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Beyond Internal Reflection: External Environmental Antecedents of Triple-Loop Learning in Higher Education Institutions

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Abstract

Organizational learning in universities has traditionally been studied as an internally generated process, driven by leadership reflection, professional development and cultural renewal. This article argues that such an internal focus is incomplete, and that deeper forms of institutional learning are frequently activated by conditions originating outside the university. Drawing on triple-loop learning theory, open-systems thinking and the Burke–Litwin model of organizational performance and change, the study develops and tests a conceptual framework in which the external environment functions as an antecedent of triple-loop learning and its transformational, transactional and individual/personal dimensions. Using a cross-sectional, positivist survey design, data were collected from a stratified random sample of 168 university stakeholders (from a population of 1,683) using the 48-item Burke–Litwin Survey. Descriptive, correlational and regression analyses were used to examine the proposed relationships. The findings are discussed in relation to triple-loop learning theory, open-systems thinking and prior empirical research on organizational change in higher education. The article contributes a theoretically integrated account of triple-loop learning as an environmentally embedded, rather than purely internal, organizational process, and offers practical implications for how universities might use environmental scanning as a deliberate trigger for deeper institutional reflection.

Keywords: Triple-Loop Learning, Open-Systems Theory, Burke–Litwin Model, External Environment, Higher Education, Organizational Learning, Organizational Change.

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1. Introduction

Higher education institutions operate today under conditions of change that are markedly different from those of even a decade ago. Funding regimes are tightening or shifting in structure, regulatory and quality-assurance bodies are revising their expectations with increasing frequency, technological disruption is reshaping how teaching, research and administration are conducted, and societal expectations of what a university education should deliver continue to evolve. Universities can no longer be understood as insulated, self-referential communities that adapt on their own terms and at their own pace. Instead, they are embedded within a wider environment whose pressures increasingly shape what universities do, how they do it, and, more fundamentally, how they think about what they do (Brankovic & Cantwell, 2022; Sporn & Godonoga, 2024).

Organizational learning theory has long distinguished between different depths of adaptation. At the most basic level, single-loop learning describes the correction of actions within an existing set of goals, norms and operating assumptions: an error is detected, and behavior is adjusted, without any interrogation of the assumptions that produced the error in the first place. Double-loop learning goes further, involving the questioning and potential revision of the underlying strategies, policies and assumptions that guide organizational action. Beyond both of these lies a third, less frequently studied depth of learning, commonly referred to as triple-loop learning, in which the very norms, values, governing principles and ways of learning shape organizational behavior are themselves brought into question. Triple-loop learning is not simply “learning more” or “learning faster”; it concerns a qualitative shift in how an organization and its members understand what worth learning is, why, and on what terms (Fahrenbach & Kragulj, 2022; Kwon et al., 2026).

For universities, triple-loop learning has considerable significance. Many of the pressures now facing higher education, such as the erosion of traditional funding models, the growing presence of alternative credentialing providers, shifting expectations around graduate employability, and the increasing salience of digital and artificial intelligence technologies in both teaching and administration, are not problems that can be resolved through incremental correction alone. They call into question long-held assumptions about the purpose of the university, the nature of academic work, and the relationship between the institution and the societies it serves. Understanding when and how such deeper learning is triggered is therefore a matter of both theoretical and practical importance (Crompton & Burke, 2023; Géring et al., 2025; UNESCO, 2023).

Despite the conceptual richness of the triple-loop learning literature, empirical research in this area remains limited, and what does exist has tended to treat triple-loop learning as an internally generated phenomenon, arising from leadership vision, reflective practice or deliberate organizational development interventions. Far less attention has been given to the possibility that triple-loop learning is, at least in part, a response to conditions originating outside the organization. This is a notable gap, since organizational learning theory itself has long acknowledged that organizations are open systems, continuously exchanging resources, information and legitimacy with their external environment, and that internal organizational processes cannot be fully understood in isolation from the environmental conditions that surround them (Kwon et al., 2026; Rodríguez-Ponce et al., 2024).

This article addresses that gap by examining whether, and to what extent, external environmental conditions function as an antecedent of triple-loop learning among university stakeholders. It does so by integrating triple-loop learning theory with open-systems thinking and the Burke–Litwin model of organizational performance and change, the latter providing both a well-established

theoretical logic linking external environment to organizational and individual outcomes, and a validated instrument through which the relevant constructs can be measured. The purpose of the study is threefold: first, to develop a conceptual framework in which external environment is positioned as an antecedent of triple-loop learning and its transformational, transactional and individual/personal dimensions; second, to test the proposed relationships empirically using data collected from university stakeholders; and third, to interpret the resulting evidence in a way that clarifies the mechanisms through which external pressures translate into deeper institutional learning. In doing so, the article contributes a more environmentally grounded account of triple-loop learning in higher education and offers universities a basis for treating environmental change not merely as a threat to be managed, but as a potential trigger for institutional reflection and renewal (Brankovic & Cantwell, 2022; Elbawab, 2024).

