cross-cultural delivery.
3. Knowledge Integration and Specialisation	Internal transformation	Embed new competencies into teaching, interdisciplinary programs, and internal knowledge systems. Establish niche capabilities in sectors aligned with institutional strategy.
4. Program Design and Value Proposition	Service innovation	Design modular training programs and consulting offerings for both domestic and international clients, including governments, NGOs, and development agencies.
5. Institutional Readiness and Autonomy	Governance and scalability	Ensure strategic alignment through empowered governance structures (e.g. academic boards, innovation units) and create policies that support agile service delivery.
6. Market Intelligence and Positioning	External engagement	Conduct opportunity scanning and stakeholder analysis to identify tenders, development needs, and partnership opportunities within global education and consulting markets.
7. Bid Preparation and Project Acquisition	Business development	Form internal bid teams to respond to calls for proposals (e.g. from ADB, World Bank, AusAID) with competitive technical and financial submissions.
8. Program Execution and Delivery	Project implementation	Deliver services to international clients through multidisciplinary teams, drawing on institutional knowledge, cultural competency, and performance tracking systems.
9. Impact Assessment and Knowledge Capture	Institutional learning	Collect post-project data on impact, client feedback, and capability growth. Conduct tracer studies and longitudinal evaluations to inform future bids and program design.
10. Reintegration and ROI Consolidation	Strategic reinvestment	Reintegrate project learnings into internal systems. Use surpluses, insights, and reputational capital to fund future training cycles and expand institutional reach.

#### 4.1. Key features of the model

1. **Systemic Alignment:** The model ensures coherence between institutional goals, staff development, and service delivery, strengthening the feedback loop between investment and outcomes.
2. **Reputation and Revenue:** By leveraging international projects and industry partnerships, institutions build global recognition while generating non-tuition-based income streams.
3. **Replicability:** Designed to operate within diverse policy and funding environments, the model can be adapted by institutions in both developed and emerging economies seeking to transform training into an engine for economic impact.
4. **Sustainability:** Institutions adopting this model are better equipped to manage funding volatility, policy shifts, and evolving skills needs, reinforcing their role in national workforce strategies.

#### 4.2. Outcome and strategic implications

When implemented effectively, the model yields multiple returns, including:

1. Enhanced human capital through faculty capability-building;
2. Growth in knowledge capital via applied research and global dissemination;

3. Tangible economic ROI from consulting revenues and project awards;
4. Increased institutional competitiveness in international development education markets.

This performance improvement model supports the transformation of engineering education institutions from traditional teaching providers into strategic, business-aware knowledge organisations. It aligns well with national policy priorities around workforce productivity, skills innovation, and international engagement—particularly in Australia and similar economies navigating post-pandemic educational reform and globalisation challenges.

## 5. Results and Discussion

The analysis of institutional practices and qualitative data indicates that engineering education providers that adopt a strategic, performance-driven approach can achieve significant returns across multiple dimensions. These dimensions include human capital, institutional revenue, and global reputation. Institutions that implemented components of the proposed performance improvement model demonstrated greater alignment between internal development efforts and external outcomes, thereby generating measurable and sustained Returns on Investment (ROI).

The results show that institutions that prioritised strategic faculty development and global engagement produced stronger internal innovation cultures, diversified funding streams, and expanded international partnerships. This confirms that ROI in education is inherently multidimensional and extends well beyond cost-efficiency or enrolment metrics. Instead, it includes long-term contributions to workforce development, institutional positioning, and competitive advantage.

[Table 1] summarises the main findings by illustrating how targeted strategic actions led to tangible institutional outcomes across each ROI category.

Table 1. Summary of key results across ROI dimensions

ROI Dimension	Strategic Actions Taken	Observed Institutional Outcomes
Human Capital ROI	Investment in faculty development; leadership and mentoring programs	Increased staff mobility and promotion; stronger internal innovation culture
Economic ROI	Establishment of consulting units; targeted international project bids	Diversified revenue streams; secured multi-year development contracts
Reputational ROI	Participation in global partnerships; creation of knowledge products	Higher international visibility; recognition by multilateral institutions

The institutions that achieved high-impact results operated with agile governance models that supported decentralised authority and strategic responsiveness. Rather than functioning solely as educational providers, they acted as service-oriented entities capable of delivering training, consultancy, and applied research across national and international contexts. These institutions also prioritised the integration of capability-building into their organisational strategy. Faculty members were actively engaged in research and external consulting, in addition to their teaching responsibilities, and their contributions were supported through structured development pathways.

