

ADDRESSING THE LEARNING INVESTMENT PARADOX IN ASEAN DIGITAL LOGISTICS: DEVELOPMENT OF AN INTEGRATED ROTI-DBOM FRAMEWORK

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ABSTRACT

Employee learning investment in the ASEAN digital logistics sector has increased substantially, yet this growth has not consistently produced proportional improvements in cross-border logistics performance. Despite this issue, limited integrative evidence explains how training expenditure can be systematically linked to measurable logistics performance outcomes. This study examines this learning investment paradox using a conceptual research design and comparative secondary data from PT Pos Logistik Indonesia and Pos Malaysia Berhad. PT Pos Logistik Indonesia recorded IDR 3.912 billion in education and training expenditure across 172 programs in 2023, yet selected cross-border performance indicators remained relatively stagnant. Pos Malaysia Berhad, although supported by the Certified Wira programme and HRD Corp levy scheme, continues to face operational capability gaps in digital and cross-border logistics execution. This study develops an Integrated ROTI-DBOM Framework that combines Return on Training Investment, the Design-Build-Operate-Maintain cycle, and the Balanced Scorecard causal logic. The framework is further grounded in UNESCO's four pillars of learning and Senge's five disciplines of a learning organization. This paper proposes a reorientation of training management accounting from a cost-center paradigm to a strategically integrated value-center model. The analysis suggests that the learning investment paradox is not merely a problem of investment size, but of weak investment architecture and limited linkage between learning, operational capability, customer outcomes, and financial accountability. The study contributes to logistics management accounting by offering a lifecycle-based framework for linking training expenditure to measurable cross-border performance outcomes through a Learning Investment Portfolio.

Keywords: Logistics Management Accounting; ROTI-DBOM; Balanced Scorecard; Learning Investment Paradox; Cross-Border Logistics Performance

INTRODUCTION

Digital logistics transformation has intensified the need for adaptive human capability in ASEAN logistics enterprises. Cross-border logistics now depends not only on physical infrastructure and delivery networks, but also on employees' ability to use digital platforms, customs data, delivery visibility systems, customer service channels, and changing regulatory requirements. As logistics firms increase investment in employee learning, management accounting systems must be able to show whether such expenditure

contributes to operational and financial performance. The theoretical basis for this argument is grounded in organizational learning and educational philosophy. Peter Senge (1990) asserted in *The Fifth Discipline* that “the rate at which organizations learn may become the only sustainable competitive advantage.” This view positions learning as a strategic capability rather than a peripheral HR activity. According to Delors (1996), UNESCO articulated four pillars of education: Learning to Know, Learning to Do, Learning to Be, and Learning to Live Together. In this study, these pillars define learning as broader than technical skills training. They provide the foundation for evaluating human capability investment in ASEAN digital logistics.

The central problem is the learning investment paradox. Employee learning investment in ASEAN state-owned logistics enterprises continues to grow, yet cross-border performance (CBP) fails to improve proportionally. PT Pos Indonesia (Persero) recorded total education and training expenditures of IDR 3.912 billion with 172 training programs implemented in 2023, covering digital reskilling and upskilling across multiple career levels (PT Pos Indonesia, 2022, 2023). Despite this, cross-border complaint rates remained stagnant at approximately 4% and on-time delivery rates hovered around 87%. Pos Malaysia Berhad, implementing the flagship Certified Wira programme and Human Resource Development Corporation (HRD Corp) levy schemes, similarly reported capability gaps at the operational frontline level (Pos Malaysia Berhad, 2023). These cases suggest that higher learning expenditure does not automatically generate stronger cross-border logistics outcomes.

Existing training evaluation approaches remain limited for this problem. Conventional HR evaluation often emphasizes participation, completion, satisfaction, learning scores, or behavioral change, but it rarely traces training expenditure to logistics process efficiency, customer outcomes, and financial accountability. From a Balanced Scorecard (BSC) perspective, learning and growth should strengthen internal business processes, improve customer outcomes, and generate financial performance (Kaplan & Norton, 1992, 1996). When this causal chain is not explicit, training remains treated as a cost center rather than as a measurable human capital investment. This creates a research gap at the intersection of logistics management accounting, human capital investment, and organizational learning. Limited studies have integrated Return on Training Investment (ROTI), lifecycle-based cost tracing, BSC causality, UNESCO’s four pillars, and Senge’s five disciplines into a single framework for evaluating learning investment in ASEAN digital logistics enterprises.