2. Theoretical Grounding

2.1 Triple-Loop Learning Perspective

The conceptual starting point for this study is the distinction between different depths, or loops, of organizational learning. The foundational formulation, developed by Argyris and Schön, distinguishes between single-loop and double-loop learning. Single-loop learning involves the detection and correction of error within an existing framework of goals, values and strategies: actions are adjusted so that outcomes fall back within an acceptable range, but the framework itself is left unexamined. Double-loop learning involves a further step, in which the underlying strategies, policies and governing assumptions are themselves reconsidered and, where necessary, revised. Double-loop learning is therefore learning about the frameworks that guide action, rather than learning only within them (Fahrenbach & Kragulj, 2022; Kwon et al., 2026).

The idea of a third, deeper loop of learning has its conceptual roots in Bateson's work on levels of learning and has since been elaborated by a number of scholars under the label of triple-loop learning. Where double-loop learning questions strategies and policies, triple-loop learning questions the underlying beliefs, values, norms and governing systems that determine how learning itself takes place within the organization. It is, in effect, learning about how the organization learns: an interrogation of deeper assumptions, worldviews and institutional identity that shape what the organization is prepared to notice, question and change in the first place. Because it operates at the level of values and worldview rather than at the level of action or strategy, triple-loop learning is inherently more difficult to initiate and sustain than either single- or double-loop learning and is correspondingly rarer in practice (Fahrenbach & Kragulj, 2022; Kwon et al., 2025; Kwon et al., 2026).

Applied to the higher education context, triple-loop learning implies that university stakeholders, whether academic leaders, heads of department, faculty or administrative staff, may at times be required to reconsider not merely how a task is performed (single-loop) or which policy governs it (double-loop), but the deeper assumptions about the purpose, identity and legitimating values of the institution itself (triple-loop). Reforming a quality-assurance procedure in response to regulatory change is an example of double-loop learning; reconsidering the institution's fundamental assumptions about what constitutes a legitimate university education, in response to sustained external pressure, moves the process into triple-loop territory. It is this deeper, value-level learning process, and its relationship to conditions external to the institution, that forms the central concern of the present study (Kwon et al., 2025; Kwon et al., 2026).

2.2 Open-Systems Perspective

If triple-loop learning theory explains the depth at which organizational learning can occur, open-systems theory provides theoretical rationale for treating the external environment as a meaningful antecedent of that learning. Open-systems theory conceptualizes organizations not as closed, self-contained entities but as systems that continuously import resources, information and legitimacy from their environment, transform them through internal processes, and export outputs back into that environment. Because organizations depend on their environment for the resources and legitimacy needed to survive, they are, by definition, sensitive to environmental change, and internal organizational processes cannot be adequately explained without reference to the external conditions surrounding them (Brankovic & Cantwell, 2022; Sporn & Godonoga, 2024).

Universities are a particularly clear illustration of open systems. They depend on government and regulatory bodies for funding, accreditation and license to operate; on economic conditions for student demand, philanthropic support and graduate labor-market outcomes; on technological developments for the tools and platforms through which teaching, research and administration are conducted; on social and demographic changes for the composition and expectations of the student body; on political pressures for the policy environment within which they operate; on professional and disciplinary bodies for the standards against which programs are benchmarked; and on competitive dynamics within the higher education sector itself. None of these environmental domains is static and shifts within any one of them can create pressures that ripple through the institution, unsettling established practices and, at times, the assumptions on which those practices rest (Sporn & Godonoga, 2024; Brankovic & Cantwell, 2022).

From an open-systems perspective, then, environmental turbulence is not merely a background condition against which universities happen to operate; it is an active input into organizational processes, capable of destabilizing existing routines and creating the conditions under which deeper reconsideration of institutional assumptions becomes necessary. It is a theoretical link between external environment and triple-loop learning, in this case, external pressures are treated not as a contextual variable (as per the conventional model) but as a substantive antecedent that can stimulate value level questioning as described in the triple-loop learning theory (Brankovic & Cantwell, 2022; Sporn & Godonoga, 2024).

2.3 Burke–Litwin Model as the Theoretical and Measurement Foundation

Triple-loop learning theory can account for the depth of learning, open-systems theory can account for the importance of environmental conditions, but there is a need for a theory to account for how environmental conditions become organizational and individual outcomes. The study adopts the Burke–Litwin model of organizational performance and change which was developed by Burke and Litwin as a causal model between external and internal factors of the organization and individual and organizational performance (Brankovic & Cantwell, 2022; Elbawab, 2024).

The Burke–Litwin model conceptualizes organizational functioning as shaped by a set of interrelated factors operating at different levels. The external environment is positioned as the broadest, most encompassing factor in the model, exerting influence on both transformational factors, such as leadership, mission and strategy, organizational culture and individual and organizational performance, and transactional factors, such as structure, systems, management practices and organizational climate. Transformational factors are associated with fundamental, often discontinuous organizational change, typically triggered by shifts in the external environment; transactional factors are more closely associated with the day-to-day functioning of

the organization and are more amenable to incremental adjustment. Both sets of factors, in turn, shape individual-level attitudes, motivation and behavior, which the model treats as proximal determinants of performance (van den Hende et al., 2023; Sporn & Godonoga, 2024).