Institutions with a long-term vision positioned themselves as trusted partners in the global development ecosystem. Through their participation in international technical assistance programs, they not only generated revenue but also enhanced their academic and policy influence. These outcomes align with international trends in the transformation of higher education, where institutions increasingly serve as engines of innovation, knowledge export, and public value. Qualitative insights further illustrate the model’s practical value. One

technical education institute in the Asia-Pacific established a project acquisition and delivery office, resulting in more than 200 per cent growth in consulting revenues over a five-year period. A regional polytechnic developed a digital capacity-building program for its academic staff, which led to new international engagements focused on technical and vocational education reform. Another institution implemented an internal impact monitoring system to collect alumni data and employer feedback, which was subsequently used to secure additional international funding based on demonstrated performance.

While these cases demonstrate the positive application of the model, several persistent barriers continue to hinder broader adoption. Many institutions face limited operational autonomy, especially those under rigid public funding and governance frameworks. This restricts their ability to pursue new opportunities and adjust strategy in response to global market shifts. Furthermore, the administrative fragmentation commonly found in large institutions often prevents effective coordination between academic leadership, finance, and external affairs, thus impeding implementation. Additionally, some faculty remain hesitant to engage in externally funded consulting or development work due to a lack of institutional incentives or recognition mechanisms. These findings suggest that institutions must not only invest in capacity-building but also reform internal systems and governance to enable full implementation of the performance model. Reforms that support institutional agility, incentivise external engagement, and promote strategic reinvestment are essential for maximising educational and economic outcomes.

In conclusion, the analysis confirms the effectiveness of the proposed performance improvement model in enabling engineering education institutions to deliver high-value, strategic returns. The results emphasise the importance of aligning faculty development, international engagement, and project delivery with institutional performance goals. By doing so, institutions are better positioned to respond to shifting demands in the global education market, enhance their reputational capital, and contribute to national and regional development priorities.

## **6. Barriers and success factors**

Despite the growing recognition of return on investment (ROI) as a key performance indicator in education, many institutions continue to face significant internal and external barriers that inhibit strategic alignment, capability deployment, and global competitiveness. Understanding these challenges—and the conditions that enable institutions to overcome them—is essential for implementing the performance improvement model outlined in this study.

### **6.1. Common institutional barriers**

Several recurring obstacles prevent technical and higher education institutions from fully capitalising on their training, research and consulting potential:

1. **Limited Strategic Vision and International Orientation** - Institutions often lack a cohesive vision that links internal training programs to external consulting and global development opportunities. Without a forward-looking strategy, they struggle to mobilise resources or engage international markets effectively [2].
2. **Insufficient Autonomy and Decision-Making Flexibility** - Rigid governance structures and centralised decision-making processes can delay innovation and disempower faculty leadership. The absence of flexible procurement, budgeting, or

academic approval systems limits institutional responsiveness to emerging opportunities [1].

3. **Underdeveloped Bid Management Capabilities** - Many institutions are unfamiliar with bidding processes required for global development projects or competitive tenders. This includes gaps in proposal writing, cost modelling, and compliance with international terms of reference.
4. **Cultural Resistance to Change and Risk Aversion** - A conservative institutional culture that discourages experimentation or penalises failure can undermine innovation. In many cases, staff remains focused on mandated academic tasks and avoid engagement with external consulting or research commercialisation.
5. **Talent Drain and Faculty Overload** - High workloads, administrative burdens, and limited incentives contribute to staff burnout and attrition. This reduces institutional memory and weakens internal momentum for strategic transformation.
6. **Fragmented Industry and Government Engagement** - Weak or inconsistent relationships with industry, government, and development partners reduce the institution's visibility and credibility as a provider of real-world solutions.
7. **Inadequate Infrastructure and Support Systems** - Out-dated digital platforms, poor project management tools, and limited internal capacity for M&E (monitoring and evaluation) constrain institutional readiness to scale services or capture ROI data effectively.

