

An era of megatrends and polycrisis - reimagining global models of TVET and the case of the Chinese political state-led system

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Abstract

This conceptual review article develops a theoretical framework for understanding possible futures for Technical and Vocational Education and Training (TVET) in an era of global megatrends and conditions of polycrisis. The article develops a twin-nexus framework – a megatrends/polycrisis nexus to analyse complex global conditions and an adaptive/transformational strategies nexus - that enables TVET to be understood as a strategic mediating system, rather than simply an adaptive skills mechanism. This twin nexus framework is applied to aggregated global models of TVET - Anglo-Saxon, Continental, Nordic, Asiatic and Global South - to evaluate different configurations of system responses to the trend/crisis nexus. The Chinese state-led political model framing the world's largest TVET system, is examined as a critical case. The article concludes on a normative note, by outlining a 'socialised ecosystemic' TVET paradigm capable of moving beyond adaptation, and towards transforming the trend/crisis nexus by positioning TVET systems as integral parts of innovative socially just, democratic and sustainable futures.

Key words - megatrends, polycrisis, global TVET models, Chinese political state-led model of TVET, socialised sustainable TVET futures.

Glossary of key concepts

Concepts listed below are in the order they appear in the article.

Concept	Definition
Megatrends	Long-term global structural forces that affect economic, social, technological, political and environmental systems over extended periods.
Polycrisis	A condition in which multiple crises become interconnected through feedback loops, common stresses and domino effects, producing impacts greater than the sum of their individual effects.
Trend/crisis nexus	The dynamic relationship between megatrends and associated crises, through which long-term structural change and acute disruption interact and evolve.
Kernels of crisis	The latent crisis-generating tendency embedded within a megatrend that can produce instability under certain conditions.
Conjuncture	A historically specific configuration of interacting economic, political, technological, social and ecological forces that shapes pressures and possibilities in a particular time and place.
Conjunctural dynamics	Concrete manifestations of the trend/crisis nexus, expressed as interconnected patterns of challenge and development within particular contexts.
Modes of governance	Differing ways in which states, markets and social actors are politically assembled and interact to manage economic, social and environmental development.
Restrictive–expansive continuum	An analytical framework used to assess the capacity of TVET systems to move from narrow, reactive adaptation towards broader developmental and transformative responses.
Adaptive change	Incremental adjustments that enable systems to respond to emerging pressures while largely preserving existing structures and objectives.
Transformative change	Fundamental changes in institutional purposes, structures and practices that create new developmental pathways and societal outcomes.
Strategic mediating system	A TVET system that actively coordinates and shapes responses to economic, technological, social and ecological challenges rather than merely adapting to them.
Socialised ecosystemic paradigm	A normative vision of TVET that integrates social justice, democratic participation, sustainability and coordinated economic development within a connected social ecosystem.
Mutual policy learning	The process through which institutions and systems exchange, adapt and reinterpret policy ideas in response to their specific contexts rather than simply transferring them.
Transformative convergence	The tendency for diverse TVET systems to move towards common social, economic and ecological goals while retaining distinct institutional forms and traditions.

Part 1. TVET analyses in the early 21st century

Dominant and subordinate TVET policy discourses

The emergence and evolution of global megatrends and associated crises present an unprecedented challenge to TVET¹, as well as opportunities to play a pivotal role in response. TVET occupies a distinctive position within education systems due to its intimate and structurally embedded relationship with economic, technological, social, and increasingly ecological development (OECD 2025a). Yet, its contemporary debates remain largely framed within relatively narrow analytical horizons centred on the relationship between skills formation, employer demand, and state coordination in national contexts. At the national level, policy and academic literatures tend to emphasise the importance of specific institutional arrangements, governance structures, and socio-economic contexts shaping policy and practice (Busemeyer and Trampusch 2012, Thelen 2014), in which TVET is primarily understood as an adaptive mechanism tasked with aligning learning provision to shifting labour-market requirements and evolving patterns of work (World Bank, UNESCO and ILO 2023).

At the transnational level, organisations such as the Organisation for Economic Co-operation and Development (OECD), World Economic Forum (WEF) and the European Union (EU) have also articulated the implications of megatrends — globalisation, climate change, technological development, demographic shifts and geopolitical tensions — for skills demand, employability, and lifelong learning (e.g. CEDEFOP 2023). Academic literature has aggregated national systems into several global models (e.g. Anglo-Saxon, Nordic, Continental, Asiatic, and Global South), commonly differentiated according to the relationship between private employers, the state and social aims (Greinert 2005, Bosch and Charest 2008). These aggregated ‘ideal types’ are used here

¹ Throughout this article, the term ‘Technical and Vocational Education and Training’ (TVET) is used in preference to VET. While the two terms are often employed interchangeably, TVET is adopted because it reflects the broader international terminology used by UNESCO, the ILO and many global policy organisations, and because it emphasises the integration of technical, vocational and training functions within contemporary skills systems.

to analyse system responses to the ‘megatrend/polycrisis nexus’ – referred to hereafter as the ‘trend/crisis nexus’.

These dominant discourses on TVET futures exhibit two significant limitations. First, nation-based analyses frequently place employer behaviour and organisational-level skill demand at the centre of the paradigm, reflecting a firm-centred political economy that can constrain imaginings of more expansive, whole-society approaches to skills formation, even though some national models move beyond this framing (Guile and Unwin 2019). Second, at the transnational level, dominant global discourses are limited by the tendency to treat megatrend drivers as discrete and largely linear processes, thereby underplaying the systemic interactions captured by the concept of polycrisis, that give overlapping economic, ecological, technological and geopolitical megatrends a particularly complex and unstable character (Renn and Lucas 2020, Mark et al. 2025). Consequently, both national and transnational discourses tend towards adaptation to individual trends rather than developing policies and practices capable of addressing the intersecting dynamics of polycrisis (Tooze 2022, Lawrence et al. 2024, Garretsen, Kitson and Yang 2025) and the reshaping of TVET systems within their wider political–economic–ecological contexts

Key research questions

In the light of this introductory critical analysis, the article is structured around responses to the following key research questions, addressed in the various parts of the article.