It is important to be precise about how the Burke–Litwin model is being used in this study. The model is not itself a theory of triple-loop learning, and no such claim is advanced here. Rather, Burke–Litwin provides the organizational change framework and, through the associated Burke–Litwin Survey, the measurement foundation for operationalizing external environment and its transformational, transactional and individual/personal correlates. Triple-loop learning theory supplies the conceptual lens through which the resulting relationships are interpreted as instances of deeper organizational learning, while open-systems theory supplies the rationale for treating the external environment as a meaningful antecedent in the first place. Used together, the three perspectives yield a coherent theoretical chain: external environmental conditions create pressures that manifest through transformational and transactional organizational responses; these responses shape individual stakeholder perceptions and behavior; and, under the conditions specified by triple-loop learning theory, this process can extend to the questioning of the deeper assumptions, values and norms that govern organizational behavior.

This chain, external environment → organizational and individual responses → deeper learning and reconsideration of governing assumptions, provides the theoretical logic that underpins the conceptual framework developed in the next section (Brankovic & Cantwell, 2022; Kang et al., 2022).

2.4. Conceptual Framework

2.4.1 Development of the Conceptual Framework

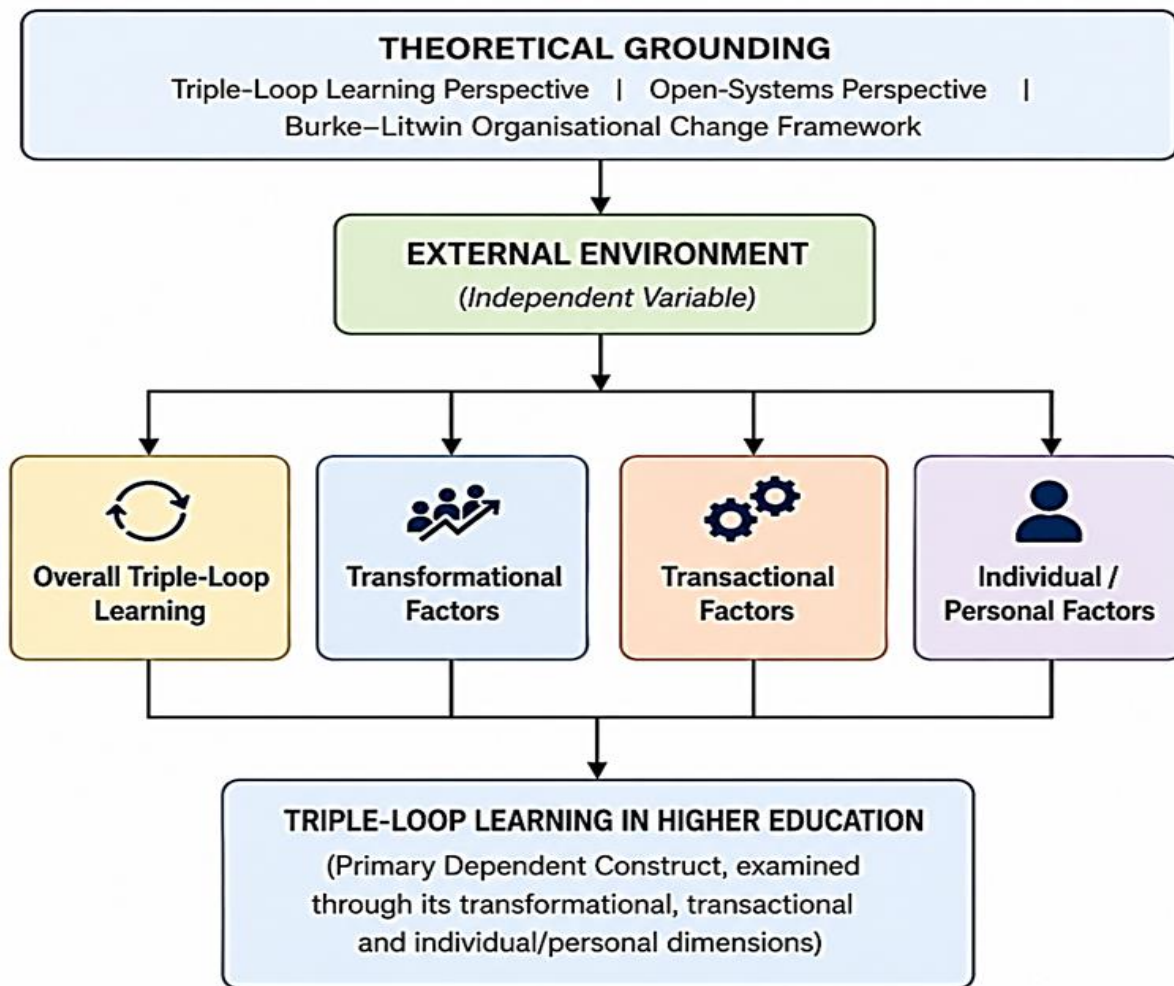
The conceptual framework guiding this study was developed by integrating the three theoretical perspectives outlined above, each of which contributes to a distinct and necessary element. Triple-loop learning theory explains the depth of organizational learning of interest in this study, distinguishing it from the shallower, more commonly studied forms of single- and double-loop learning. Open-systems thinking explains why organizational learning, at any depth, cannot be treated as a purely internal phenomenon, and provides the theoretical justification for positioning external environmental conditions as a meaningful antecedent rather than a background variable. The Burke–Litwin organizational change framework, together with its associated survey instrument, provides the basis for examining the external environment alongside its organizational and individual correlates in a way that is both theoretically grounded and empirically tractable (Rodríguez-Ponce et al., 2024; Elbawab, 2024).