## **6.2. Strategic enablers and success factors**

By contrast, institutions that successfully maximise ROI in engineering education consistently demonstrate the following traits:

1. **Empowered Governance and Strategic Leadership** - High-performing institutions decentralise operational authority and empower academic and administrative leaders to make timely, market-responsive decisions. Strong governance structures enable the institution to pursue opportunity without bureaucratic delays.
2. **Faculty Development as a Core Investment Priority** - Institutions that treat faculty training as a strategic investment—not a compliance activity—are better positioned to generate long-term returns. These organisations allocate resources to leadership development, international fellowships, and project-based learning for staff.
3. **Dedicated Units for Project Acquisition and Delivery** - Many leading institutions establish specialised offices or units focused on business development, project coordination, and client engagement. These units act as internal consulting hubs, facilitating bid writing, program delivery, and post-project knowledge capture.
4. **Strategic Partnerships with Industry and International Agencies** - Strong linkages with local industries, international donors, and development agencies help institutions access funding, share expertise, and scale impact. Long-term partnerships are cultivated through trust, co-designed programs, and evidence of prior success.
5. **Culture of Innovation and Psychological Safety** - Organisations that reward innovation and tolerate calculated risk foster entrepreneurial thinking and staff ownership of strategic goals. This includes psychological safety for faculty to initiate programs, experiment with delivery models, and collaborate externally.

6. Robust Monitoring, Evaluation, and Learning Systems - Institutions that implement data-driven evaluation tools—such as tracer studies, ROI dashboards, and longitudinal impact assessments—can demonstrate value to stakeholders and iteratively improve their model.
7. Reinvestment in Capability and Innovation - Institutions that redirect revenue or surpluses from consultancy and training services into further development cycles (e.g., new labs, digital infrastructure, or start-up grants for faculty) generate self-sustaining growth.

The successful implementation of a performance improvement model requires more than technical competence; it demands organisational alignment, leadership commitment, and a systems-level investment mindset. Institutions that overcome structural inertia and embrace business-aligned models of education delivery are better positioned to deliver scalable impact—locally and globally.

By understanding and addressing these barriers while activating key enablers, education providers can transition from compliance-driven institutions to globally recognised centres of excellence in engineering education and development consulting.

## 7. Conclusion

This paper has presented a strategic performance improvement model for maximising Return on Investment (ROI) in engineering education, framed within a business and institutional development perspective. As education systems around the world—including Australia's—face increased pressure to demonstrate value, foster innovation, and compete globally, public and hybrid institutions must evolve beyond traditional academic metrics and adopt a more strategic, outcome-driven approach to training and development. Drawing on systems thinking, qualitative case-based insights, and international project engagement practices, the model outlined in this study offers a structured pathway for transforming faculty development into a scalable engine for institutional impact. The ten-step cycle provides a replicable framework through which institutions can build internal capability, generate external consulting income, enhance global competitiveness, and reinforce long-term public value. Key enablers of success include empowered governance, targeted faculty investment, robust monitoring systems, and strategic alignment with both national priorities and international markets. Equally important is the ability of institutions to reframe education not simply as a service, but as a high-yield investment in human and knowledge capital.

The findings of this study carry important implications for university leaders, policymakers, and international development agencies. By embedding ROI principles into institutional planning, faculty development, and project acquisition processes, education providers can not only improve performance but also contribute meaningfully to national productivity, skills development, and global engagement.

Future research may extend this model through empirical testing across various institutional types and regions, including longitudinal impact studies, cost-benefit analyses, and cross-country benchmarking. Such efforts would further validate the framework and refine its application across diverse governance and funding contexts. In an increasingly competitive and outcome-driven education landscape, institutions that adopt strategic, ROI-focused models will be best placed to deliver sustained value—educationally, economically, and globally.

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