

The TORY Framework: Integrating curriculum, technology, and instruction for sustainable school excellence

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Abstract

The increasing integration of digital technologies into education has transformed school innovation into an organisational challenge that requires curriculum, technology, and instruction to function as interconnected capabilities. However, existing research has largely examined these domains independently, providing only a partial understanding of how schools sustain long-term educational improvement. This study addresses this gap by proposing the Transforming, Optimizing, Responding, and Yielding (TORY) Framework, an integrated organisational capability framework explaining how curriculum innovation, learning technology innovation, and instructional innovation interact to sustain school excellence. A qualitative single-case study was conducted at an Indonesian Islamic secondary school recognised for integrating national, religious, and international curricula with technology-enhanced learning. Data were collected through semi-structured interviews, observations, and document analysis and analysed using reflexive thematic analysis. The findings show that sustainable school excellence emerges through the recursive interaction of four organisational capabilities. Transforming establishes strategic direction, Optimizing strengthens organisational capacity, Responding enables evidence-informed adaptation, and Yielding institutionalises continuous improvement. Rather than representing sequential stages, these capabilities operate as a mutually reinforcing organisational system that supports continuous educational improvement. The study contributes to educational technology and educational change scholarship by providing an empirically grounded framework that explains how curriculum, technology, and instruction function as integrated organisational capabilities for sustaining school excellence across diverse educational contexts.

1 Introduction

Rapid advances in digital technologies, artificial intelligence (AI), and data-driven educational practices are transforming how schools design curriculum, organise teaching, and support student learning. Schools are increasingly expected to integrate digital technologies with curriculum and pedagogy to prepare learners for rapidly changing educational and societal contexts (OECD, 2023; Selwyn, 2022; UNESCO, 2021b). Consequently, sustainable school improvement has become less a matter of adopting isolated innovations than of developing organisational capabilities that integrate curriculum, technology, and instructional practices into coherent systems capable of continuous adaptation. Although many schools have introduced digital technologies and curriculum reforms, relatively few have successfully institutionalised these innovations as sustainable organisational practices.

These challenges are particularly evident in Indonesia, where the implementation of the Merdeka Curriculum has accelerated reforms promoting school autonomy, competency-based learning, digital transformation, and learner-centred education (Kemendikbudristek RI {Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia}, 2022). However, schools differ considerably in their capacity to translate these policy initiatives into sustained educational improvement because of differences in leadership, organisational culture, technological readiness, and institutional capacity. This variation suggests that educational transformation depends not only on policy implementation but also

on schools' ability to integrate and institutionalise multiple innovations as coherent organisational capabilities.

Existing research has established the importance of curriculum innovation, educational technology, instructional improvement, and leadership for enhancing school performance (Christensen, 2011; Fullan, 2020; Mishra & Koehler, 2006; Rogers, 2003; Tondeur et al., 2017). Nevertheless, these domains have largely been examined independently rather than as interdependent organisational capabilities that collectively sustain long-term school excellence. Consequently, current educational change literature provides only a partial explanation of how multiple innovations become integrated within organisational routines, particularly in developing countries and faith-based schools where educational reform occurs within complex cultural, institutional, and policy environments. Addressing this gap requires an organisational capability perspective that explains how schools embed innovation within enduring organisational structures and routines rather than treating innovation as a series of discrete reform initiatives (Teece, 2018).

Indonesian Islamic secondary schools provide an appropriate context for investigating these organisational processes because they must simultaneously reconcile national education policy, Islamic educational values, digital transformation, and international educational standards. SMA Darul Ulum 2 Jombang represents an information-rich case in which the National Curriculum, Merdeka Curriculum, Pesantren Curriculum, and Cambridge Curriculum have been integrated within a coherent educational system supported by a digital learning ecosystem and learner-centred instructional practices. This context offers an opportunity to examine how multiple forms of educational innovation become institutionalised as sustainable organisational capabilities.

To address these conceptual and empirical gaps, this study proposes the Transforming, Optimizing, Responding, and Yielding (TORY) Framework, an integrated organisational capability framework explaining how curriculum innovation, learning technology innovation, and instructional innovation interact recursively to sustain school excellence. Unlike existing educational change perspectives that primarily emphasise curriculum reform, organisational learning, innovation diffusion, or capacity building as separate processes, the TORY Framework integrates these perspectives into a unified explanation of how multiple innovation capabilities continuously reinforce one another through organisational learning and institutional adaptation.

Guided by this framework, the study investigates how curriculum innovation, learning technology innovation, and instructional innovation interact within an Indonesian Islamic secondary school to sustain long-term educational improvement. The study contributes to educational technology and educational change literature in three ways. First, it reconceptualises educational innovation as an integrated organisational capability rather than a collection of independent initiatives. Second, it empirically demonstrates how curriculum innovation, learning technology innovation, and instructional innovation function as mutually reinforcing organisational capabilities. Third, it develops and empirically refines the TORY Framework as a recursive organisational capability framework that explains how

schools institutionalise continuous innovation while maintaining organisational coherence and educational identity. Accordingly, this study addresses the following research question: How do curriculum innovation, learning technology innovation, and instructional innovation interact through the TORY Framework to sustain school excellence in an Indonesian Islamic secondary school?

2 Theoretical foundation and conceptual framework

2.1 Curriculum innovation

Curriculum innovation has evolved from revising curricular content to developing dynamic learning systems that integrate competency-based education, interdisciplinary learning, learner-centred pedagogy, and flexible curriculum implementation responsive to rapidly changing educational contexts (Darling-Hammond et al., 2020; OECD, 2023; Priestley et al., 2021; UNESCO, 2021a). Rather than prescribing uniform instructional procedures, contemporary curriculum frameworks increasingly encourage schools to exercise professional autonomy in designing meaningful learning experiences that foster critical thinking, creativity, collaboration, communication, and lifelong learning.

Empirical studies consistently demonstrate that curriculum innovation strengthens instructional quality, teacher collaboration, organisational responsiveness, and schools' capacity to implement educational reform (Fullan, 2020; Jones & Harris, 2020; Priestley et al., 2021). However, curriculum reform rarely produces sustainable improvement when implemented independently of technological capacity, instructional innovation, organisational culture, and leadership support.