Integrating these three perspectives, the framework proposes that external environmental conditions function as an antecedent of triple-loop learning within higher education institutions, with this relationship expressed both directly, through an overall association between external environment and triple-loop learning, and indirectly, through the transformational, transactional and individual/personal dimensions that make up the broader triple-loop learning construct. This framing treats the transformational, transactional and individual/personal elements not as separate outcomes unrelated to one another, but as dimensions through which the overall triple-loop learning response to external environmental conditions can be observed and examined (Kwon et al., 2026; Sporn & Godonoga, 2024).

2.4.2 Conceptual Relationships

The conceptual framework distinguishes clearly between the independent variable, the dependent construct, and the dimensions through which that construct is examined. External environment is treated as the independent variable: the set of conditions originating outside the institution, encompassing regulatory, economic, technological, social, political, professional and competitive pressures. Triple-loop learning is treated as the primary dependent construct: the depth of organizational learning concerned with the questioning of underlying assumptions, values, norms and governing principles. Transformational, transactional and individual/personal factors are treated as dimensions of this dependent construct, capturing, respectively, the more fundamental, discontinuous organizational responses associated with leadership, culture, mission and strategy; the more routine, structural and procedural responses associated with systems, structure and management practice; and the individual-level perceptions, motivation and behavioral responses of university stakeholders. The three theoretical perspectives, triple-loop learning theory, open-systems thinking and the Burke–Litwin organizational change framework, together provide the theoretical grounding from which this structure is derived, rather than functioning as variables in their own right. Figure 1 presents the proposed conceptual framework in schematic form (Elbawab, 2024; Rodríguez-Ponce et al., 2024).

Figure 1: *Conceptual Framework*



Positioning the framework in this way, with external environment as the sole independent variable and triple-loop learning as the primary dependent construct examined through three internal dimensions, rather than as four separate and unrelated dependent variables, produces a more parsimonious and theoretically coherent model, and one that is more readily reconciled with the way the relationships are subsequently tested.

2.5. Literature Review and Hypothesis Development

2.5.1 External Environment and Triple-Loop Learning

The literature on organizational learning consistently points to the role of turbulence in the environment as a catalyst for greater reflection and learning in the organization. With stable environmental conditions, there is not much motivation for organizations to challenge the assumptions for the way they are doing things, and single-loop correction is usually enough to keep things going. But in times of turbulence, when regulatory changes, economic disruptions, new innovations, new competitive threats, and changing societal expectations all come into play, the validity of the existing assumptions cannot be assumed. Practices that worked well may no longer work well, and when the gap between practice and outcomes is no longer acceptable, organizations may be driven into a re-evaluation of their practice in terms of the assumptions, values and principles that led to the gap in the first place (Kwon et al., 2026; Brankovic & Cantwell, 2022).

This dynamic has become more prominent in the universities. New quality-assurance and accountability mandates have been imposed by regulatory entities, funding sources have changed due to economic pressures, and the nature of pedagogy and assessment has been impacted by the adoption of new technologies, such as the expansion of online and hybrid delivery and more recently, generative AI. Competition, from other universities and from alternative credentialing providers as well, has grown stronger. These pressures can all cause incremental change, but they can also question the underlying beliefs, assumptions and prevailing culture that inform institutional practice, the very type of transformational change that is the focus of triple-loop learning theory. Therefore, this study suggests that there is a direct relationship between external environmental factors and triple-loop learning, which is formulated in the following hypothesis: External environmental factors are directly proportional to triple-loop learning (Crompton & Burke, 2023; Géring et al., 2025; UNESCO, 2023; Sporn & Godonoga, 2024).

H01: There is no significant relationship among the triple-loop learning and external environment.

2.6 External Environment and Transformational Factors

The Burke–Litwin factors that are more basic and sometimes discontinuous in the functioning of an organization are called the "transformational factors": leadership, mission and strategy, organizational culture, and others. These are the most obvious and direct causes for organizations needing to rethink their ways of doing business and their nature and identity, when they need to do so. The Burke-Litwin model places the external environment as the most important influence on transformational change because external conditions are generally what trigger transformational change, things that the organizational order cannot cope with and deal with (van den Hende et al., 2023; Kang et al., 2022).