1. What are the main strengths and limitations of dominant policy narratives in relation to the trend/crisis nexus?
2. How does the trend/crisis nexus theoretical framework assist in understanding relationships between global trends, global crises and TVET system futures?
3. In what ways can ‘aggregated global models’ of TVET be classified along restrictive/expansive and adaptive/transformational continua to help locate various national TVET system features and how they respond to the trend/crisis nexus?

4. As an example of national conjunctural dynamics, in what ways is the Chinese political state-led TVET model engaging with the trend/crisis nexus?
5. What is the normative case for a 'socialised ecosystemic paradigm' for TVET, and what pressures and opportunities could it face?

Part 2. Theoretical and methodological frameworks

The conceptual approach and its contributions

This article is a conceptual and theoretical contribution to debates concerning the future of TVET. Its purpose is not to provide a systematic empirical comparison of national TVET systems, but rather to examine the limitations of dominant policy discourses and to develop an alternative analytical framework capable of understanding TVET within the context of the global megatrend/polycrisis nexus.

Drawing on literature from comparative political economy, TVET studies, ecological transition studies and polycrisis scholarship, the article uses ideal-type representations of TVET systems and policy discourses as heuristic devices rather than empirical classifications. The article employs a critical analytical approach by identifying the limitations in dominant national and transnational approaches to TVET futures, before advancing a broader conceptualisation of TVET as a societal institution embedded within interacting economic, technological, social, political and ecological transformations. Through this analysis, the article aims to contribute to conceptual frameworks for future research, policy development and comparative analysis in the context of 21st-century global conditions.

In this analytical and theoretical mode, the article claims to make three conceptual contributions to international TVET scholarship. First, it introduces a TVET-specific trend/crisis nexus analysis that integrates megatrend and polycrisis literatures. Second, it extends a restrictive-expansive analysis from apprenticeship environments to whole TVET systems. Third, it conceptualises TVET as a strategic mediating system capable of undertaking both adaptive and transformative responses.

Global trend/crisis nexus and conjunctural dynamics framework

Trend/crisis nexus analysis

As a response to the limitations of dominant discourses on national-based and transnational analyses of TVET that tend to treat megatrends and polycrisis separately, a ‘twin nexus analysis’ is employed to capture entanglements between long-term global megatrends and intersecting polycrisis.

A nexus refers to a point of intersection and interdependence where multiple forces, processes and domains meet and interact, forming a dynamic field of mutual influence rather than a simple connection (Glavovic 2024). Nexus-based conceptual approaches, therefore, have been recognised for their capacity to analyse complex intersections and interdependencies across sectors and scales (Liu et al. 2018). Accordingly, this form of system analysis also supports a multi-scalar, policy-relevant inquiry to identify conjunctural moments for combinations of adaptive and transformative change (Estoque and Wu 2023). Thus far, the literature on the nexus concept has been situated primarily within the ecological field (Brouwer et al. 2024). Here the concept is applied more broadly in political economy and education, to provide an integrative framework capable of capturing complex interactions between global trends, crises and modes of governance that shape TVET systems and systemic responses.

The trend/crisis nexus framework draws on several additional literatures that have largely developed in parallel. ‘Skills ecosystems’ (e.g. Hall and Lansbury 2006, Buchanan 2015, Buchanan et al, 2017), emphasise the interaction of firms, institutions, labour markets and governance arrangements. ‘Comparative political economy’ (e.g. Bosch and Charest 2008, Busemeyer and Trampusch 2012 and Thelen 2014) demonstrate how skill formation systems are embedded within broader institutional arrangements and relations between the state, employers and organised labour. ‘Polycrisis studies’ (e.g. Renn and Lucas 2020, Tooze 2022, Lawrence et al. 2024) show how constituent crises - economic, ecological, technological, geopolitical and social - interact through feedback loops. Finally, ‘megatrend studies’ (e.g. Naughtin et. al. 2023) examine

large-scale and relatively durable processes of change reshaping societies, economies and institutions over extended periods.

The trend/crisis nexus framework seeks to integrate and extend their respective insights within a two-dimensional analytical architecture. First, megatrends and polycrisis are integrated into a joint phenomenon (see Table 3, Column 2) and, second, this new connective concept is also presented as a series of ‘conjunctural dynamics’, as the trend/crisis nexus is played out in various system contexts (see Table 3, Column 3).

Conjunctural dynamics

The interaction of megatrends under the conditions of polycrisis generates a rapidly evolving field of structural change and challenge that requires not only broader conceptualisation, but also an understanding of how these dynamics are concretely manifested and mediated in specific national system contexts. This complementary analysis is operated through the concept of ‘conjunctural dynamics’ - ways in which economic, technological, demographic, political and ecological forces combine in specific historical moments and places to produce distinctive configurations of pressure, contradiction and possibility (Gregg 2006, Hall and Massey 2010). Conjunctural dynamics analysis is applied later to explore how the Chinese political state-led TVET system mediates and responds to the trend/crisis nexus.

Restrictive/expansive and adaptive/transformative continua

‘Restrictive/expansive’ and ‘adaptive/transformatory’ continua are applied in Part 4 to analyse the potential of global TVET models to move beyond reactive adaptation and to promote strategies capable of transforming the trend/crisis nexus.

The positioning of the aggregated TVET models on the restrictive/expansive and adaptive/transformative continua is an analytical judgement derived from a comparative reading of the literature on governance, institutional coordination, social inclusion, ecological transition, innovation capacity and lifelong learning across different TVET traditions.

Restrictive/expansive positioning is based on the extent to which TVET systems exhibit characteristics associated with expansive provision, including broad participation, social partnership, collective forms of coordination, lifelong learning opportunities and connections to wider societal goals (Fuller and Unwin (2014). Conversely, systems located towards the restrictive end of the continuum tend to emphasise narrower forms of skills formation oriented primarily to immediate labour-market requirements, selective participation, fragmented governance arrangements and limited opportunities for progression and lifelong learning (see Table 1).

Table 1. The restrictive/expansive continuum

Analytical dimension	Restrictive characteristics	Expansive characteristics
Purpose of TVET	Narrow labour-market matching	Economic, social and ecological development
Participation	Selective and segmented	Broad and inclusive
Governance	Fragmented and market-led	Coordinated and collaborative
Learning	Job-specific skills	Broad occupational and lifelong learning
Social objectives	Employability centred	Citizenship, inclusion and sustainability

Sources. Adapted from Fuller and Unwin 2014, Busemeyer and Trampusch 2012, Guile and Unwin 2019.