This study addresses this gap with a single research question: How can an Integrated ROTI-DBOM Framework based on the BSC, the four pillars of UNESCO, and Senge’s Five Disciplines reorient training management accounting from a cost center paradigm toward a strategically integrated value center in ASEAN digital logistics enterprises? The objective of this study is to develop an Integrated ROTI-DBOM Framework that reclassifies training expenditure as a measurable human capital investment rather than a routine operating cost. ROTI provides the investment evaluation logic, DBOM provides the lifecycle cost-tracing structure, and BSC provides the causal link between learning, internal processes, customer outcomes, and financial performance. The framework links training costs to cross-border performance indicators such as cost per shipment, complaint reduction, on-time delivery improvement, customer retention, and revenue impact.

This study offers three contributions. First, theoretically, it integrates UNESCO’s four pillars of learning, Senge’s five disciplines, BSC, DBOM, and ROTI into a unified learning investment framework. Second, methodologically, it proposes a lifecycle-based accounting logic for tracing training expenditure across Design, Build, Operate, and Maintain phases.

Third, managerially, it reframes training from a cost center into a Learning Investment Portfolio linked to measurable cross-border logistics outcomes.

LITERATURE REVIEW

The Philosophy of Learning: UNESCO, Senge, and Implications for Training Accounting

UNESCO's Delors Report (1996), *Learning: The Treasure Within*, articulates four pillars of education for the 21st century as an integrated and inseparable system. Learning to Know refers to the capacity to understand and apply knowledge. In digital logistics, it relates to the mastery of TMS/WMS systems, cross-border regulatory frameworks, and data analytics. Learning to Do refers to practical competence. It supports cross-border execution such as customs clearance accuracy, route optimization, and complaint resolution. Learning to Be concerns personal development and adaptive judgment. In this study, it is linked to Digital Learning Agility (DLA), or the individual's capacity to learn, unlearn, and re-learn in response to rapidly shifting regulatory and technological environments. Learning to Live Together refers to collaboration across organizational and national boundaries. It forms the foundation for Strategic Customer Relationship Management (S-CRM) across the Indonesia-Malaysia corridor.

Senge (1990, 2006) articulated five disciplines that must be cultivated simultaneously for an organization to become a true learning organization: Systems Thinking, Mental Models, Personal Mastery, Team Learning, and Shared Vision. These disciplines extend UNESCO's individual learning pillars into an organizational learning architecture. In this study, they explain why technical training alone is insufficient. Without systems thinking, shared vision, and team learning, training may increase employee knowledge without changing logistics processes, customer outcomes, or financial performance.

From a management accounting perspective, the inability to measure the financial value of learning investment has been long identified by Cascio (2000) in costing human resources and by Anthony and Govindarajan (2007) in management control systems. The Kirkpatrick model (1959), which evaluates Reaction, Learning, Behavior, and Results, does not by itself provide an explicit causal linkage between training costs as input and CBP financial indicators as output. Phillips (2003) and Phillips and Phillips (2016) offer a partial solution through ROI methodology, but their approach still requires integration with the BSC framework, DBOM lifecycle costing, and the digital logistics context.

The Balanced Scorecard (BSC) as an Integrated Management Accounting Framework

Kaplan and Norton (1992) introduced the BSC as a performance measurement system translating vision and strategy into four causally linked perspectives. Kaplan and Norton (1996) further developed it into a strategic management system in which the causal logic Learning & Growth → Internal Business Process → Customer → Financial constitutes the fundamental value creation logic. Kaplan and Norton (2004), in *Strategy Maps*, identified intangible assets, including human capital, information capital, and organizational capital, as strategic investments that must be managed through explicit causal linkages to financial outcomes.

The relevance to this study lies in the way BSC connects learning expenditure to performance accountability. Training investment in the Learning & Growth perspective should develop logistics HR capability in the Internal Business Process perspective. Improved process capability should strengthen cross-border customer service in the

Customer perspective. Better customer outcomes should then generate measurable ROTI in the Financial perspective. When this causal chain is not made explicit in the management accounting system, the learning investment paradox becomes structurally likely.

For logistics management accounting, the Balanced Scorecard provides the causal architecture through which training expenditure can be translated into operational and financial accountability. Training costs should therefore not be evaluated only through participation rates, learning scores, or behavioral change, but through their traceable contribution to process efficiency, customer outcomes, cost avoidance, and revenue improvement. This accounting logic becomes the foundation for integrating ROTI with DBOM lifecycle costing in the proposed framework.