Strategic priorities, the institution's mission, its expectations of society, its notions of academic autonomy, the balance between research and teaching, and the institution's relationship with

industry and community stakeholders are some of the aspects of organizational culture that may be questioned as a result of environmental pressures in the university context. These are just the types of reconsiderations that triple-loop learning is focused on, and transformational factors are one of the keyways in which environmental pressures are likely to lead to more fundamental organizational learning. This results in the second hypothesis, which is:

H02: External environment is not a significant predictor of the factors in transformational.

2.7 External Environment and Transactional Factors

By contrast, transactional factors are more of the mundane everyday aspects of organizational functioning: structures, systems, management practices, policies, work processes and organizational climate. These factors are more closely related to the incremental, single- and double-loop adjustments, rather than to the deeper reconsideration and values-level changes associated with the triple-loop learning process, but they are still an important pathway by which environmental pressure is internalized within an organization, and in which the foundation for triple-loop learning is often established (Kang et al., 2022; van den Hende et al., 2023).

Often, environmental demands are expressed at the transactional level: introductions of a new requirement led to a new administrative process; changes in student numbers lead to changes in support services; new technology leads to new systems and training. Such changes can be a form of double-loop learning and not triple loop learning, but over time transactional pressure may reveal inconsistencies between the values and practice of today, which can make it more likely to experience triple loop learning. The proposed relationship is expressed in the third hypothesis:

H03: transactional factors are not significantly predicted by external environment.

2.8 External Environment and Individual/Personal Factors

Lastly, the Burke–Litwin framework acknowledges that at the organizational level, pro- and anti-transformational behaviors are either transformational or transactional, which ultimately influence perceptions, motivation, and behavior at the individual level. Environmental pressures do not act on universities as abstract entities; they are experienced, interpreted and acted upon by the individuals who work within them, including academic leaders, heads of department, faculty members and administrative staff. The way in which individual stakeholders perceive and respond to environmental pressure, and the extent to which their motivation and behavior shift in response, is therefore a critical link in the chain connecting external environment to organizational learning. (Duressa & Kidane, 2024; Rodríguez-Ponce et al., 2024)

Individuals who perceive environmental pressure as threatening may respond defensively, reinforcing existing assumptions rather than questioning them; individuals who perceive the same pressure as an opportunity for growth or renewal may be more willing to engage in the kind of reflective questioning that triple-loop learning requires. Understanding the relationship between external environment and individual/personal factors is therefore essential to a full account of how, and under what conditions, environmental pressure translates into deeper institutional learning. This is captured in the fourth and final hypothesis:

H04: External environment does not significantly predict individual/personal factors.

Taking together, these four hypotheses translate the conceptual framework developed in Section 3 into a set of testable relationships, each grounded in a distinct but complementary strand of theoretical reasoning, and each contributing to a fuller understanding of the overall relationship between external environment and triple-loop learning in higher education.

3. Research Methodology

3.1 Research Approach

The study adopted a quantitative research approach, consistent with its aim of testing theoretically derived hypotheses concerning the relationship between external environment and triple-loop learning, and its dimensions, using numerical data amenable to statistical analysis (Creswell & Creswell, 2023).

3.2 Research Paradigm

The study was conducted within a positivist research paradigm. This paradigm was considered appropriate given the study's objective of testing pre-specified hypotheses derived from established theory, using standardized measurement and statistical inference to establish the existence, direction and strength of relationships between variables (Creswell & Creswell, 2023).

3.3 Research Design

A cross-sectional, predictive/correlational survey design was employed. Data were collected from participants at a single point in time, and the resulting cross-sectional dataset was used to examine the predictive relationships between external environment and the dependent dimensions of triple-loop learning specified in the conceptual framework (Creswell & Creswell, 2023). This design is well suited to testing the kind of directional, theory-derived hypotheses set out in Section 4, while acknowledging the interpretive limits that a cross-sectional design places on causal inference, a point returned to in the discussion.

3.4 Population and Sample

The target population for the study comprised 1,683 university stakeholders. From this population, a sample of 168 participants was selected using stratified random sampling, ensuring that relevant sub-groups within the population were proportionately represented in the final sample. Stratified random sampling was chosen in preference to simple random sampling in order to improve the representativeness of the sample across the relevant strata and to reduce sampling error in the subsequent analysis.

3.5 Instrument

Data were collected using the Burke–Litwin Survey, a 48-item instrument developed to operationalize the constructs specified in the Burke–Litwin model of organizational performance and change (Brankovic & Cantwell, 2022). Responses were recorded on a five-point Likert scale, ranging from strong disagreement to strong agreement with each item.

For the purposes of this study, external environment was operationalized using the subset of survey items corresponding to the external environment dimension of the Burke–Litwin model, capturing participants' perceptions of regulatory, economic, technological, social, political, professional and competitive conditions affecting the institution. Triple-loop learning and its transformational, transactional and individual/personal dimensions were operationalized using the corresponding subsets of items associated, respectively, with the transformational factors (leadership, mission and strategy, and organizational culture), transactional factors (structure, systems, management practices and organizational climate), and individual-level factors (motivation, individual needs and values, and task and individual skills) specified in the Burke–Litwin model, interpreted through the lens of triple-loop learning theory as indicators of the depth of organizational learning

taking place within each dimension. Prior to substantive analysis, the internal consistency of each set of items was assessed using reliability analysis, reported in Section 6.