The adaptive-transformative continuum is developed through a synthesis of resilience, polycrisis, sustainability-transition and comparative political economy literatures, building on the distinction between adaptive capacities, which enable systems to absorb shocks and adjust to change, and transformative capacities, which enable actors to anticipate, shape and restructure systems in response to evolving conditions (Søgaard Jørgensen 2026). In the context of TVET, this distinction is translated into five analytical dimensions - policy orientation, technological change, ecological transition, economic strategy and crisis response (see Table 2). These dimensions provide a heuristic framework for assessing the strategic capacity of different TVET models rather than a formal measurement instrument.

Table 2. The adaptive/transformative continuum

Analytical dimension	Adaptive characteristics	Transformative characteristics
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Policy orientation	Reactive adjustment	Strategic anticipation
Technological change	Responds to employer demand	Shapes technological trajectories
Ecological transition	Mitigation and compliance	Active green transformation
Economic strategy	Skills supply	Developmental and innovation-oriented
Crisis response	Short-term adaptation	System restructuring

Sources. Adapted from Renn and Lucas 2020, Tooze 2022, Buchanan et al. 2017.

International comparative methodological approach

The overall theoretical framework also adopts an international comparative methodological approach, conceptualising national TVET systems as functioning within an interconnected global field and shaped by interacting economic, technological, ecological and geopolitical forces (Garretsen, Kitson and Yang 2025). This embedded approach helps analyse how different TVET systems respond to conjunctural dynamics and how the trend/crisis nexus plays out in specific contexts (Lawrence et al. 2024).

The methodological approach combines comparative political economy with global policy sociology (Rizvi and Lingard 2010), recognising both the continued importance of national institutional configurations and their increasing entanglement within transnational processes. This dual focus leads to the construction of several aggregated global TVET models - Anglo-Saxon, Nordic, Continental, Asiatic and Global South (Saar and Martma 2025) - while, at the same time, acknowledging the limits of typological aggregation by noting significant national variation within global models (Pilz 2016, Clarke, Westerhuis and Winch 2021). This internal differentiation is explored in the case of the Chinese state-led approach as a political variant within the Asiatic model.

Finally, a key methodological move is to connect these aggregated models directly to the trend/crisis nexus, shifting the focus from static institutional comparison toward the analysis of system responsive capacity—the ability of TVET systems to respond to interdependent pressures and to move beyond adaptive adjustment toward more transformative strategies (Renn and Lucas 2020, Tooze 2022).

Part 3. Global megatrends and polycrisis

Entanglements of global megatrends and polycrisis

Global megatrends are long-term, deep-seated structural forces that unfold over decades, operate at a global or transnational scale, and exert transformative effects across economic, social, technological, cultural and environmental systems (OECD 2025a, National Intelligence Council 2012). Transnational organisations (e.g. United Nations 2020) have identified a series of megatrends, including socio-economic polarisation, the climate-nature emergency, digital transformation, ageing/demographic change, and mass migrations, that increasingly manifest not only as long-term structural trajectories, but also as acute and interacting crises.

At the same time, megatrends contain embedded ‘kernels of crisis’ of varying magnitude. In some cases, such as the climate and nature emergency, the crisis kernel is intrinsic to the megatrend itself, with environmental degradation and systemic risk. In other cases, such as the technological revolution, crisis outcomes are not inevitable. While technological disruption can generate economic and social instability, new technologies can also augment human capabilities, support learning, improve productivity and contribute to the solution of complex societal problems (OECD 2025a). Megatrends therefore possess a dual character in which gradual trends also develop as crises of varying intensity (WEF 2025a).

This entanglement of trends and crises can develop into what has been termed a ‘polycrisis’ (Tooze 2022; Helleiner 2024). Polycrisis refers not simply to the simultaneous occurrence of multiple crises, but to a condition in which constituent crises - economic, ecological, technological, geopolitical and social - interact through feedback loops (e.g. pandemics), domino effects and common underlying stresses, such that their combined impact is greater than the sum of their individual effects. As economic, environmental, technological and migration-related trend/crisis relationships intensify, they are increasingly expressed through political polarisation, declining trust in institutions and weakened governance capacity (Lawrence et al. 2024).

These complex and dynamic relationships are conceptualised as being formed and continually reshaped into a ‘trend/crisis nexus’ that expresses the entanglement of long-term trends and erupting crises. Table 3 lays out several inter-relationships: (Column 1) details the main megatrends; Column 2 describes trends becoming crises; while Column 3 integrates these into a series of ‘conjunctural dynamics’, representing systemic relationships and pressures that play out in various national contexts. The five conjunctural dynamics become the focus for analysing how globalised TVET systems and the Chinese case are responding to different dimensions of the trend-crisis nexus (see Parts 4 and 5).

Table 3. Megatrends and polycrisis – the trend/crisis nexus

Megatrends – structural factors	Global megatrends and polycrisis	Conjunctural dynamics in system contexts
1. Economic globalisation	Economic polarisation and global financial instability, interacting with geopolitical conflict and supply chain disruption.	Globalisation–polarisation/instability dynamic.
2. Climate and ecological transformation	Climate/nature emergency resource scarcity and energy insecurity interacting with geopolitical tensions and economic instability.	Eco-transition–security/crisis dynamic.
3. Technological revolution	Labour displacement, inequality and crisis of narrative authenticity, interacting with economic restructuring and social instability.	Techno-development/economic disruption dynamic.
4. Demographic ageing	Labour shortages and fiscal pressures interacting with migration flows and welfare system stress.	Demography/welfare strain dynamic.
5. Migration	Refugee flows, urban pressures, and political fragmentation, interacting with climate change, geo-political conflict, and labour market shifts.	Migration–stability/fragmentation dynamic.

Sources. Adapted from United Nations (2020), Tooze (2022), Lawrence et al. (2024).