DBOM as a Lifecycle-Oriented Management Accounting Instrument

Design-Build-Operate-Maintain (DBOM) originates in infrastructure project management, formally codified by the US Federal Highway Administration (FHWA, 2017) and legislatively enabled through the US Intermodal Surface Transportation Efficiency Act (ISTEA, 1991). Although DBOM was originally developed for infrastructure and project delivery, its lifecycle logic is useful for training management accounting. Training investment also passes through identifiable phases: designing capability needs, building learning modules, operating the learning intervention, and maintaining capability through review, updating, and continuous improvement.

DBOM's value as a management accounting instrument lies in its lifecycle orientation. Each phase, Design, Build, Operate, and Maintain, has clearly identifiable cost inputs, standardized processes, and measurable performance outputs. When DBOM phases are mapped to the four UNESCO pillars and four BSC perspectives, training expenditure can be traced from initial capability design to operational and financial outcomes.

Return on Training Investment (ROTI) in Logistics Accounting

ROTI builds on the ROI analysis developed by Phillips (2003), defined as:

$$\text{ROTI} = [(\text{Programme Benefits} - \text{Programme Cost}) / \text{Programme Cost}] \times 100\%$$

Brinkerhoff (2005) reinforced the concept with the Success Case Method, emphasizing the identification of genuine success cases from training investment. Phillips and Phillips (2016) provide techniques for isolating the impact of training from external confounding factors. In the digital logistics context, ROTI must be re-operationalized by measuring programme benefits through CBP indicators, including cost per shipment savings, cost avoidance from complaint rate reduction, and revenue generation from on-time delivery improvement, rather than through post-training knowledge test scores. However, ROTI alone is insufficient if it is treated only as a final financial ratio. It must be embedded in a broader accounting structure that identifies where training costs arise, how learning capabilities are built, and which operational outcomes are expected to change. This is why the present study integrates ROTI with DBOM lifecycle costing and BSC causality.

RESEARCH METHODOLOGY

This study uses a conceptual research design supported by comparative secondary data analysis as summarized in Table 1. This approach is appropriate because the study aims to develop an integrated logistics management accounting framework rather than test statistical relationships. A conceptual design is suitable for this study because the main objective is framework development. The study does not seek to estimate statistical

relationships between training expenditure and logistics performance. Instead, it uses comparative evidence to identify a management accounting problem and to develop a theoretically grounded framework for linking learning investment to cross-border logistics outcomes.

The cases were selected purposively. PT Pos Logistik Indonesia and Pos Malaysia Berhad were chosen because both operate in ASEAN logistics markets, are linked to national postal and logistics systems, have implemented structured employee learning initiatives, and disclose relevant information on training, capability development, and logistics performance. The comparison also provides useful regional contrast between Indonesia and Malaysia, particularly in terms of learning investment disclosure, digital logistics capability, and cross-border service performance.

Table 1. Secondary Data Sources

Data source	Period	Data used	Purpose
PT Pos Indonesia annual reports	2021-2023	Training expenditure, number of training programs, HR development information	Identify learning investment trend
Pos Malaysia Berhad annual report	2023	Certified Wira programme, HRD Corp learning initiatives, operational capability issues	Compare learning investment practice
MCMC and logistics industry reports	2022-2025	Delivery performance, logistics benchmarks, cross-border service indicators	Assess logistics performance context
Academic literature	1959-2025	ROTI, DBOM, BSC, UNESCO learning pillars, Senge's five disciplines	Build the conceptual framework

The analysis was conducted in three stages. First, the study identified the learning investment paradox by comparing learning investment indicators, such as training expenditure, number of training programs, and capability development initiatives, with cross-border performance indicators, including on-time delivery, complaint rate, customer satisfaction, cost efficiency, and delivery performance. Second, the study examined the limitations of conventional training evaluation from a Balanced Scorecard and management accounting perspective, especially the weak linkage between training outcomes and internal process, customer, and financial performance. Third, the study developed the Integrated ROTI-DBOM Framework by synthesizing Return on Training Investment, the Design-Build-Operate-Maintain lifecycle, the Balanced Scorecard, UNESCO's four pillars of learning, and Senge's five disciplines. This method provides a theoretical and comparative basis for reorienting training management accounting from a cost-center approach toward a value-based learning investment framework.