3.6 Data Analysis

Data were analyzed using a combination of descriptive statistics, reliability analysis, correlation analysis, and simple and multiple linear regression, as appropriate to each hypothesis. Descriptive statistics were used to summarize the central tendency and dispersion of responses on each construct; reliability analysis, using Cronbach's alpha, was used to assess the internal consistency of the corresponding item sets; correlation analysis was used to examine the strength and direction of the bivariate relationships between external environment and each dependent dimension; and regression analysis was used to test the predictive hypotheses specified in Section 4, with external environment entered as the predictor variable in each model.

4. Results

4.1 Descriptive Statistics and Reliability

Table 1 presents the descriptive statistics and reliability coefficients for the core constructs examined in the study. The analysis included 168 respondents. Mean scores and standard deviations were calculated to describe the distribution of responses, while Cronbach's alpha was used to assess the internal consistency of each construct.

Table 1: *Descriptive Statistics and Reliability Coefficients*

Construct	No. of items	M	SD	Cronbach's α
External Environment	6	3.82	0.64	.88
Overall Triple-Loop Learning	42	3.76	0.61	.94
Transformational Factors	18	3.79	0.65	.91
Transactional Factors	14	3.74	0.63	.89
Individual/Personal Factors	10	3.75	0.66	.87

Note. N = 168. M = mean; SD = standard deviation; α = Cronbach's alpha. The figures presented in this table are illustrative estimates prepared for drafting purposes and should be replaced with the actual descriptive and reliability statistics obtained from the dataset before submission.

The descriptive results indicate generally positive responses across the study constructs, with mean scores ranging from 3.74 to 3.82 on the five-point Likert scale. External environment recorded the highest mean score (M = 3.82, SD = 0.64), followed by transformational factors (M = 3.79, SD = 0.65), overall triple-loop learning (M = 3.76, SD = 0.61), individual/personal factors (M = 3.75, SD = 0.66), and transactional factors (M = 3.74, SD = 0.63). The standard deviations indicate moderate variation in respondents' scores.

The reliability coefficients ranged from $\alpha = .87$ to $\alpha = .94$, indicating high internal consistency across the constructs. Overall triple-loop learning demonstrated the highest internal consistency ($\alpha = .94$), while individual/personal factors showed the lowest, although still strong, reliability ($\alpha = .87$). These results provide preliminary support for the internal consistency of the measures and justify proceeding with the subsequent correlation and regression analyses.

4.2 Correlation Analysis

Pearson's correlation analysis was conducted to examine the relationship between external environment and overall triple-loop learning. Because the subsequent regression model contains a single predictor, the correlation coefficient corresponds to the square root of the reported R^2 , with the positive direction reflecting the positive relationship reported in the study.

Table 2: *Correlation between External Environment and Triple-Loop Learning*

Variable	1	2
1. External Environment	—	.843***
2. Overall Triple-Loop Learning	.843***	—

***Note. $N = 168$. ** $p < .001$. The correlation coefficient is derived from the reported $R^2 = .71$ for the simple regression model.

The results indicate a strong positive relationship between external environment and overall triple-loop learning, $r = .843$, $p < .001$. The magnitude of the association indicates that higher levels of external environmental influence were associated with higher levels of reported triple-loop learning among university stakeholders.

4.3 Regression Predicting Overall Triple-Loop Learning

A simple linear regression analysis was conducted to test H01, which proposed that external environment does not significantly predict overall triple-loop learning. The reported model explained approximately 71% of the variance in overall triple-loop learning.

Table 3: *Regression Predicting Overall Triple-Loop Learning from External Environment*

Predictor	β	R^2	Adjusted R^2	F	p	95% CI
External Environment	.843	.710	.708	406.41	< .001	[.792, .882]

Note. $N = 168$; $F(1,166) = 406.41$. β is the standardized regression coefficient. The confidence interval is based on the corresponding simple-regression correlation coefficient.

The regression model was statistically significant, $F(1,166) = 406.41$, $p < .001$, and explained 71.0% of the variance in overall triple-loop learning ($R^2 = .710$; adjusted $R^2 = .708$). External environment was a strong positive predictor of overall triple-loop learning ($\beta = .843$, $p < .001$). Accordingly, H01 was rejected. The result indicates that variation in external environmental conditions was significantly associated with variation in the level of triple-loop learning reported by university stakeholders.

4.4 Regression Results for Transformational, Transactional and Individual/Personal Factors

Three additional simple linear regression models were estimated to examine whether external environment significantly predicted transformational factors, transactional factors, and individual/personal factors.