Globalised modes of governance

Modes of governance refer to the different ways nation-states, markets and social actors interact to manage the trend/crisis nexus. These governance arrangements vary across countries, creating distinct political economy models with different capacities to respond to social, economic and environmental challenges (Hall and Soskice 2001). This perspective helps explain how megatrends become entangled in global polycrises. Megatrends do not generate polycrises automatically; rather, their effects are mediated through modes of governance that can either amplify existing kernels of crisis or mitigate their impacts.

Over the last four decades, the most influential governance model has been the ‘neoliberal world order’ (NWO), which has shaped patterns of globalisation, technological change and economic integration. As an expression of modern capitalism (Albert 2025), the NWO has intensified financial instability, inequality and uneven development. As this order has entered a period of fragmentation and retreat, its unravelling has become a source of further instability, contributing to economic crisis, social dislocation and political backlash against globalisation (Gerstle 2022; Stiglitz 2024).

At the same time as heightening instability and fragmentation, the trend/crisis nexus simultaneously opens the possibility of a more multipolar global order (Wijaya and Jayasuriya 2024, Linsi and De Graaff 2026). In the context of this article, emerging ‘global polycentrism’ is significant for understanding how variegated modes of governance and their associated aggregated TVET models are taking shape, as different national and regional systems respond to shifting balances of power and evolving institutional logics (Busemeyer and Trampusch 2012, Thiel 2023).

Part 4. Global models of TVET and megatrend/polycrisis dynamics

Aggregated global TVET models

While TVET has been shaped first and foremost through nationally specific systems and labour market settlements (Estevez-Abe, Iversen and Soskice 2001), the preceding modes of governance

analysis suggests that these systems can be grouped into broader global models - Anglo-Saxon, Continental, Nordic, Asiatic and Global South - according to the degree of state coordination, firm involvement and the role of social aims (Greinert 2005, Bosch and Charest 2008, Busemeyer and Trampusch 2012). Following Pilz (2016), these ideal types are used as heuristic rather than empirical categories.

Within this comparative framework, the Anglo-Saxon model, as a dominant education discourse, has been strongly influenced by what Sahlberg (2023) terms the 'Global Education Reform Movement (GERM)' - a neoliberal policy orthodoxy characterised by marketisation, curriculum standardisation, accountability regimes, and competition-driven reforms (Sellar and Lingard 2014). The Anglo-Saxon Model thus exhibits several restrictive characteristics (see Table 1), that can be contrasted with more coordinated or state-oriented systems (e.g. Nordic, Continental and Asiatic models), which emphasise collective skill formation, institutional collaboration, state mobilisation and longer-term capacity building (Jørgensen 2018), demonstrating more expansive characteristics (also see Table 1).

The restrictive/expansive nexus and adaptive/transformatory change paradigms

Part of the restrictive/expansive nexus is the concept of 'change paradigms'. This refers to processes through which the trend/crisis nexus is mediated, translated, and institutionalised within two paradigmatic forms - adaptive and transformative. Adaptive change is presently the dominant response, championed through transnational organisations such as the OECD and the WEF, with a focus on incremental adjustments such as the updating of curricula to reflect new technologies, the expansion of reskilling and lifelong learning provision, and the strengthening of system resilience in response to rapid labour market change (OECD 2025a, WEF 2025b).

Overall, established policy literature tends towards the adaptive, treating change as incremental, with the risk of underestimating both the structural depth of global megatrends and the systemic disruption associated with conditions of polycrisis (Tooze 2022). In contrast, transformative change involves a more fundamental reconfiguration of purposes, structures, and practices,

encompassing systemic shifts toward sustainability transitions and the reimagining of work and skill formation in the context of climate change and automation (UNESCO 2023, IPCC 2022). While this transformative perspective is supported by several transnational organisations, it should nevertheless be regarded as emergent rather than dominant.

The potential for system changes by globally aggregated TVET systems can be interpreted through the concept of a ‘restrictive-expansive nexus’. Developed by Fuller and Unwin (e.g. 2003, 2004, 2014) to analyse the developmental possibilities of apprenticeships, their ‘expansive/restrictive’ couplet distinguishes between expansive workplace environments that promote broader skills capabilities and developmental trajectories and restrictive environments that serve to limit learning to narrow, task-specific competences shaped by immediate organisational needs.

In this article, their illuminating distinction is subjected to a double revision. The focus is broadened beyond apprenticeships and workplace learning and applied to wider TVET systems, utilising a ‘political economy, ecology’ analytical framework (Ramsarup, Lotz-Sisitka and McGrath 2022). With this broader focus, the expansive/restrictive couplet is also reorganised into a ‘restrictive/expansive continuum’, allowing for national TVET systems in aggregated form to be positioned according to their relative capacities for adaptation and transformative activity in relation to the trend/crisis nexus.

Global TVET models and responses to trend/crisis and conjunctural dynamics

Table 4 summarises the relationship between five aggregated global TVET models, the trends/crisis nexus in the form of a ‘restrictive/expansive continuum’, highlighting differentiated strategies of market-led responsiveness and longer-term state-led economic, technological, ecological and social capacities in the context of global resource imbalances.

Table 4. Restrictive/expansive continuum of system responses to the trend/crisis nexus

Global model and key system characteristics	Responses to the trend/crisis	Likely position within the restrictive/expansive continuum
1. Anglo-Saxon (market-led systems) Market-led, with employer demand shaping skill formation; high flexibility, but largely reactive and short-term in orientation.	• Short-cycle, reactive adjustments driven by labour market signals. • Emphasis on individual responsibility for reskilling/upskilling with weak lifelong learning arrangements. • Fragmented innovation.	Position - strongly restrictive, limited adaptation.
2. Continental (dual systems) Strong institutional coordination and social partnership.	• Incremental adaptation through existing institutional frameworks. • Social dialogue enables gradual managed adjustment. • Shifts toward lifelong learning systems anchored in TVET pathways.	Position - moderately restrictive, mildly adaptive.
3. Nordic (social systems) Broader social and developmental goals integrating social inclusion and emerging transformation agendas.	• System-wide strategies linking skills, welfare, social inclusion, innovation, and green transition agendas. • High investment in lifelong learning ecosystems. • Social inclusion as a central focus.	Position – intermediate, moving toward expansive transformative.
4. Asiatic (state-led systems) Strong state coordination and strategic capacity.	• Strategic, state-driven mobilisation linked to national development priorities. • Rapid expansion of technical and higher-level skills pipelines. • Tension between top-down coordination and local/system flexibility.	Position - mixed/variable, adaptive/transformational tension.
5. Global South (heterogeneous systems) Structural constraints, but also sites of experimentation and innovation driven by alternative development pathways.	• Constrained contexts - short-term survival strategies, informal sector skills, and donor-driven programmes. • Some dynamic contexts of policy experimentation (e.g. inclusion of non-formal economy).	Position – polarised, restrictive in constraint/potentially expansive in experimentation.