Data triangulation was conducted by comparing information from company annual reports, regulatory and industry reports, and academic literature. Company reports were used to identify learning investment and capability development practices. Industry and regulatory sources were used to contextualize logistics performance indicators. Academic literature was used to construct and justify the conceptual framework. This triangulation reduces reliance on a single source and strengthens the analytical basis of the comparison. To reduce interpretation bias, the analysis followed a predefined analytical structure based on the Balanced Scorecard perspectives, DBOM lifecycle phases, and ROTI logic. Each

organization was examined using equivalent dimensions: learning investment, internal business process capability, customer performance, and financial accountability. The study also avoids claiming direct statistical causality because the available data do not permit causal testing. Instead, the findings are interpreted as indicative evidence of a mismatch between learning investment and cross-border logistics performance.

Research Limitations and Validity Considerations

This study has several limitations. First, it relies on secondary data, which limits access to internal training records, operational dashboards, employee-level learning outcomes, and unpublished financial data. Second, the two organizations differ in the level of disclosure, especially regarding detailed training expenditure and cross-border performance indicators. Third, some logistics performance indicators are used as operational proxies rather than audited measures of direct training impact. Therefore, the study does not claim that training expenditure directly caused changes in cross-border logistics performance. The validity of the study rests on analytical generalization rather than statistical generalization. The proposed ROTI-DBOM Framework is developed from theory and comparative evidence, but it requires future empirical testing through primary data, longitudinal analysis, and pilot implementation in logistics business units. These limitations are consistent with the study's conceptual purpose and provide a basis for future research.

RESULTS AND DISCUSSION

Theme 1: Learning Investment Paradox in ASEAN Logistics

This section presents indicative empirical evidence of the learning investment paradox in two ASEAN logistics enterprises. The evidence is based on secondary data compiled from company annual reports, logistics industry publications, and regulatory or institutional reports. Since this study does not use primary operational data, the figures are interpreted as comparative indicators rather than audited measurements of direct causal impact. The purpose of the analysis is to show the existence of a mismatch between increasing learning investment and relatively stagnant cross-border performance outcomes.

Table 2 presents the learning investment paradox at PT Pos Logistik Indonesia. The data indicate that training expenditure increased from IDR 2.84 billion in 2021 to IDR 3.91 billion in 2023, while the number of training programs increased from 142 to 172 programs. However, key cross-border performance indicators did not show proportional improvement. The cross-border on-time delivery rate remained around 87%, the complaint rate remained around 4%, the customer satisfaction index stayed relatively stable, and cost per shipment efficiency showed no meaningful improvement. This pattern suggests a weak linkage between learning investment and cross-border performance outcomes. From a Balanced Scorecard perspective, the Learning and Growth perspective does not appear to be clearly translated into stronger internal process, customer, or financial results.

Table 2. Learning Investment Paradox and Cross-Border Performance of PT Pos Logistik Indonesia, 2021-2023

Indicator	2021	2022	2023	Trend
Training Expenditure (IDR billion)	2.84	3.45	3.91	Increasing
Number of Training Programs	142	158	172	Increasing
Average Cost/Employee (IDR million)	1.12	1.38	1.56	Increasing
Cross-Border On-Time Delivery Rate (%)	87.2	86.8	87.1	Stagnant

Cross-Border Complaint Rate (%)	4.1	4.3	4.0	Stagnant
Customer Satisfaction Index (CSI)	74.2	73.8	74.5	Stagnant
Cost per Shipment Efficiency (index)	100	101	100	Stagnant

Source: Compiled by the authors from PT Pos Indonesia Annual Reports 2021-2023 and relevant ASEAN logistics industry data. Training expenditure and programme indicators are based on company-reported HR development information, while cross-border performance indicators are used as operational proxies for Balanced Scorecard customer and financial perspectives.

Complementary evidence is observed in Pos Malaysia Berhad. Unlike PT Pos Logistik Indonesia, Pos Malaysia discloses learning investment mainly through programme achievements and capability development initiatives rather than detailed training expenditure figures. Through the Certified Wira programme and HRD Corp levy-based learning initiatives, Pos Malaysia has implemented a more structured approach to employee capability development. Operationally, Pos Malaysia has reported strong delivery performance, including 96% guaranteed delivery performance compared with the industry average of 78% (MCMC, 2022; Malay Mail, 2023). However, its annual report also indicates continuing capability gaps at the operational frontline level, particularly in adapting to digital logistics requirements and changing cross-border service demands. The comparison shows that the paradox is not simply a problem of low training expenditure. PT Pos Logistik Indonesia shows rising expenditure but stagnant cross-border indicators. Pos Malaysia Berhad shows a more structured capability programme, but still faces frontline capability gaps. The common weakness is the absence of a formal accounting mechanism that links training expenditure to operational capability, customer outcomes, and financial value.