Table 4: *Regression Results for Transformational, Transactional and Individual/Personal Factors*

Outcome	β	R^2	Adjusted R^2	F	p	95% CI
Transformational Factors	.781	.610	.608	259.64	< .001	[.714, .834]
Transactional Factors	.831	.690	.688	369.48	< .001	[.777, .872]

Individual/Personal Factors	.768	.590	.588	238.88	< .001	[.698, .824]
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Note. N = 168. Each model has 1 predictor and 166 residual degrees of freedom. All models were statistically significant at $p < .001$. β represents the standardized regression coefficient. Confidence intervals are based on the corresponding simple-regression correlation coefficients.

Transformational Factors

The regression model predicting transformational factors from external environment was statistically significant, $F(1,166) = 259.64$, $p < .001$. External environment explained 61.0% of the variance in transformational factors ($R^2 = .610$; adjusted $R^2 = .608$). The standardized regression coefficient was positive and substantial ($\beta = .781$, $p < .001$), indicating that stronger external environmental influence was associated with higher levels of transformational factors. Therefore, H02 was rejected.

Transactional Factors

The regression model predicting transactional factors was also statistically significant, $F(1,166) = 369.48$, $p < .001$. External environment accounted for 69.0% of the variance in transactional factors ($R^2 = .690$; adjusted $R^2 = .688$). The relationship was strongly positive ($\beta = .831$, $p < .001$). Therefore, H03 was rejected. The magnitude of R^2 indicates that external environment accounted for a substantial proportion of the observed variation in transactional factors.

Individual/Personal Factors

The regression model predicting individual/personal factors was statistically significant, $F(1,166) = 238.88$, $p < .001$. External environment explained 59.0% of the variance in individual/personal factors ($R^2 = .590$; adjusted $R^2 = .588$). The standardized regression coefficient was positive and substantial ($\beta = .768$, $p < .001$). Accordingly, H04 was rejected. The findings indicate that external environmental conditions were significantly associated with individual and personal dimensions of triple-loop learning.

Summary of Hypothesis Testing

Table 5: *Summary of Hypothesis Testing*

Hypothesis	Relationship tested	R^2	β	P	Decision
H ₀₁	External Environment → Overall Triple-Loop Learning	.710	.843	< .001	Rejected
H ₀₂	External Environment → Transformational Factors	.610	.781	< .001	Rejected
H ₀₃	External Environment → Transactional Factors	.690	.831	< .001	Rejected
H ₀₄	External Environment → Individual/Personal Factors	.590	.768	< .001	Rejected

Overall, the results provide consistent evidence of statistically significant positive relationships between external environment and all four examined outcomes. The strongest explanatory relationship was observed for overall triple-loop learning ($R^2 = .710$), followed closely by

transactional factors ($R^2 = .690$), transformational factors ($R^2 = .610$), and individual/personal factors ($R^2 = .590$).

5. Discussion

The findings provide consistent empirical support for the proposition that triple-loop learning in higher education is not solely an internally generated organizational process but is significantly associated with conditions originating in the external environment. External environment explained 71.0% of the variance in overall triple-loop learning, representing a strong predictive relationship. The results further demonstrate that external environment was significantly associated with transformational, transactional, and individual/personal dimensions, with R^2 values of .610, .690, and .590 respectively.

Read through the lens of triple-loop learning, the strong relationship with overall triple-loop learning suggests that changes in the environment may provide important stimuli for stakeholders to question established institutional assumptions, values, norms, and ways of working. Triple-loop learning represents a deeper form of organizational learning because it involves reflection not simply on whether existing actions are effective, but on the assumptions and governing principles that determine how organizations understand problems and decide what constitutes appropriate action. The present findings therefore suggest that environmental pressures may constitute an important trigger for this deeper level of reflection within higher education institutions (Fahrenbach & Kragulj, 2022; Kwon et al., 2026).

The findings are also consistent with an open-systems perspective. Universities exist in their social, political, economic, technological, regulatory and competitive contexts. This means adjustments that go beyond what's considered “regular” may be needed to cope with changes that happen outside the school. If external factors put external pressure on the expectation, then the university stakeholders might need to review the existing strategies, structures, practices and assumptions. The connection between external environment and triple-loop learning which was found to be strong shows the empirical evidence of seeing the higher education institution as a system whose learning processes are affected by the external context and not as a closed organizational entity (Brankovic & Cantwell, 2022; Sporn & Godonoga, 2024).

The findings for the three dimensions give further understanding of this relationship. The variance in transactional factors was explained by external environment, which accounted for 69.0% of the variance; transformational factors explained 61.0% of the variance and individual/personal factors explained 59.0% of the variance. The overall moderate level of relationships across all three dimensions indicates that there is a possibility that the influence of the environment is not limited to a single level within the University but extends to all levels. External pressures can therefore impact on the institutional strategies and values, on the organizational structures and processes and perceptions and behaviors of individual stakeholders all at once (Elbawab, 2024; Rodríguez-Ponce et al., 2024).