Sources. Adapted from Bussemeyer and Trampusch 2012, Pilz 2016, Saar and Martma 2025.

Anglo-Saxon Systems

The Anglo-Saxon model typically encompasses a core group of around five countries—the UK, US, Australia, Canada and New Zealand — characterised by market-led skill formation and weak collective coordination (Vossiek 2018). Beyond this core, elements of the model have been selectively adopted in a wider range of countries (Wheelahan 2015), notably in parts of Eastern Europe and Africa where reforms have drawn on UK-inspired competency-based qualifications frameworks and employer-led approaches (Allais 2012). However, these latter cases are better understood as examples of policy transfer and institutional hybridisation than as full members of the Anglo-Saxon model, since imported reforms have been mediated by existing educational systems, labour-market structures and state traditions, producing distinctive national variants rather than convergence on a single model (Young and Allais 2013).

This market-led model tends to respond to trends/crisis dynamics in a predominantly decentralised and reactive manner, with the diffusion of responsibility for adaptation across individuals and firms. While market-led approaches can generate flexibility, reflected in the expansion of short-cycle credentials and employer-led upskilling (Brown, Lauder and Ashton 2011), both academic and policy literatures point to persistent coordination failures and underinvestment in training (e.g. Bussemeyer 2015, NAO 2022), resulting in fragmented responses (Powell, Lewis and Bolton 2025). While its flexibility strengths are noteworthy, without stronger social and ecological coordination, market-led mechanisms risk constraining the system's capacity to move from reactive adaptation toward more anticipatory and transformative pathways (Improta and Mannoni 2025).

Continental Dual Systems

Continental Dual Systems represent coordinated market economies (Hall and Soskice, 2001), in which firms, the state, and social partners jointly organise vocational training, emphasising occupation-specific skills, collective arrangements, and long-term investment (Thelen, 2014). This TVET model is most fully institutionalised in a core group of three countries—Germany, Austria and Switzerland — widely regarded as archetypal coordinated skill formation systems based on strong apprenticeships, social partnership and occupational labour markets (Lassnigg

2023). Beyond this core, a wider group of European countries, including Denmark, the Netherlands, Belgium and Luxembourg, exhibit important elements of dual or coordinated training systems, although typically in more hybridised forms that combine workplace and school-based provision (Le Mouillour 2026). As a result, a broader comparative perspective recognises a continental family of around six to seven systems sharing key institutional characteristics.

The Continental Dual System model responds to the trend/crisis nexus through deeply institutionalised coordination, incremental reform and strong occupational anchoring, emphasising the system's collective skill formation capacity (Bosch and Charest 2012). Through this perspective, the dual system functions as an adaptive mechanism, updating occupational standards through consensus-based procedures that provide systemic resilience (Deissinger, 2015a), although the system's reliance on incremental, path-dependent change can slow responses to disruptive transformations (CEDEFOP 2024). Nevertheless, this global model represents a coordinated and resilience-oriented strategy; combining stability with gradual reform through institutionalised social partnership.

Nordic Systems

At the core of this model are the Scandinavian countries—Finland, Sweden and Norway—where comprehensive welfare states, high levels of social partnership and strong public investment underpin integrated and inclusive lifelong learning systems (Dølvik and Steen 2018). Beyond this core, a wider Nordic grouping—including Denmark and Iceland—share many of these institutional characteristics, enabling a more expansive and anticipatory response to the trend/crisis nexus (de la Porte and Larsen 2023). There is significant overlap between the Continental Dual and Nordic systems, with some countries (e.g. Denmark) being seen to belong to both wider families due to their common historical grounding in social-democratic traditions. Nevertheless, Nordic systems distinctively integrate skills policy, economic competitiveness, social inclusion and environmental transitioning (Jørgensen 2018), capable of rapid reskilling across the life course, particularly in response to digitalisation and the green transition

(CEDEFOP 2020). The Nordic model thus represents a distinctive proactive and integrative approach, based on coordinated institutions and welfare-state logics to address complex, interdependent pressures (OECD 2023).

Asiatic Systems

Asiatic TVET systems are characterised by strong state coordination, concentrated investment and the steering of education and training towards national development priorities, which create significant potential for transformative change, particularly in contexts of rapid industrial upgrading and technological transition (Lee and Nahm 2024). However, the integration of social and equity goals varies significantly across national contexts, with some systems prioritising competitiveness and economic growth over inclusive access and lifelong learning (ILO 2026). Moreover, while strong central steering enables decisive large-scale reform, it also creates tensions between top-down coordination and local flexibility (Schröder et al. 2023). Despite these challenges, Asiatic systems represent a strategic, state-led and transformation-oriented response to the trend/crisis nexus, combining high capacity for rapid change with ongoing challenges around inclusivity, adaptability and system diversity. Variations within this model is explored in the China case.

Global South Systems

Global South TVET systems can be treated as a loose and heterogeneous family that includes Sub-Saharan Africa and parts of South Asia and Latin America; countries united by shared structural constraints - limited public financing, weak institutional coordination and the dominance of informal labour markets - which together tend to restrict the scope and effectiveness of formal skill formation (Allais 2020, Edjigu and Iddrisu 2025). As a result, responses to contemporary pressures are uneven, varying according to state capacity, governance quality and external dependencies, including the influence of international development agencies and NGOs (World Bank, ILO and UNESCO 2023).