Theme 2: Failure of Conventional Training Evaluation Systems

The evidence points to a limitation in conventional training evaluation. Training is often evaluated through input and activity indicators such as budget size, number of programmes, participation, completion, and post-test results. These indicators are useful, but they do not show whether learning investment changes logistics performance. In cross-border logistics, the more relevant question is whether training reduces customs clearance errors, shortens delivery response time, lowers complaint rates, improves customer retention, or reduces cost per shipment. This failure is partly organizational. HR units usually manage training records, while operations units manage service performance data, and accounting units manage cost classification. When these data remain separate, training cannot be traced to cross-border performance outcomes.

As a result, learning expenditure remains visible as a cost, but its contribution to logistics value creation remains invisible. The Indonesian and Malaysian cases also suggest different forms of the same structural problem. PT Pos Logistik Indonesia appears to emphasize training volume and expenditure, but the linkage to customer and financial indicators remains weak. Pos Malaysia Berhad appears to have a more formal capability development structure, but available disclosures do not show a formal ROTI-CBP calculation. Therefore, both cases point to a need for a more explicit learning investment architecture.

Theme 3: ROTI-DBOM as a Strategic Management Accounting Solution

Figure 1 presents the Integrated ROTI-DBOM Framework proposed in this study. To avoid conceptual overlap, the framework is organized into three analytical layers. The first

layer is the core management accounting layer, which consists of Return on Training Investment (ROTI), the Design-Build-Operate-Maintain (DBOM) lifecycle, and the Balanced Scorecard causal chain. This layer explains how training costs are classified, traced, and linked to financial and non-financial performance outcomes. The second layer is the learning foundation layer, which consists of UNESCO's four pillars of learning and Senge's five disciplines of a learning organization. This layer explains the types of learning capabilities that should be developed so that training investment does not focus only on technical skills, but also on knowledge development, personal mastery, collaboration, and systems thinking.

The third layer is the operational logistics layer, which consists of Digital Learning Agility (DLA), Dynamic Digital Capability (DDC), Strategic Customer Relationship Management (S-CRM), microlearning, and cross-border performance indicators. This layer translates the accounting and learning foundations into measurable logistics practices, including on-time delivery, complaint reduction, customer satisfaction, cost efficiency, and revenue improvement. The framework addresses the learning investment paradox by assigning a specific role to each concept. ROTI evaluates financial return. DBOM traces costs across the training lifecycle. BSC links learning to internal process, customer, and financial outcomes. UNESCO and Senge define the learning capabilities that should be developed. DLA, DDC, S-CRM, and microlearning translate these foundations into digital logistics practices. This structure prevents the framework from becoming a loose combination of theories.



Figure 1. Integrated ROTI-DBOM Framework

Source: Adapted from Kaplan & Norton (1996); Delors/UNESCO (1996); Senge (1990) and FHWA (2017)

Table 3 operationalizes how the four BSC perspectives, four UNESCO pillars, and ROTI-DBOM elements integrate into a coherent management accounting framework. The causal logic follows Senge's proposition: superior learning (Learning & Growth perspective; Know + Be pillars) generates superior operational process capability (Internal Business Process; Do pillar), which builds superior cross-border customer relationships

(Customer; Live Together pillar), which ultimately produces measurable ROTI (Financial perspective).

Table 3. Layered Integration of ROTI-DBOM, Balanced Scorecard, Learning Foundations, and Cross-Border Performance Indicators

BSC Perspective	UNESCO Pillar of Learning	ROTI-DBOM Element	Related CBP Indicator	DBOM Phase
Financial (ROTI)	Financial outcome	$ROTI = [(\Delta Rev + \text{Cost Avoid} + \text{Cost Save}) - \text{DBOM Cost}] / \text{DBOM Cost} \times 100\%$	Cost/shipment efficiency; revenue from on-time delivery improvement	Maintain: Financial KPIs
Customer (S-CRM)	Learning to Live Together	S-CRM: digital logistics customer mobilization	Complaint rate $\leq 2\%$; CSI; customer retention; on-time delivery $\geq 95\%$	Operate: DDC Seizing
Internal Business Process	Learning to Do	DDC: sensing, seizing, transforming; DBOM operational cycle	Cross-border SLA; customs clearance speed; digital workflow accuracy	Operate: DDC Sensing and Transforming
Learning & Growth	Learning to Know + Learning to Be	DLA: Digital Learning Agility; microlearning	Completion rate $\geq 80\%$; DLA score; DDC score post-intervention	Design and Build: DLA + microlearning