These limitations suggest that curriculum innovation should be conceptualised as one organisational capability operating in conjunction with learning technology innovation and instructional innovation. This perspective provides the conceptual basis for the TORY Framework, which conceptualises curriculum innovation not as an isolated reform initiative but as one organisational capability that interacts recursively with learning technology innovation and instructional innovation to sustain long-term school excellence.

2.2 Learning technology innovation

Learning technology innovation extends beyond the adoption of digital tools to encompass integrated digital ecosystems that support curriculum implementation, instructional decision-making, assessment, collaboration, and organisational learning (Bond et al., 2025; Selwyn, 2022). Rather than functioning as an isolated technological intervention, digital innovation requires organisational structures, leadership, and professional practices that enable technology to support teaching and learning effectively (Dexter, 2018). Consistent with the TPACK perspective, technology contributes to educational improvement only when integrated with pedagogy and disciplinary knowledge within supportive organisational conditions (Ertmer & Ottenbreit-Leftwich, 2010; Mishra & Koehler, 2006).

Research consistently shows that learning technology innovation enhances instructional flexibility, learner engagement, data-informed decision-making, and organisational adaptability (Bond et al., 2025; OECD, 2023). Nevertheless, technology alone rarely produces sustainable improvement unless accompanied by curriculum alignment, professional learning, instructional transformation, and collaborative leadership (Fullan, 2020; Selwyn, 2022).

These findings indicate that learning technology innovation should be viewed as one organisational capability within a broader innovation system rather than as an independent driver of school improvement. The TORY Framework therefore conceptualises learning technology innovation as an organisational capability whose value emerges through its recursive interaction with curriculum innovation and instructional innovation, thereby strengthening schools' adaptive capacity for sustainable educational improvement. Together, curriculum innovation and learning technology innovation indicate that sustainable educational improvement depends on the integration of complementary organisational capabilities rather than isolated innovation initiatives. The following section extends this perspective by examining instructional innovation as the pedagogical capability through which these organisational resources are translated into classroom practice.

2.3 Instructional innovation

Instructional innovation extends beyond the adoption of new teaching methods to encompass the continuous redesign of learning experiences, assessment practices, classroom interactions, and pedagogical strategies that enhance learners' cognitive, social, and emotional development (Darling-Hammond et al., 2020; Hattie, 2023; Hattie & Clarke, 2019). Contemporary approaches emphasise learner-centred pedagogy, inquiry-based learning, collaborative learning, personalised instruction, and formative assessment, enabling teachers to adapt instruction to diverse learner needs while fostering higher-order thinking and lifelong learning (OECD, 2023; UNESCO, 2021a).

Empirical evidence consistently shows that instructional innovation enhances learner engagement, academic achievement, problem-solving, and teachers' professional learning while strengthening collaborative cultures within schools (Darling-Hammond et al., 2020; Hattie, 2023). However, innovative pedagogy rarely produces sustainable improvement when implemented independently of curriculum flexibility, technological support, and organisational capacity. Without alignment among these organisational conditions, instructional innovation often remains confined to individual classrooms rather than becoming embedded within school-wide practice.

These limitations suggest that instructional innovation should be understood as an organisational capability operating in synergy with curriculum innovation and learning technology innovation. Within the TORY Framework, instructional innovation represents the capability through which curriculum intentions and technological opportunities are translated into meaningful teaching and learning practices. Rather than functioning independently, these three innovation capabilities interact recursively to support sustainable school excellence.

2.4 Organisational capability for sustainable school excellence

Organisational capability provides an important theoretical perspective for explaining how schools sustain educational improvement despite continuous policy reform, technological change, and evolving societal expectations. Rather than attributing school improvement to individual leadership, curriculum reform, or technological investment alone, this perspective emphasises schools' collective capacity to integrate knowledge, professional expertise, organisational resources, and institutional routines into coherent processes that sustain innovation over time (Helfat & Peteraf, 2003; Senge, 2006; Teece, 2018).

Educational change research similarly argues that sustainable improvement depends on institutionalising innovation rather than implementing isolated reforms. Sustainable change requires coherence among curriculum, pedagogy, leadership, organisational culture, and professional learning, enabling schools to continuously generate, share, and embed knowledge within everyday organisational practice (Fullan, 2020; Jones & Harris, 2020; Senge, 2006). Dynamic capability theory further explains how organisations continuously renew and reconfigure internal resources in response to changing environments, thereby strengthening long-term adaptability and organisational resilience (Teece, 2018).

Despite these theoretical advances, curriculum innovation, learning technology innovation, and instructional innovation have largely been examined through separate conceptual perspectives. Consequently, limited attention has been devoted to understanding how these innovation domains interact as mutually reinforcing organisational capabilities that collectively sustain school excellence. Addressing this limitation requires an integrated framework capable of explaining not only the contribution of each innovation dimension but also the recursive interactions through which they become institutionalised across the organisation.

Taken together, these perspectives provide the theoretical foundation for the proposed TORY Framework, which conceptualises curriculum innovation, learning technology innovation, and instructional innovation as interdependent organisational capabilities that collectively sustain long-term school excellence.

2.5 The TORY Framework: An integrated organisational capability perspective

Building on the preceding theoretical synthesis, this study proposes the Transforming, Optimizing, Responding, and Yielding (TORY) Framework as an integrated organisational framework for explaining sustainable school excellence. Rather than conceptualising curriculum innovation, learning technology innovation, and instructional innovation as independent reform initiatives, the framework positions them as mutually reinforcing organisational capabilities whose recursive interaction enables schools to sustain continuous educational improvement.

Existing educational change research has established the importance of curriculum reform, technology integration, and instructional innovation for improving educational quality. However, these innovation

domains have largely been examined through separate theoretical perspectives, providing only a partial explanation of how schools institutionalise innovation over time. The TORY Framework addresses this gap by explaining not only the individual contributions of curriculum, technology, and instruction, but also the recursive organisational mechanisms through which these innovation capabilities are integrated and institutionalised to sustain school excellence.