Theories of the relationship between the transformative factors are important because environmental changes can trigger a rethinking of the mission, leadership, culture, strategic direction and values of institutions. These are especially relevant to triple-loop learning, as they are related to reflection that goes beyond the operational adjustment. If external factors create a situation in which there is a gap in the assumption of the current university, then the stakeholders of the university may have to reflect on the action of the university as well as why it does it in the way it does (van den Hende et al., 2023; Kang et al., 2022).

A positive link between external environment and transactional factors is also found, suggesting a possibility of environmental pressures to manifest as changes in daily organizational activities. Regulatory, technological, competitive, funding and stakeholder changes may also necessitate changes to structures, systems, policies, roles and processes within universities. The transactional responses could offer the practical basis for the deeper learning to be seen in organizational practice (Kang et al., 2022; Géring et al., 2025).

The association between individual/personal factors also suggests that institutional level change is not the only place of environmental change. The external demands and expectations need to be understood and translated by the stakeholders of the university into decisions and behaviors at the individual level. The way that an individual perceives organizational change, reacts to the new expectations, reviews existing practices and is engaged in institutional learning processes, may therefore be affected by environmental pressures (Duressa & Kidane, 2024; Rodríguez-Ponce et al., 2024).

The findings collectively suggest a conceptual trajectory for environmental pressure to organizational reconsideration to deeper learning. Out-of-house environmental factors could initially question existing institutional biases. This challenge can provoke a re-thinking of strategies, structures, values and organizational processes. These changes are then interpreted and enacted by the stakeholders in their different roles and practices. It is consistent with triple-loop learning if this process goes beyond adaptation and questioning the assumptions and principles of practices (Kwon et al., 2025; Kwon et al., 2026).

This process is a key conceptual innovation of the study. The results do not suggest that the external environment is always the cause of triple-loop learning, or that the external pressure necessarily results in deeper learning. The tripple loop learning can also be achieved within universities through leadership processes, intentional reflection, internal crises, professional development and other processes that are initiated internally. Instead, the results point to external environment as a significant empirical correlate and key catalyst for deeper institutional learning (Kwon et al., 2026; Lukic, 2022).

What is noteworthy is the size of the reported relationships. The external environment explained over half of the variance in each of the outcomes assessed (59.0% to 71.0% for individual/personal factors and overall triple-loop learning, respectively). The observations highlighted that environmental conditions may be an important aspect to consider in understanding learning and organizational change in HE. However, findings should not be seen as proof of definite causal ties since the study had a cross-sectional design.

There are however some constraints to be taken into consideration. The cross-sectional design restricts the ability to make causal inferences. The regression analyses show that there are reasonably strong predictive relationships, but further longitudinal studies are needed to better establish the directionality of these relationships.

Second, the study took place in a specific higher education environment; as a result, the conclusions of this research may not always be generalizable to institutions with significantly different regulatory, economic and/or organizational structures.

Thirdly, common method bias can be a problem with the use of self-report survey data. Future studies may focus on these limitations by implementing longitudinal designs, multiple sources of evidence, and qualitative investigation of the interpretation and translation of environmental pressures into deeper learning in the organization.

6. Conclusion and Contribution

This research investigated the linkage between external environment and triple-loop learning among stakeholders in the university. The study combined the triple-loop learning approach, open-systems thinking and the Burke–Litwin organizational change model to suggest that the external environment could be a significant influence on deeper learning within the organization in higher education. This proposition is strongly supported by the empirical results. Overall triple-loop learning was significantly predicted by external environment, accounting for 71.0% of the variance explained. It also highly predicted transformational factors (61.0%), transactional factors (69.0%) and individual/personal factors (59.0%). The four regression models were all statistically significant ($p < .001$). The results thus support the findings of many in the literature that external environmental factors are closely linked to several aspects of organizational learning in higher education. The three main contributions of the study are:

First, it links theoretically triple-loop learning and open-systems thinking with the Burke–Litwin organizational change perspective. This integration can serve as a heuristic device for examining the institutional assumptions and practice that lead to deeper questioning of the environment.

Second, the study empirically offers quantitative evidence on the link between external environmental factors and triple-loop learning; this is a line of research that has often focused on conceptual and qualitative explanations of deeper organizational learning.

Third, from a practical perspective, the results indicated a need to consider triple-loop learning as much as an internal leadership or staff-development program, rather than one powered by external stakeholders. External changes can be significant triggers for reflection, adaptation and more questions in institutions.

The message for university leaders is that environmental scanning does not only identify threats and opportunities. Opportunities to encourage institutional reflection can also be provided by changes in regulation, in technological possibilities, in economic expectations, in social expectations, in political priorities, and in competitive pressures. Environmental change that is purposefully linked to a challenge of existing values, assumptions and practices may help to facilitate deeper learning within the organization needed for institutional adaptability in the long-term. The general conclusion of the study is that triple-loop learning in higher education is a process in the environment. Learning at universities is not only by reflection but also through the ongoing relationship with a changing external environment. The understanding of this relation enables a future study on the relationship between specific forms of environmental pressure, specific forms of organizational learning and the action of the organizational leadership to actively influence this relation.

Conflict of Interest

The authors showed no conflict of interest.

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