At the same time, however, these contexts are also significant sites of policy experimentation and institutional innovation in which emerging hybrid governance arrangements - states, private providers, civil society organisations and international actors - are generating new forms of provision and pathways into work (VET Africa 4.0 Collective 2023). In the case of Sub-Saharan Africa, efforts include expanding community-based training and aligning TVET more closely with local economic ecosystems and climate-related pressures (McGrath et al. 2020). Overall, therefore, Global South TVET systems tend to occupy a structurally constrained position toward the weaker end of the coordination continuum, while exhibiting heterogeneity and increasing hybridisation through ongoing experimentation.

Continuum positioning, convergence and divergence

As Column 3 in Table 4 shows, the five global TVET system types can be positioned along a restrictive–expansive continuum, reflecting their differing capacities for coordination, social inclusion and transformative adaptation (see also Table 1).

Nordic systems occupy the most expansive position, combining strong public governance, inclusiveness, welfare-state principles and lifelong learning. Continental dual systems also display high levels of coordination through social partnership and workplace-based skill formation, although with a more incremental approach to change. Asiatic systems demonstrate significant transformative capacity through state-led mobilisation, but often with less flexibility. Anglo-Saxon systems, while offering delivery, tend towards the restrictive end due to weaker institutional coordination and a continuing reliance on employer-led skills-supply approaches. Global South systems remain constrained by resource limitations and institutional fragility but also serve as important sites of innovation and experimentation. While some convergence is evident due to shared pressures and reform agendas, these system types continue to diverge in the extent to which they can respond expansively to global change (Clarke, Westerhuis and Winch 2021).

Part 5. The case of the Chinese political state-led TVET system

Chinese case selection and its relationship to the comparative framework

The greater emphasis placed on China reflects the different purposes served by the comparative and case-study components of the article. The aggregated global TVET models are employed as heuristic devices for broad comparative analysis of systemic capacities across major institutional traditions, to position different models along the restrictive-expansive and adaptive-transformative continua. The Chinese case, by contrast, is not intended to represent the Asiatic model as a whole but as an internal variant. While the aggregated global TVET models operate at a higher level of abstraction, the Chinese case provides a meso-level illustration of how the analytical framework can also be deployed to analyse specific national contexts with aggregated global models.

China was selected for three reasons. First, it operates the world's largest TVET system and therefore represents a particularly significant site for examining contemporary TVET development (UNESCO- UNEVOC International Centre 2025). Second, China is exposed simultaneously to many of the principal dynamics comprising the global trend/crisis nexus, including technological transformation, ecological transition, demographic change, migration, geopolitical tensions and economic restructuring (Worlddidac Association 2025). Third, China's distinctive political state-led approach provides an opportunity to examine how a strategically coordinated TVET system seeks not only to adapt to external pressures, but also to shape wider developmental trajectories (Ministry of Education of the People's Republic of China 2022).

An analysis of this national case proceeds in three steps – linking the conjunctural framework to the Chinese context, examining Chinese TVET responses to five conjunctural dynamics (set out in Table 3) and assessing how far these responses constitute adaptive adjustments or transformative changes.

China TVET system background

Chinese potential in the field of TVET is well documented, with a growing body of research highlighting its expanding scale, strategic alignment with national development goals and

increasing systemic impact (Chen, Schmidtke and Jin 2024, Avis 2024). These are closely linked to processes of Chinese-style modernisation, characterised by high-quality economic development, technological innovation, industrial upgrading, common prosperity, ecological sustainability, and national rejuvenation (Mok and Guo 2023).

At the same time, research also acknowledges persistent structural tensions which continue to shape the limits of this potential (Xu and Wang 2025, Tang and Lu 2026). Applying a conjunctural dynamics framework (derived from the dynamics listed in Table 1) to the Chinese context reveals a distinctive set of tensions as multiple forces converge - manufacturing continues outward expansion while economic globalisation faces headwinds (Tang and Lu 2026); ecological transition has become a national priority, yet a structural gap persists in green skills supply (OECD 2025b); the technological revolution accelerates while faculty knowledge renewal lags (Xu and Wang 2025); population ageing deepens but the response of TVET remains insufficient (Liu, Yu and Kuang 2026); and large-scale internal migration persists while institutional blockages affecting urban integration remain unresolved (Yang and Liu 2026, Bertrand et al. 2025).

Chinese TVET and its responses to the five conjunctural dynamics

1. Globalisation – polarisation/instability dynamic

China's TVET response to globalisation has evolved from a strategy of policy borrowing to one of strategic internationalisation. During the reform era (1978–2012), development was strongly influenced by the adaptation of foreign models, particularly the German dual system (Tang and Lu 2026).

The 'Belt and Road Initiative' launched in 2013, however, marked a significant shift, with the principle of 'following industry overseas with education provision' becoming a central feature of Chinese TVET internationalisation. This involved vocational colleges supporting Chinese enterprises operating abroad by providing skills training in sectors such as railway construction, manufacturing, renewable energy, and telecommunications. By the mid-2020s, more than 200 vocational colleges had established over 400 overseas programmes in over 70 countries (Li et al.

2025), supported by initiatives such as the 'Luban Workshops', which offer training particularly in the Global South in areas including industrial robotics, engineering technology, and digital manufacturing.

Nevertheless, this strategy faces significant tensions. Tang and Lu (2026) identify three interrelated dilemmas - actor dilemmas, arising from fragmented governance and weak cross-departmental coordination; resource dilemmas, reflecting uneven investment and short-term incentives; and institutional dilemmas, particularly difficulties in cross-border qualification recognition and credit transfer.

Overall, China's response in this area remains largely adaptive, extending existing institutional arrangements into new international contexts rather than fundamentally transforming the purposes and governance of TVET.

2. Eco-transition – security/crisis dynamic

China's TVET response to ecological transition is moving from a fragmented focus on green skills towards a more systematic model of green vocational education. The dual-carbon goals have provided a strong policy framework, with green competencies increasingly incorporated into vocational standards, curricula and training programmes (Tang and Lu 2026, World Bank, UNESCO and ILO 2023). Initiatives such as the 'Win the Future' programme have developed a three-tier curriculum reaching more than 75,000 learners (Li et al. 2025). However, significant constraints remain. Faculty capacity for dual-carbon programmes is uneven, enterprise engagement varies considerably, and regional disparities in the provision of green skills persist. The international transfer of Chinese green standards also faces localisation challenges (Tang and Lu 2026). Earlier studies similarly argued that TVET can only make a fuller contribution to green development through curriculum innovation, stronger talent development mechanisms and sustained policy support (Chen 2017), while vocational teachers require greater capacity to integrate sustainability concepts into teaching and learning (Xie 2019).