Specifically, Transforming represents the capability through which schools establish strategic educational direction by aligning curriculum, institutional values, technological vision, and long-term educational goals. Optimizing strengthens organisational capacity through professional learning, collaborative leadership, technological integration, and resource alignment. Responding enables schools to continuously interpret changing educational conditions, evaluate organisational performance, and adapt institutional practices through evidence-informed decision-making. Rather than functioning as a terminal outcome, Yielding represents the emergent organisational capability reflected in sustained educational quality, institutional resilience, collaborative professionalism, and continuous school improvement. Together, these capabilities interact recursively through organisational learning, with each continuously reinforcing and reshaping the others over time.

Figure 1 presents the preliminary conceptual TORY Framework that guided this study. Rather than depicting a linear sequence of educational change, the framework illustrates the recursive interaction among the four organisational capabilities proposed to sustain long-term school excellence. This preliminary framework provides the initial theoretical proposition that is subsequently examined and refined through the qualitative case study, leading to the empirically refined TORY Framework presented in the Results section.

The TORY Framework extends existing educational change literature by integrating curriculum innovation, learning technology innovation, and instructional innovation within a single organisational capability perspective. In doing so, it reconceptualises sustainable school excellence as an evolving organisational capability rather than a static organisational outcome. This conceptualisation is consistent with recent calls for integrative frameworks that explain educational innovation through the interaction of organisational processes rather than isolated interventions (Fullan, 2020; Teece, 2018). The framework subsequently serves as the analytical lens through which the empirical findings are analysed, enabling the preliminary conceptual framework to be empirically refined into a recursive organisational capability framework for sustainable school excellence.

3 Method

3.1 Research design

This study employed a qualitative single-case study design to investigate how curriculum innovation, learning technology innovation, and instructional innovation interact as organisational capabilities within the proposed TORY Framework to sustain school excellence. A qualitative case study was appropriate

because the study sought to develop an in-depth understanding of a contemporary organisational phenomenon within its real-life context rather than to test predetermined causal relationships (Merriam & Tisdell, 2016; Yin, 2018). This approach enabled the exploration of how multiple innovation capabilities were enacted, interpreted, and institutionalised across organisational levels.

The study adopted a single instrumental case study because the selected school provided a theoretically relevant context for refining the proposed TORY Framework rather than serving as a unique case in itself (Stake, 1995). Consistent with theory-building qualitative research, empirical evidence was used to elaborate and refine the preliminary conceptual framework through analytical rather than statistical generalisation (Yin, 2018).

SMA Darul Ulum 2 Jombang was purposively selected as an information-rich case because it has consistently demonstrated sustained innovation in curriculum, technology, instructional practice, and organisational development. These characteristics provided an appropriate setting for examining how multiple innovation capabilities become institutionalised to support sustainable school excellence.

3.2 Research setting and participants

The study was conducted at SMA Darul Ulum 2 Jombang, East Java, Indonesia, between February and October 2025. The school integrates the National Curriculum, the Merdeka Curriculum, the Pesantren Curriculum, and the Cambridge Curriculum within a coherent educational system supported by digital learning ecosystems, learner-centred instructional practices, collaborative professional cultures, and continuous organisational improvement.

Participants were selected using criterion-based purposive sampling to include stakeholders directly involved in planning, implementing, supporting, and experiencing educational innovation (Patton, 2015). Recruitment continued until sufficient information power had been achieved across stakeholder groups (Malterud et al., 2016).

A total of 37 participants representing multiple organisational levels participated in the study. Participant characteristics are summarised in Table 1, illustrating the diversity of stakeholder groups involved in the research. Including diverse stakeholder groups enabled triangulation of perspectives and strengthened the credibility of the findings (Lincoln & Guba, 1985).

Table 1
Participant Characteristics

Participant Group	Number	Primary Role
Principal	1	Strategic leadership
Vice Principals	4	School management and innovation coordination
Teachers	12	Curriculum implementation and instructional innovation
Students	10	Learning experiences and technology use
Foundation Board	3	Strategic governance
Alumni	4	Graduate perspectives
Parents	3	Educational partnership
Total	37	

3.3 Data Collection

Data were collected between February and October 2025 using three complementary qualitative methods: semi-structured interviews, non-participant observations, and document analysis. Combining multiple sources of evidence enabled methodological triangulation and provided a comprehensive understanding of how the organisational capabilities represented in the TORY Framework were enacted in practice (Yin, 2018). Consistent with qualitative case study methodology, data collection and preliminary analysis proceeded recursively, allowing emerging insights to guide subsequent interviews, observations, and document selection (Merriam & Tisdell, 2016).

3.3.1 Interview

Semi-structured interviews constituted the primary data source because they enabled participants to describe their experiences and interpretations of educational innovation in depth (Brinkmann & Kvale, 2015). The interview protocol was informed by the preliminary TORY Framework while remaining sufficiently flexible to explore emerging issues (Patton, 2015). Questions addressed curriculum innovation, learning technology innovation, instructional innovation, leadership, professional collaboration, and continuous school improvement. Interviews lasted between 45 and 90 minutes, were conducted in Indonesian, audio-recorded with informed consent, and transcribed verbatim.

3.3.2 Observations

Non-participant observations were conducted in classrooms, leadership meetings, professional development activities, and technology-supported learning environments. Observations focused on how curriculum, technology, instructional practices, and organisational routines were enacted in everyday practice. Detailed field notes documented contextual conditions and naturally occurring interactions that complemented interview data (Patton, 2015).

3.3.3 Document analysis

Document analysis provided institutional evidence of how educational innovation was planned, implemented, and sustained (Bowen, 2009). Documents included curriculum materials, strategic plans, institutional policies, professional development programmes, lesson plans, meeting minutes, and annual reports. These documents were used to corroborate evidence obtained through interviews and observations.

Data collection remained recursive throughout the study. Emerging patterns identified in one data source were explored and verified through the others using constant comparison across participants, observations, and institutional documents (Miles et al., 2020). Table 2 provides an overview of the data sources, their purposes, and the corresponding outputs generated during data collection. This recursive process strengthened the credibility and richness of the empirical evidence supporting refinement of the TORY Framework.

Table 2
Overview of Data Sources

Data Source	Participants / Documents	Purpose	Output
Semi-structured interviews	37 participants	Explore participants' experiences and organisational capabilities	Interview transcripts
Non-participant observations	Classroom, meetings, school programmes	Observe innovation practices in context	Field notes
Document analysis	Strategic plans, curriculum documents, policies, reports	Corroborate institutional practices	Documentary records

3.4 Data analysis

Data analysis was conducted concurrently with data collection using an iterative and reflexive approach, allowing emerging interpretations to inform subsequent interviews, observations, and document analysis (Braun & Clarke, 2022; Miles et al., 2020). The analysis primarily followed reflexive thematic analysis, complemented by the interactive qualitative analysis model of Miles et al. (2020).