Source: Adapted from Kaplan & Norton (1996, 2004); Delors/UNESCO (1996); Senge (1990, 2006); Phillips (2003)

Table 4 maps training costs per DBOM phase into measurable ROTI indicators. This mapping is important because it converts training from a one-time HR activity into a lifecycle-based accounting object. Each phase has a cost input, expected capability output, and related performance indicator. The ROTI formula proposed for the digital logistics accounting context is:

$$ROTI (\%) = [(\Delta \text{Revenue} + \text{Cost Avoidance} + \text{Cost Savings}) - \text{Total DBOM Cost}] / \text{Total DBOM Cost} \times 100\%$$

Table 4. DBOM Cost Mapping, CBP Outputs, and ROTI Indicators Grounded in UNESCO and Senge

DBOM Phase	Cost Input (Accounting)	Measurable CBP Output	ROTI Indicator and UNESCO / Senge Link
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Design (Weeks 1-4)	DLA assessment and curriculum design costs	Competency gap map; Personal Learning Journey; baseline DLA score	Learning to Know: digital logistics knowledge foundation; cost per employee assessed
Build (Weeks 5-8)	Microlearning module production	Modules available; completion rate; post-test score	Learning to Do: conversion of learning agility into operational competence
Operate (Weeks 9-12)	DDC simulation and Community of Practice costs	DDC score; cross-border response time; data-based decisions	Learning to Be: development of adaptive logistics professionals
Maintain (Ongoing)	Curriculum updates and capability audit costs	On-time delivery; complaint rate; cost per shipment; CSI	Learning to Live Together: bilateral community learning and customer relationship improvement

Source: Adapted from FHWA (2017); Phillips & Phillips (2016); Delors/UNESCO (1996); Senge (1990)

Theme 4: Comparative Interpretation of Indonesia and Malaysia

Table 5 analyzes the four BSC perspectives in learning investment management across both logistics enterprises. The analysis reveals that both organizations share a similar structural gap, namely the absence of an explicit causal chain across the four BSC perspectives in their training accounting frameworks.

Table 5. Comparative BSC Analysis between PT Pos Logistik Indonesia and Pos Malaysia Berhad

Analytical Dimension	PT Pos Logistik Indonesia	Pos Malaysia Berhad
Training / Learning Investment	IDR 3.912 billion; 172 programs in 2023	HRD Corp levy scheme; Certified Wira Programme
Customer Perspective	Cross-border complaint rate around 4%; CSI not linked to ROTI calculation	Strong reported delivery performance, but limited disclosed linkage between customer outcomes and training investment
Internal Business Process	Field operations remain partly manual-reporting dominant; digital sensing capability appears limited	More structured digital logistics capability, but frontline capability gaps remain reported
Learning & Growth	Training investment is visible, but evaluation remains weakly linked to CBP	Competency development is more structured, but ROTI-CBP linkage is not clearly disclosed

Financial Perspective	Training appears treated mainly as a cost center; no explicit ROTI calculation linked to CBP	Training appears treated as HR investment; no formal ROTI-CBP linkage is disclosed
Core BSC Gap	Weak causal link across learning, process, customer, and financial perspectives	Weak formal linkage between capability programmes and measurable CBP financial outcomes
ROTI-DBOM Recommendation	Reorient training accounting toward a value-center model	Use ROTI-DBOM to complement existing capability development with measurable CBP outcomes

Source: PT Pos Indonesia (2022, 2023); Pos Malaysia Berhad (2023); Malay Mail (2023); ASEAN Secretariat (2025)

The comparison shows both similarity and difference. PT Pos Logistik Indonesia discloses clearer training expenditure and programme volume, but the available indicators suggest limited translation into cross-border service improvement. Pos Malaysia Berhad appears to have a more structured capability development model, but the available disclosures still do not show how training investment is converted into ROTI. Therefore, the difference is not simply that one organization invests more effectively than the other. The deeper issue is that neither case shows a fully integrated accounting system connecting learning expenditure to cross-border performance and financial outcomes.

Figure 2 presents the causal model linking the Learning & Growth perspective (DLA as Learning to Know + Be) with the Internal Business Process perspective (DDC as Learning to Do) and the Customer perspective (CBP as Learning to Live Together), all of which collectively generate ROTI as the Financial perspective outcome.