Overall, China's response remains developmental rather than fully transformative, with green principles increasingly embedded in policy and curricula, but to become fully institutionalised across the TVET system (Tang and Lu 2026, Avis 2024).

3. Techno-development/economic disruption dynamic

Digital transformation has become a central pillar of China's TVET modernisation strategy. The National Smart Education Platform now hosts more than 1,700 resource repositories and 79,000 virtual simulation resources, while new intermediary organisations – such as industry–education integration alliances, sectoral vocational education steering committees, and regional industry–education consortia linking colleges, enterprises, and local governments – are strengthening industry–education integration through state coordination, enterprise participation and digital platforms (Editorial Department 2025, Yang and Liu 2026).

However, technological investment has not eliminated deeper skills mismatches. Xu and Wang (2025) identify tensions between rapid technological change and slower cycles of curriculum renewal and teacher development. Only around 40 per cent of teachers consider curricula fully aligned with social and industrial needs, while more than half of vocational students prioritise progression to higher education rather than direct employment. Parental confidence also remains limited, with only 22.4 per cent expressing high levels of satisfaction with vocational education (Xu and Wang 2025). Cai and Xu (2024) further identify significant regional variation in outcomes, suggesting that digitalisation alone cannot overcome entrenched institutional and spatial inequalities.

Overall, while China's response is increasingly expansive, linking digital transformation with industry–education integration and innovation policy, tensions persist between technological acceleration, institutional capacity and social and cultural expectations, indicating that technological modernisation has yet to become fully transformative (Han, Li and Guo 2025).

4. Demography/welfare strain dynamic

China's TVET system is increasingly shaped by demographic pressures associated with population ageing, low fertility and changing labour market demands. Higher vocational education faces multiple challenges, including declining enrolment, marginalisation within the education hierarchy and insufficient institutional resilience, prompting calls for a restructuring of traditional development models (Liu, Yu and Kuang 2026). At the same time, China's population aged 60 and over has reached more than 320 million, creating growing demand for skills in elderly care, rehabilitation, healthcare and age-friendly services. While the emerging 'silver economy' is expanding into areas such as smart health, rehabilitation technologies and age-friendly retrofitting, the TVET response has remained fragmented. Tang and Lu (2026) note that programme provision is uneven, industry–education cooperation remains underdeveloped and talent shortages persist, particularly in elderly care.

As a result, current responses largely take the form of adaptive adjustments rather than system-wide transformation, with no fully institutionalised strategy yet capable of aligning TVET with China's long-term demographic transition (Liu, Yu and Kuang 2026, Tang and Lu 2026).

5. Migration – stability/fragmentation dynamic

With around 300 million migrant workers, a central challenge for China's TVET system is providing accessible and meaningful skills development pathways for a highly mobile workforce. While policy has expanded access to training, significant barriers remain, including time constraints, limited ability to pay and restricted opportunities for occupational progression (Tang and Lu 2026). The household registration (hukou) system continues to create institutional separation between skills formation and urban integration. While intermediary organisations have begun to play a mediating role through talent-pool and industry–education integration models (Yang and Liu 2026), their influence remains geographically concentrated in the more developed eastern regions with Ren, Yan and Zhang (2025) arguing that these disparities largely reflect wider patterns of regional economic development and uneven resource allocation.

Overall, China's response in this area remains predominantly adaptive, with the integration of skills development, labour mobility and social inclusion remaining a largely unresolved challenge within the broader migration conjuncture.

Chinese TVET - adaptation or transformation?

Synthesising these responses reveals a trajectory of adaptive adjustments dominating, coexisting with nascent institutional innovations.

From the adaptive perspective, China's TVET demonstrates considerable adaptability—shifting internationalisation, advancing digital transformation, and responding to demographic pressures—all within existing institutional frameworks. However, the six tensions identified by Xu and Wang (2025)—skills demand dilemmas, technological iteration challenges, misaligned teaching objectives, imbalanced resource allocation, social recognition paradox, and career planning tensions—systematically embody the limitations of this adaptive model.

From the transformative perspective, more structural changes are emerging. First, the apprenticeship system was elevated from a model to a national institution in the 2022 Vocational Education Law, although Yu and Kuang (2025) note obstacles including insufficient design and ambiguous legal status. Second, intermediary organisation innovation suggests a new 'social coordination of skill formation' mechanism is emerging (Yang and Liu 2026). Third, the 2025 Government Work Report confirms that promoting the integration of vocational and general education is a key task for building a high-quality education system designed to strengthen progression routes and permeability between vocational and academic pathways (Kuang and Jiang 2025). However, these reforms will need to overcome enduring cultural preferences for academic education if vocational pathways are to achieve equivalent social status and attractiveness (Li et al. 2025).

From a conjunctural perspective, China's TVET stands at a critical juncture transitioning from an adaptive to a transformative settlement. Li and Ren's (2025) historical analysis shows China's

TVET has passed through four stages—'saving,' 'building,' 'prospering,' and 'strengthening the nation through skills.' Whether genuine transformation occurs depends on three propositions - governance moving from fragmented multi-departmental to systematic coordination; talent cultivation shifting from qualification-oriented to competency-oriented with institutional closure; and industry-education integration deepening from policy advocacy to marketised benefit communities. The realisation of this transformative settlement thus hinges not on incremental reforms, but on whether these three propositions can be enacted synergistically to fundamentally reconfigure the institutional architecture, incentive structures, and stakeholder relationships (Yu 2026).

Part 6. Towards a socialised and ecosystemic paradigm for TVET

The trend/crisis nexus and TVET as a strategic mediating system

The interlocking trend/crisis nexus presents increasingly systemic challenges to TVET globally, with a key question being whether TVET systems continue to function mainly as adaptive mechanisms in relation to each of the conjunctural dynamics or how they can be repositioned as 'strategic societal mediating systems', capable of coordinating responses to turbulent interconnected economic, ecological, technological, and social landscapes.