Interview transcripts, field notes, and documentary evidence were read repeatedly to achieve familiarity with the dataset before being coded inductively. Similar codes were continuously compared across participants and data sources and progressively organised into broader organisational categories and higher-order themes (Gioia et al., 2013). Rather than serving as a predetermined coding framework, the preliminary TORY Framework functioned as a sensitising theoretical lens (Blumer, 1954), enabling recursive dialogue between emerging empirical evidence and conceptual interpretation. This iterative process resulted in the empirical refinement of the preliminary framework into the Empirically Refined TORY Framework presented in the Results section.

Analytical rigour was strengthened through methodological triangulation, analytical memos, and an audit trail documenting coding decisions, category development, and theme refinement (Lincoln & Guba, 1985; Nowell et al., 2017). Themes were repeatedly reviewed to ensure coherence, conceptual distinctiveness, and consistency across multiple sources of evidence. Table 3 summarises the analytical stages, while Fig. 2 illustrates the recursive analytical process.

Table 3
Analytical Process

Analytical Stage	Purpose	Output
Familiarisation	Read and immerse in the data	Analytical memos
Initial Coding	Generate inductive codes	Initial codes
Category Development	Compare and cluster related codes	Organisational categories
Theme Development	Develop higher-order organisational themes	Organisational themes
Framework Refinement	Integrate empirical themes with the preliminary TORY Framework	Empirically Refined TORY Framework

4 Results and discussion

The analysis generated four interrelated organisational themes explaining how curriculum innovation, learning technology innovation, and instructional innovation interact as organisational capabilities to sustain school excellence at SMA Darul Ulum 2 Jombang. Derived from recursive analysis of interviews, classroom observations, and institutional documents, the themes demonstrate how educational innovation becomes institutionalised through interconnected organisational processes. Transforming establishes strategic direction and shared institutional values; Optimizing strengthens organisational capacity through the integration of curriculum, technology, and professional learning; Responding captures the school's adaptive capability to refine organisational practice; and Yielding represents the sustained educational outcomes generated through the recursive interaction of these capabilities.

4.1 Transforming: Reconfiguring curriculum as organisational renewal

The findings demonstrate that Transforming extends beyond curriculum reform as a response to educational policy. Rather than implementing externally mandated changes, the school continuously reconfigured its educational system to integrate national curriculum requirements, Islamic educational values, and international standards within a coherent organisational framework. Across interviews, classroom observations, and institutional documents, curriculum innovation was consistently understood as the strategic integration of multiple curricular traditions rather than the replacement of one curriculum with another.

Participants described curriculum planning as a collaborative process through which policy requirements, religious values, and international expectations were interpreted and translated into locally meaningful educational practices. Classroom observations showed competency-based learning, Islamic character education, and internationally benchmarked pedagogies operating simultaneously, while institutional documents demonstrated that curriculum review had become embedded within continuous cycles of planning, implementation, evaluation, and refinement. These findings indicate that curriculum innovation had become institutionalised as a routine organisational practice rather than a temporary reform initiative.

The findings suggest that curriculum transformation functioned primarily as organisational renewal rather than policy implementation. Instead of responding passively to curriculum reforms, the school demonstrated the capability to reinterpret external policy while preserving institutional coherence and educational identity. This finding aligns with curriculum theory, which conceptualises curriculum as a socially constructed and evolving practice shaped through professional agency and contextual interpretation (Priestley et al., 2021). It also supports arguments that sustainable educational change depends on coherence among curriculum, pedagogy, leadership, and organisational culture, reinforced through collaborative professionalism and organisational learning (Fullan, 2020; Jones & Harris, 2020).

The findings further indicate that transformation was sustained through collective organisational learning. Teachers and school leaders engaged in collaborative planning, reflective dialogue, and continuous evaluation to reinterpret educational reforms within the school's organisational and religious context. This pattern is consistent with organisational learning theory, which explains that sustainable improvement occurs when knowledge becomes embedded in shared routines and professional practice (Argyris, 1999; Senge, 2006). From a dynamic capability perspective, curriculum transformation also reflects the school's ability to renew organisational resources and reconfigure educational processes while maintaining strategic coherence amid continuous environmental change (Teece, 2018).

Importantly, the findings show that curriculum transformation became sustainable only through its integration with complementary organisational capabilities. Consistent with recent educational technology research, sustainable educational improvement depends on coherent interaction among curriculum, pedagogy, leadership, and digital technologies rather than isolated innovation initiatives (Bond et al., 2025; OECD, 2023). Within the TORY Framework, Transforming therefore represents the foundational organisational capability that establishes strategic direction and creates the conditions through which subsequent capabilities (Optimizing, Responding, and Yielding) can emerge through recursive organisational learning.

4.2 Optimizing: Strengthening organisational capacity through technology and professional learning

The findings indicate that Optimizing represents the organisational capability through which educational innovation becomes embedded in institutional practice. Whereas Transforming establishes strategic direction, Optimizing strengthens organisational capacity by aligning technological infrastructure,

professional learning, collaborative leadership, instructional resources, and organisational support. Rather than functioning as an independent innovation, technology operated as an enabling capability that strengthened curriculum implementation, instructional quality, and institutional effectiveness.

Across interviews, observations, and institutional documents, participants consistently described learning technologies as organisational resources supporting pedagogical improvement rather than merely digitising classroom activities. Digital platforms, learning management systems, and multimedia applications were integrated into everyday teaching to promote learner engagement, collaborative learning, formative assessment, and continuous feedback. Classroom observations further showed that technology selection was guided by curriculum objectives and pedagogical purposes, supporting inquiry-based learning, differentiated instruction, collaborative knowledge construction, and learner autonomy.

Technological optimisation was reinforced through sustained professional learning. Teachers participated regularly in collaborative lesson planning, peer mentoring, professional development workshops, and reflective dialogue that strengthened curriculum implementation, instructional practice, and digital competence. Institutional documents likewise demonstrated that professional learning formed a strategic component of organisational development rather than a series of isolated training activities. Collaborative leadership further supported innovation by encouraging pedagogical experimentation, facilitating professional dialogue, and disseminating effective instructional practices across departments, enabling innovation to become shared organisational knowledge.