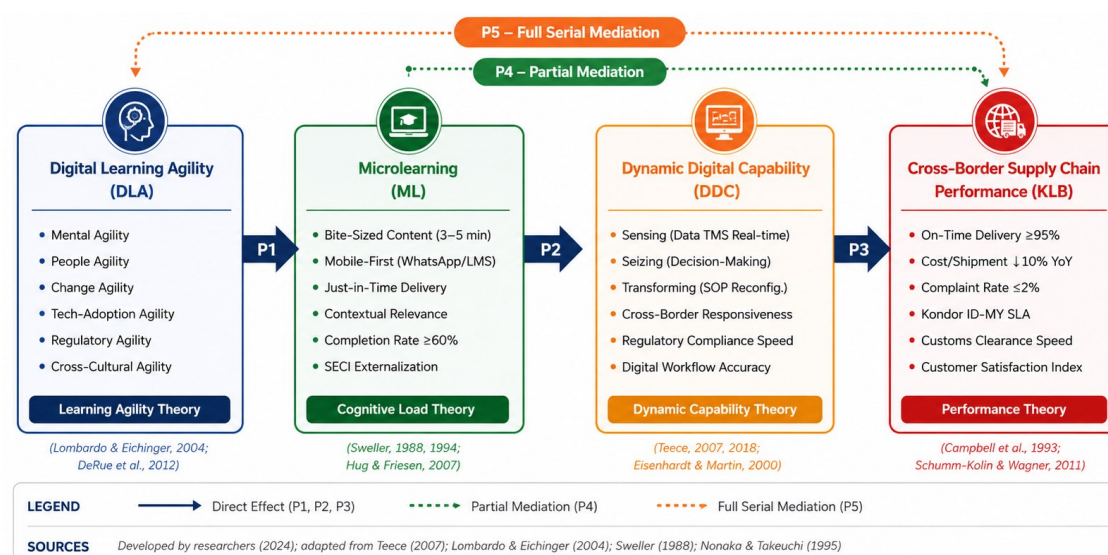


Figure 2. Causal ROTI Model: DLA (Know + Be) → Microlearning (Do) → DDC (Do + Be) → CBP (Live Together) → ROTI (Financial)

Source: Adapted from Teece (2007); Senge (1990); Delors/UNESCO (1996)

Theme 5: Learning Portfolio Architecture Beyond Skills Training

The learning investment paradox reflects a deeper conceptual problem in how organizations define and manage learning. In many logistics organizations, learning is reduced to skills training. Investment is concentrated on the Learning to Do pillar, such as TMS/WMS operation, customs procedures, shipping protocols, and complaint handling. These skills are necessary, but they are insufficient for digital and cross-border logistics performance. Conceptually, learning is a broader construct than training. UNESCO affirms that education rests on four interdependent pillars (Delors, 1996). In practice, however, corporate HRM in logistics organizations channels learning investment mainly toward technical and procedural competence.

This creates an incomplete learning architecture. Learning to Know is needed for regulatory understanding, data interpretation, and digital systems literacy. Learning to Be is needed for adaptability, judgment, and self-directed learning. Learning to Live Together is needed for cross-border coordination, customer relationship management, and inter-organizational collaboration. When these pillars are underfunded or unmeasured, training may improve technical competence without improving system-level logistics performance.

Senge's Five Disciplines as Organizational Barriers

Senge (1990) identifies five disciplines that must be cultivated simultaneously for an organization to achieve and sustain superior performance. Each discipline corresponds to a dimension of learning investment that remains underdeveloped in conventional training budgets. Systems Thinking is needed because cross-border logistics problems are interconnected. A customs clearance delay can affect customer satisfaction, retention, revenue, and future investment capacity. Without systems thinking, employees may respond to symptoms rather than root causes. Mental Models are important because employees may view their role as procedural execution rather than adaptive problem solving. This limits digital capability, especially when regulations, customer expectations, and logistics technologies change.

Personal Mastery supports Learning to Be. It develops self-directed learning, professional judgment, and resilience. These capabilities are difficult to measure through conventional post-training tests, but they affect long-term digital adaptation. Team Learning supports Learning to Live Together. In cross-border logistics, this may take the form of bilateral Communities of Practice between Indonesian and Malaysian logistics actors. Such networks can improve problem solving, service coordination, and customer response. However, conventional training budgets often do not allocate clear resources for maintaining these learning networks. Shared Vision aligns training investment with strategic objectives. Without shared vision, each unit may train for its own short-term needs. This fragments learning expenditure and weakens the BSC causal chain.