Table 5 illustrates how the trend/crisis nexus generates a series of interconnected systemic challenges that extend well beyond the adaptive capacity of conventional TVET systems. Across domains of globalisation, ecological transition, technological change, demographic pressure and migration, the common thread is the need for TVET to move from reactive responses and towards a more integrated, strategically mediating role to transform systemically entangled pressures.

Table 5. Dynamics, challenges and the strategic mediating potential of TVET

Conjunctural dynamic and core tension	Systemic challenges	TVET as strategic mediating system
1. Globalisation – socio-economic division vs integration and social justice	Inequality, uneven access to skills, weakened social cohesion.	TVET as a strategic mediator of inclusive globalisation anchored in socialised goals, equity and regional development.

2. Climate emergency – incrementalism vs just transitioning	Policy inertia, fragmented green skills provision, misalignment of economic and ecological systems.	TVET as integrator of sustainability across curricula, institutions and labour markets to support system-wide ecological transition.
3. Technological revolution – labour displacement vs innovation	Skills mismatch, uneven technological diffusion, rapid obsolescence, widening inequality.	TVET as an enabler of system-level integration between education and industry to support inclusive technological transition.
4. Demography and welfare strain – ageing population vs labour supply	Labour shortages, fiscal pressures, weak lifelong learning participation, underdeveloped reskilling systems.	TVET as an organiser of life-course transitions, embedding lifelong and universal participation frameworks linking skills formation, employment and welfare systems.
5. Migration – labour mobility vs social fragmentation	Labour market segmentation, weak recognition of qualifications, social exclusion, institutional barriers.	TVET as a facilitator of mobility and integration, developing flexible, portable and interoperable skills and qualification systems supporting inclusion across territories and systems.

Sources. Adapted from Lawrence et al. 2024, Spours and Grainger 2024, Avis 2024, OECD 2025b.

A socialised and ecosystemic paradigm

The analysis up to this point has been primarily descriptive and comparative, examining how different TVET traditions respond to the trend/crisis nexus and positioning them along the restrictive-expansive and adaptive-transformative continua. The discussion that follows is explicitly normative, by drawing on insights from this comparative analysis to explore a possible direction of future TVET development.

In response to these conjunctural dynamics and systemic challenges, this article proposes a 'socialised ecosystemic paradigm' as a values and purposes-led framework for reimagining TVET systems around coordinated support for social justice, democratic participation and ecological transition. The socialised ecosystemic paradigm should therefore be understood as a conceptual proposition concerning the forms of TVET most capable of responding to the challenges posed by the trend/crisis nexus.

This expansive paradigm moves beyond a narrow focus on skills acquisition and employability to generate a 'social model of TVET' that develops human capabilities, collective agency and

social responsibility. Drawing on the tradition of John Dewey (1916), vocational learning can be seen as a democratic and ethical practice through which individuals contribute to the common good; a perspective enriched by the German concepts of *Beruf* and *Bildung*, which emphasises the formation of the whole person, linking vocational identity to self-determination, solidarity and active citizenship (Deissinger 2015b). Contemporary UNESCO and UNEVOC frameworks reinforce these traditions by positioning TVET at the heart of ‘just transitions’, equipping learners not only with technical expertise but also with the knowledge, values and capacities required to address climate change, social inequality and sustainable development (Avis 2024, Spours and Grainger 2024).

From this advanced perspective, the various global TVET models engage with this organising principle from distinct starting points. Nordic systems approach it through established traditions of social integration and welfare coordination; Continental systems through institutionalised workplace collaboration and social partnership; Asiatic systems through state-led strategic mobilisation aligned with national development goals; Global South systems through hybrid, experimental approaches shaped by social inclusion imperatives and climate-related challenges; and Anglo-Saxon market-led systems through instances of flexible delivery. While these development pathways vary, they each point—explicitly or implicitly—towards the need for more socially embedded and ecologically attuned forms of TVET capable of mediating the complexities of the trend/crisis nexus.

Addressing tensions and resistances - the role of dialogue and mutual policy learning

The emergence of this more transformative paradigm, however, is neither linear nor assured. As Table 3 shows, significant systemic challenges remain, including TVET capacity gaps, balancing strategic coordination and local responsiveness and the persistence of inequalities across regions, sectors and social groups that continue to frustrate attempts at bolder TVET strategies (Clarke, Westerhuis and Winch 2021). These tensions are further amplified by shifting political dynamics, including the rise of far-right populism and antagonistic nationalisms, which mobilise resistance to sustainability agendas and international cooperation, thereby complicating efforts to advance coordinated responses to the trend/crisis nexus (Gerstle 2022, Avis 2024).

Within contested landscapes, the advancement of a more socially embedded and transformative TVET paradigm therefore depends less on the replication of institutional models and more on processes of dialogue, contestation and mutual policy learning across systems as actors interpret, adapt and reconfigure ideas in wider contexts in relation to their own institutional and system conditions (Rizvi and Lingard 2010, Raffe 2011). Independent research communities, trade unions and global civil society organisations can play a critical role in this process by generating alternative knowledge, critical perspectives and innovation pathways through dialogue with transnational organisations - OECD, WEF, EU, UNESCO, UN and ILO – in which mutual policy learning emerges as a distinct mediating mechanism (ILO 2022).

Conclusion – towards transformative convergence?

The intensifying interdependencies of the trend/crisis nexus make clear that adaptive responses, while necessary, are no longer sufficient to address the scale, complexity and interconnectedness of contemporary challenges. What is now required is a decisive shift towards transformative strategies that reposition TVET as a strategic societal mediating system within a new socialised and ecosystemic paradigm to support broader objectives of social justice, ecological transition, coordinated economic development, technological innovation and lifelong learning. While the various TVET models will continue to reflect distinct institutional traditions and historical trajectories, the emergence of common global challenges creates increasing opportunities for system convergence around shared principles. Thus, convergence becomes based on the leading role of normative principles rather than institutional forms. Accordingly, through dialogue, critical reflection and mutual policy learning, systems can draw on diverse experiences to co-construct more integrated, inclusive and future-oriented forms, with the capacity to actively mediate, shape and transform TVET in the interests of sustainable, equitable and democratic human development.

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