These findings reinforce educational technology research showing that technology contributes to educational improvement only when integrated with pedagogy, curriculum, and professional learning. The observed practices align with the TPACK framework, which emphasises the interaction among technological, pedagogical, and content knowledge (Mishra & Koehler, 2006), and with studies highlighting digital transformation as an organisational process requiring leadership, institutional culture, and continuous professional learning (Bond et al., 2025; OECD, 2023; Selwyn, 2022).

The findings also extend organisational learning and educational change literature by demonstrating that organisational capability develops through the recursive interaction of technological capability, collaborative professional learning, curriculum implementation, and instructional innovation. Unlike perspectives emphasising individual digital competence or technology adoption (Bond et al., 2025; Redecker et al., 2017), the present study shows that sustainable digital transformation depends on organisational routines, collaborative learning, and institutional leadership. Within the TORY Framework, Optimizing therefore represents the organisational capability that transforms strategic intentions into sustained institutional practice while strengthening the organisational readiness required for continuous adaptation.

4.3 Responding: Adaptive leadership and organisational responsiveness

The findings indicate that Responding represents the organisational capability through which the school continuously adapts to internal and external changes while maintaining strategic coherence. Rather than reacting to policy reforms or environmental pressures, responsiveness emerged as a proactive capability enabling the school to anticipate educational challenges, interpret emerging needs, and implement timely organisational adjustments. Across interviews, classroom observations, leadership meetings, and institutional documents, this capability was institutionalised through collaborative governance, evidence-informed decision-making, continuous evaluation, and organisational learning.

Evidence across multiple data sources showed that adaptive leadership played a central role in sustaining organisational responsiveness. School leaders regularly facilitated reflective meetings involving vice principals, curriculum coordinators, department heads, and teachers to evaluate programmes, review learner achievement, interpret emerging developments, and establish strategic priorities. Leadership decisions were characterised by collaborative dialogue rather than hierarchical control, while observations demonstrated that curriculum refinement, instructional improvement, and technology integration were routinely discussed through professional learning forums before implementation.

Responsiveness was further strengthened through systematic monitoring and evidence-informed feedback. Student achievement, classroom observations, teacher reflections, parental feedback, institutional evaluations, and digital learning data were continuously synthesised to inform organisational decisions. Participants consistently viewed evaluation not as an accountability mechanism but as an organisational learning process that enabled continuous refinement of educational practice. Importantly, innovations were adopted selectively according to their alignment with the school's educational philosophy, Islamic values, and long-term strategic priorities, allowing the school to remain adaptive while preserving institutional identity.

These findings extend adaptive leadership research by demonstrating that sustainable responsiveness depends not only on leadership behaviour but also on organisational structures that support collaborative learning, systematic evaluation, and evidence-informed decision-making (Heifetz et al., 2009). They also reinforce organisational learning theory, which emphasises that adaptive organisations continuously interpret experience and refine organisational practice through recursive learning processes (Argyris & Schön, 1978; Senge, 2006). Consistent with recent educational technology research, digital transformation further strengthened responsiveness because technological systems were integrated with institutional learning and collaborative decision-making rather than operating independently (Bond et al., 2025; Fullan, 2020; OECD, 2023).

Within the TORY Framework, Responding represents the adaptive organisational capability that connects Transforming and Optimizing with continuous organisational learning. By enabling schools to interpret emerging conditions, evaluate organisational performance, and refine curriculum, technology, and instructional innovation, Responding prevents innovation from becoming static and sustains continuous organisational renewal.

4.4 Yielding: Sustaining school excellence through integrated organisational capability

The findings indicate that Yielding represents the emergent organisational capability generated through the recursive interaction of Transforming, Optimizing, and Responding. Rather than conceptualising school excellence as the attainment of predetermined performance indicators, participants consistently described it as a dynamic organisational condition sustained through continuous curriculum renewal, technological integration, instructional improvement, and organisational learning.

Evidence from interviews, observations, and institutional documents showed that sustained school excellence was reflected not only in learner achievement but also in broader organisational outcomes, including improved instructional quality, stronger professional collaboration, organisational adaptability, institutional resilience, and stakeholder trust. Participants emphasised that these outcomes resulted from the cumulative integration of curriculum innovation, learning technology innovation, instructional innovation, collaborative leadership, and continuous organisational learning. Innovation had become embedded within routine teaching, collaborative planning, professional learning, reflective evaluation, and strategic decision-making rather than remaining a temporary reform initiative.

Institutional documents further demonstrated that continuous improvement was supported through integrated quality assurance processes embedded in routine school governance. Strategic planning, curriculum review, programme evaluation, school self-evaluation, and professional development consistently reflected a multidimensional approach to educational quality encompassing curriculum implementation, instructional practice, digital innovation, learner development, teacher growth, stakeholder engagement, and organisational effectiveness.

The findings further demonstrate that sustainable school excellence emerged from the recursive interaction of the four organisational capabilities proposed in the TORY Framework. Transforming established strategic direction, Optimizing strengthened organisational capacity, and Responding enabled continuous adaptation. Their interaction generated Yielding as an emergent organisational capability characterised by sustained educational quality, institutional resilience, collaborative professionalism, and continuous improvement. Rather than representing the final stage of innovation, Yielding continually reinforces subsequent cycles of transformation, optimisation, and adaptation.

These findings extend existing educational change literature, which commonly explains school excellence through leadership, organisational performance, instructional quality, or learner achievement as separate constructs (Hallinger, 2010; Leithwood et al., 2020). The present study instead demonstrates that sustainable school excellence is more comprehensively understood as an integrated organisational capability emerging from the recursive interaction of multiple innovation capabilities. This interpretation also extends organisational learning and educational change theory by showing that long-term educational improvement depends not simply on organisational learning or capacity building individually, but on the continuous integration of curriculum innovation, learning technology innovation, and

instructional innovation within a coherent organisational capability system (Argyris & Schön, 1978; Fullan, 2020; Jones & Harris, 2020; Senge, 2006).