Management Accounting Implications: From Training Budget to Learning Investment Portfolio

The Integrated ROTI-DBOM Framework implies three reconfigurations in the management accounting system of logistics enterprises. First, the chart of accounts should distinguish training expenditure by DBOM phase and learning pillar. This would allow managers to identify whether spending is concentrated only on technical training or distributed across broader learning capabilities. Second, management reports should integrate BSC and ROTI indicators. A BSC-ROTI dashboard would link training cost, process capability, customer outcomes, and financial performance in one reporting structure. Third, training budgeting should move from incremental budgeting toward

value-based budgeting. Budget approval should consider expected capability outcomes, operational improvements, and ROTI estimates for each training component. These changes shift training from a cost-center logic to a value-center logic. The accounting system would no longer record only how much was spent on training. It would also show what capability was developed, which logistics process changed, which customer outcome improved, and what financial value was created.

Learning Investment Portfolio

The proposed Learning Investment Portfolio extends the management accounting implication further. Instead of allocating training budgets mainly by department, programme, or employee group, logistics enterprises should classify learning investment according to capability type and expected performance contribution. Investment in Learning to Know and Systems Thinking can generate value through better diagnosis of bottlenecks, route decisions, and regulatory risks. Investment in Learning to Be and Personal Mastery can generate value through adaptability and retention of digitally capable employees. Investment in Learning to Live Together and Team Learning can generate value through better cross-border coordination, customer relationship management, and shared problem solving. These forms of value are often ignored when training is treated only as an operating expense. Accordingly, the learning investment paradox is best understood as a failure of investment architecture rather than investment magnitude. ASEAN logistics enterprises may not only need more training. They need a better accounting structure for deciding what kind of learning to fund, how to trace its cost, and how to evaluate its contribution to cross-border logistics performance.

CONCLUSION

This study identifies a learning investment paradox in logistics management accounting: rising learning investment at PT Pos Logistik Indonesia (IDR 3.912 billion; 172 programs, 2023) and Pos Malaysia Berhad (Certified Wira programme; HRD Corp levy) has not been clearly linked to proportional improvements in cross-border performance (CBP). This paradox reflects a weak causal connection between training expenditure, operational capability, customer outcomes, and financial accountability. It also reflects a narrow learning investment architecture that tends to emphasize Learning to Do, while giving less attention to Learning to Know, Learning to Be, and Learning to Live Together. The main finding is that increasing training expenditure alone does not automatically improve digital logistics performance. The problem lies not only in the amount of investment, but also in how learning investment is designed, classified, traced, and evaluated. Without an explicit accounting structure, training remains visible as a cost but invisible as a source of logistics value creation.

The Integrated ROTI-DBOM Framework proposed in this study advances three contributions to logistics management accounting. First, it contributes theoretically by positioning Senge's (1990) five disciplines and UNESCO's four pillars (Delors, 1996) as the foundational architecture of a learning investment system that integrates the Learning & Growth perspective with the Internal Business Process, Customer, and Financial perspectives in an explicit BSC causal chain. Second, it contributes methodologically by providing a ROTI-DBOM instrument that links per-phase training costs across Design (Know), Build (Do), Operate (Be), and Maintain (Live Together) to measurable CBP financial indicators. Third, it contributes managerially by recommending the reconfiguration of chart of accounts, a BSC-ROTI dashboard, and value-based budgeting as three operational steps in the transformation from cost center to value center and from

conventional training budget to Learning Investment Portfolio.

This study has limitations. It uses a conceptual research design supported by comparative secondary data analysis. Therefore, it does not claim direct statistical causality between learning investment and CBP outcomes. The evidence should be interpreted as indicative rather than conclusive. Access to internal training records, employee-level learning outcomes, operational dashboards, and audited cross-border performance data would be needed to validate the framework empirically. The recommended empirical research agenda includes: (1) a pilot implementation of the ROTI-DBOM framework in one PT Pos Logistik Indonesia business unit; (2) development of a management information system integrating TMS/WMS data with a ROTI-BSC dashboard; and (3) a comparative study across ASEAN state-owned logistics enterprises to develop a standardized ROTI reporting framework grounded in the four UNESCO pillars. Future studies should also apply longitudinal analysis to examine whether changes in learning investment architecture produce measurable changes in complaint rates, on-time delivery, cost per shipment, customer retention, and revenue contribution.

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