Within the TORY Framework, Yielding represents the organisational capability through which continuous innovation generates sustained educational quality, institutional resilience, collaborative professionalism, and long-term organisational renewal. Accordingly, school excellence is reconceptualised not as a static organisational outcome but as an evolving organisational capability continuously renewed through the recursive interaction of the three innovation capabilities. This reconceptualisation constitutes one of the principal theoretical contributions of the study.

4.5 Empirically Refined TORY Framework

The empirical findings demonstrate that the TORY Framework is more appropriately conceptualised as a recursive organisational capability framework than as a sequential model of educational innovation. Rather than representing discrete stages of change, Transforming, Optimizing, Responding, and Yielding function as mutually reinforcing organisational capabilities that continuously shape one another through organisational learning, institutional adaptation, and evidence-informed practice. Figure 3 presents the Empirically Refined TORY Framework developed through the iterative synthesis of interview, observation, and documentary evidence.

Table 4
Theoretical Refinement of the TORY Framework Based on the Empirical Findings

Preliminary Conceptual Framework	Empirically Refined TORY Framework	Theoretical Refinement
Four interconnected dimensions	Four recursive organisational capabilities	Innovation is reconceptualised as a recursive organisational capability
Innovation dimensions interact	Capabilities recursively reinforce one another	Organisational learning explains the recursive interaction among capabilities
School excellence as intended outcome	School excellence as emergent organisational capability	School excellence is reconceptualised as both an organisational outcome and an organisational capability
Conceptual integration	Empirically validated recursive capability system	Demonstrates how organisational capabilities emerge through integration
Proposed conceptual model	Theory refined through empirical evidence	Provides an analytically generalisable organisational capability framework

Together, Fig. 3 and Table 4 show how the empirical evidence refined the preliminary conceptual framework into a recursive organisational capability framework. Rather than validating a predefined model, the findings reveal that the four capabilities operate as an integrated system in which each continuously reinforces the others through organisational learning.

Within this refined framework, Transforming establishes strategic educational direction through curriculum integration and institutional vision, Optimizing strengthens organisational capacity through professional learning, collaborative leadership, technology integration, and resource alignment, and Responding enables continuous organisational adaptation through evidence-informed decision-making. Yielding is reconceptualised not as the final stage of innovation but as an emergent organisational capability reflected in sustained educational quality, institutional resilience, collaborative professionalism, stakeholder trust, and continuous school improvement. These outcomes, in turn, reinforce subsequent cycles of transformation, optimisation, and adaptation, creating a self-renewing system of educational improvement.

The empirical refinement further demonstrates that organisational capability does not reside within any single innovation domain but emerges through the recursive integration of curriculum innovation, learning technology innovation, instructional innovation, and organisational learning. This shifts attention from managing individual innovations to understanding how schools continuously integrate multiple innovation capabilities to sustain long-term educational improvement.

Theoretically, the refined TORY Framework extends educational change literature by explaining sustainable innovation as the product of recursively interacting organisational capabilities rather than isolated curriculum reform, technology integration, instructional improvement, or leadership initiatives. In doing so, it complements organisational learning theory (Argyris & Schön, 1978; Senge, 2006), dynamic capability theory (Helfat & Peteraf, 2003; Teece, 2018), and contemporary educational change scholarship (Fullan, 2020; Jones & Harris, 2020), while integrating curriculum innovation, learning technology innovation, and instructional innovation within a single organisational capability perspective.

The framework also contributes to educational technology research by demonstrating that technology becomes organisationally transformative only when integrated with curriculum, pedagogy, collaborative professional learning, and adaptive organisational processes. Rather than treating technology as an independent driver of change, the refined framework conceptualises learning technology innovation as one component of an integrated organisational capability system that supports sustainable educational improvement (Bond et al., 2025; OECD, 2023; Selwyn, 2022).

Methodologically, the study illustrates how recursive qualitative case study research can support theory refinement by integrating iterative data analysis with conceptual development throughout the research process (Eisenhardt, 1989; Gioia et al., 2013; Miles et al., 2020). The resulting Empirically Refined TORY Framework therefore provides an analytically generalisable explanation (Yin, 2018) of how recursive organisational capabilities sustain school excellence and offers a conceptual foundation for future comparative and longitudinal research across diverse educational contexts.

5 Conclusion

This study examined how curriculum innovation, learning technology innovation, and instructional innovation interact as recursive organisational capabilities within the TORY (Transforming, Optimizing,

Responding, and Yielding) Framework to sustain school excellence in an Indonesian Islamic secondary school. The findings show that sustainable school excellence emerges not from isolated innovation initiatives but from the continuous integration of curriculum transformation, digital innovation, instructional improvement, collaborative leadership, and organisational learning.

The study contributes to educational change literature by reconceptualising educational innovation as an integrated organisational capability. Rather than functioning as sequential stages, the four TORY capabilities interact recursively to enable continuous adaptation and institutional renewal. The empirically refined TORY Framework extends organisational learning and dynamic capability perspectives by providing a theoretically grounded explanation of how schools institutionalise innovation while maintaining organisational coherence and educational identity.

6 Practical implications

The findings suggest that sustainable school improvement requires schools to integrate curriculum development, technology innovation, professional learning, and collaborative leadership within a coherent organisational strategy rather than implementing them as separate initiatives. The TORY Framework provides school leaders with a practical guide for strengthening organisational capability through continuous learning, evidence-informed decision-making, and cross-functional collaboration.

For policymakers, the findings emphasise that curriculum reform, digital transformation, and teacher professional development should be designed as complementary components of long-term organisational capacity building. The framework may also assist researchers and school improvement practitioners in analysing organisational capability and planning sustainable educational innovation across diverse educational contexts.

7 Limitations and future research

This study is based on a single qualitative case study in an Indonesian Islamic secondary school. Although the findings support analytical generalisation, further research is needed to examine the transferability of the TORY Framework across different educational sectors, cultural contexts, and governance systems.

Future studies could employ comparative, longitudinal, or mixed-methods designs to examine how the four organisational capabilities evolve over time and influence educational outcomes. Quantitative operationalisation of the framework would also strengthen its empirical validation and further refine its explanatory scope as a model of sustainable educational innovation.

Declarations

Ethics approval and consent to participate This study was conducted in accordance with institutional and national ethical standards for educational research. Permission to conduct the study was obtained

from the school administration before data collection. Informed consent was obtained from all participants prior to data collection.

Consent for Publication All participants provided consent for the publication of anonymised findings.

Availability of data and material The data supporting the findings of this study are available from the corresponding author upon reasonable request. Data are not publicly available because they contain information that could compromise participant confidentiality.

Competing interests The authors declare that they have no competing interests.

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Authors' contributions All authors contributed to the study conception, research design, data analysis, manuscript preparation, and critical revision. All authors reviewed and approved the final version of the manuscript.

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Figures

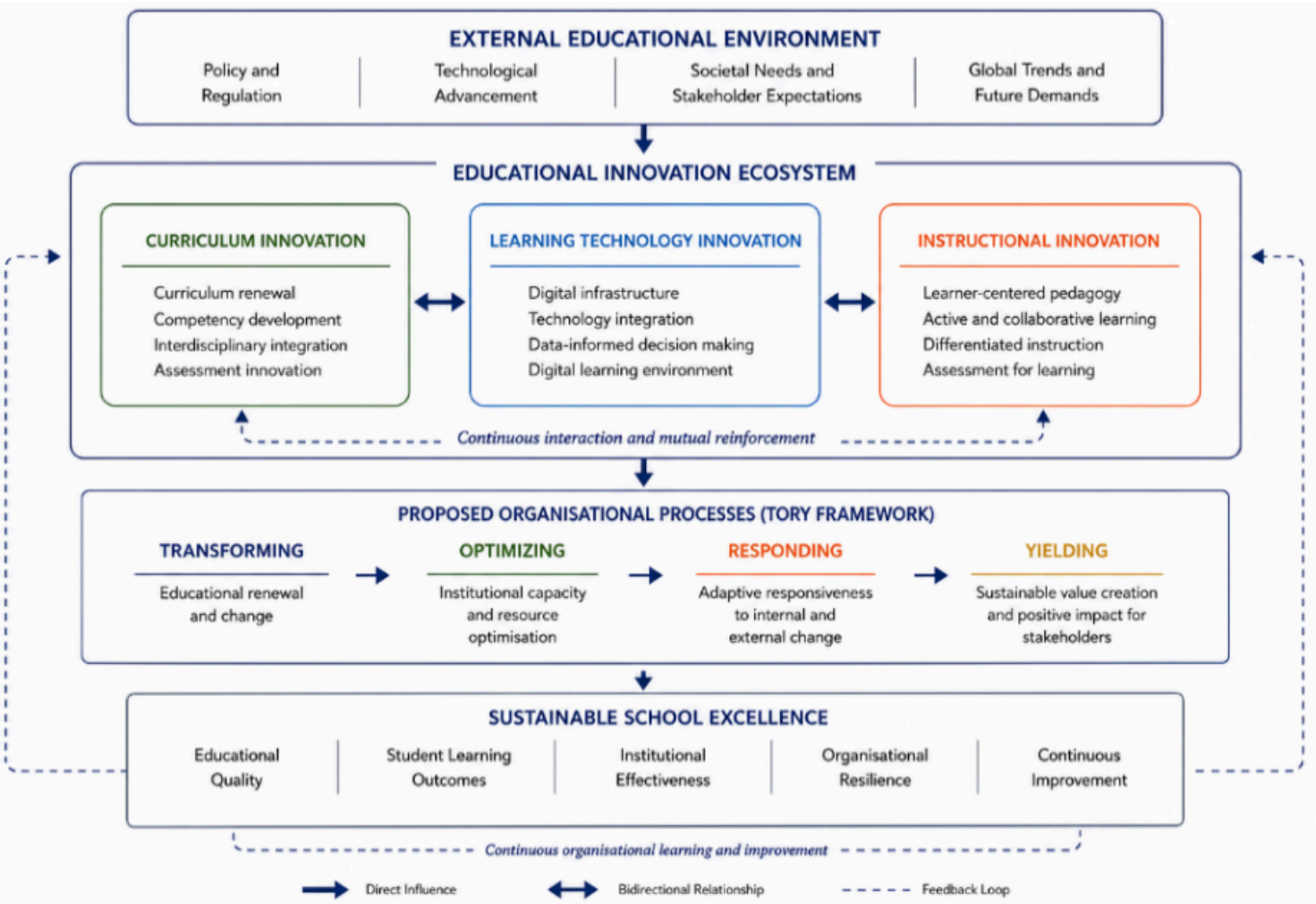


Figure 1

Conceptual TORY Framework: Integrating curriculum, technology, and instruction for sustainable school excellence

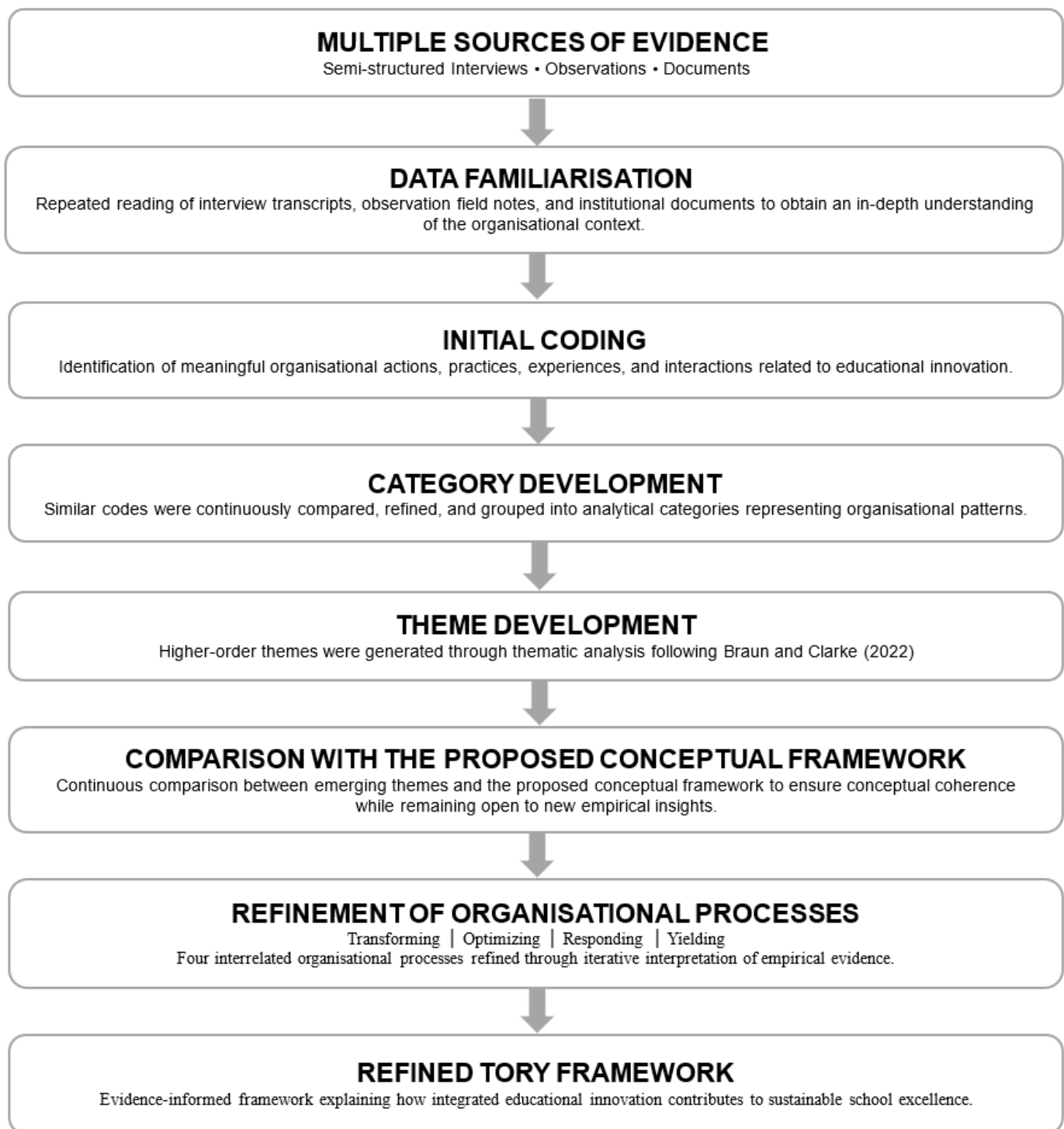


Figure 2

Recursive qualitative data analysis underpinning the development of the Empirically Refined TORY Framework

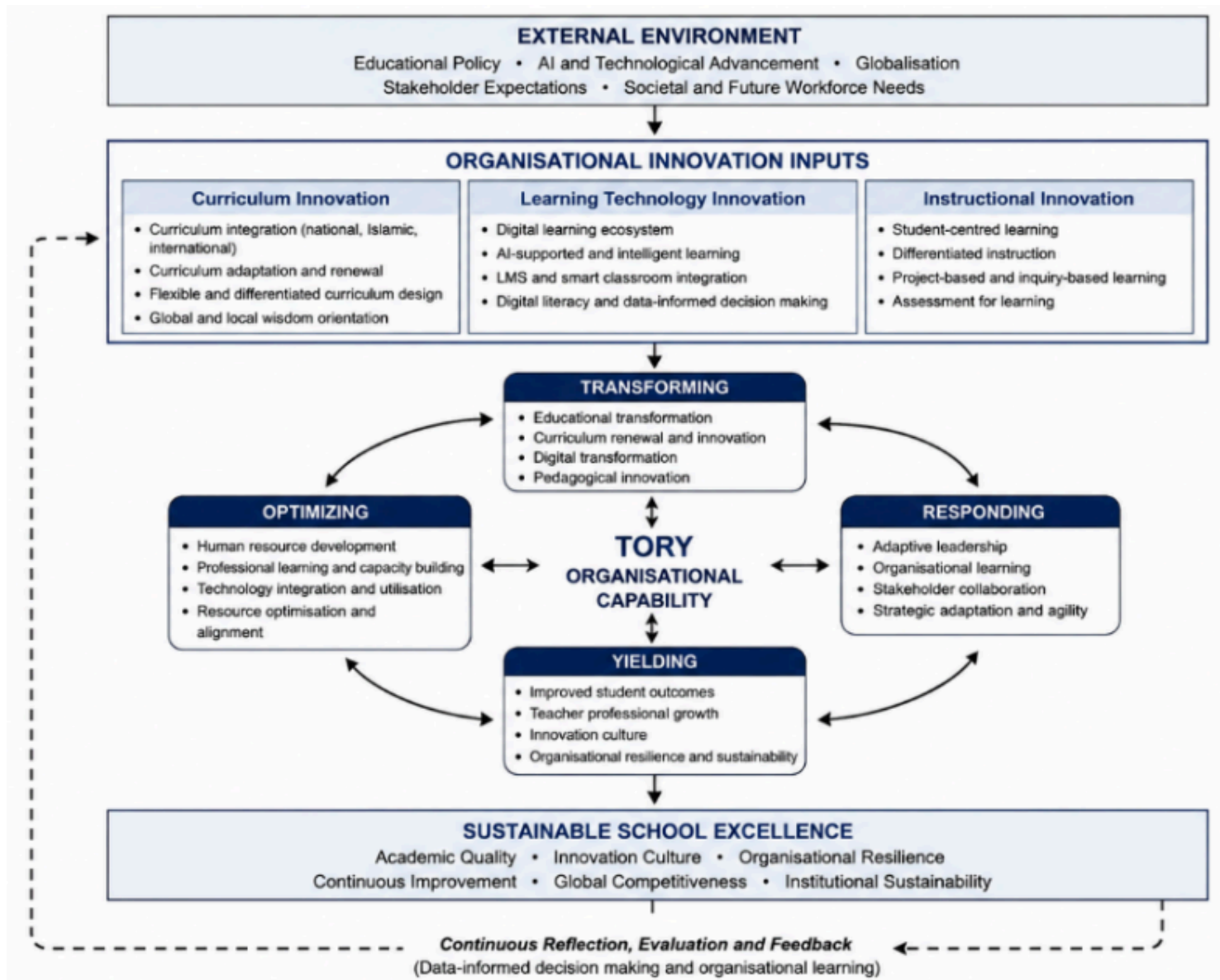


Figure 3

Empirically Refined TORY Framework Illustrating the Recursive Organisational Capabilities Supporting Sustainable School Excellence