

# Developing University GenAI Innovation Ecosystems in the Chinese higher education context

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## Part 1. Introduction

The rapid global diffusion of Generative Artificial Intelligence (GenAI) is reshaping the strategic priorities of higher education systems, national innovation strategies, and the governance of emerging technologies. While Western policy discourse tends to frame GenAI development in terms of market-based innovation ecosystems—emphasising modularity, entrepreneurial universities, cross-sector collaboration and place-based clustering—the Chinese approach has evolved into a distinctive political, state-led/hybrid model in which innovation is tightly integrated with national strategy, regulatory authority and long-term techno-industrial planning. These two imaginaries reflect contrasting assumptions about how innovation is generated, coordinated and scaled, and they shape the roles assigned to universities, firms, regions and technological infrastructures.

Against this backdrop, the Chinese higher education sector faces an acute strategic challenge: it must build effective and resilient GenAI innovation ecosystems without relying on the “brute force” computational capacity and platform dominance that characterise the United States. Instead, China must combine deliberate strategic direction, institutional coordination and distributed experimentation across a vast and uneven educational landscape. Understanding how this can be achieved requires a conceptual framework capable of capturing the **verticalities** of political strategy, the **horizontalities** of everyday technological practice, and the **meso-level zone of mediation**—the space where policy, institutional action and user innovation meet.

This paper contributes to that task in four ways. First, it offers a critical comparison of Western and Chinese innovation ecosystem literatures, identifying the assumptions, governance logics and institutional forms that underpin each model. Second, it analyses the structural contradictions within China’s own state-led/hybrid approach, revealing tensions between acceleration and dependence, core and periphery, and hierarchical coordination versus organic collaboration. Third, it develops a multi-level GenAI innovation framework grounded in the 45-degree mediation model, showing how macro-level strategy, meso-level institutional architectures and micro-level practices can be aligned into a coherent ecosystem.

Finally, it introduces a taxonomy of mediation activities—epistemic, socio-technical, institutional, political-regulatory, spatial, temporal, ethical, economic, industrial and pedagogical—re-organised into macro, meso and micro categories to demonstrate how innovation can be operationalised across China's diverse university system.

Taken together, these elements provide a synthetic lens through which to understand the organisational, technological and political dynamics shaping the emergence of GenAI university ecosystems in China. They also illuminate the conditions required for Chinese universities to function as strategic mediating institutions—capable not only of implementing national objectives, but of generating the forms of collaborative intelligence needed to sustain GenAI development under conditions of compressed technological time.

## Part 2. A critical comparison of Western and Chinese innovation ecosystems literatures

### Introduction

Part 2 undertakes a critical comparison of Western and Chinese innovation ecosystem literatures, revealing not only contrasting theoretical traditions but also differing assumptions about how innovation is generated, governed, and institutionalised. While Western models typically emphasise market-mediated coordination and place-based collaboration between firms, universities, and public agencies, Chinese scholarship conceptualises innovation ecosystems as state-led socio-technical architectures in which strategic direction, ethical boundaries, and institutional roles are centrally orchestrated. By examining these literatures side-by-side, this section illuminates how differing political economies, governance logics, and developmental objectives shape divergent ecosystem designs—one grounded in emergent network dynamics and competitive complementarities, the other in purposive state planning and techno-industrial sovereignty. This comparison provides the analytical foundation for the later critique of China's political state-led/hybrid model and the development of a multi-level GenAI framework.

### Market-based innovation ecosystem model

An emerging literature on innovation ecosystems could be broadly described as 'progressive market', in which particular types of companies and public bodies collaborate to develop place based and responsive network of innovation and governance (see Table 1).

*Table 1. Key features of the market-based innovation ecosystem model*

Feature	Structural-Relational (Jacobides et al.)	Institutional-Spatial (Finegold /WEF)	Evolutionary-Helix (Marchant-Pérez & Ferreira)
<b>Core concept</b>	<i>Modularity</i> - ecosystems emerge when distinct organizations coordinate without hierarchical fiat.	<i>High-Skill Ecosystems (HSEs)</i> - geographic clusters of high-tech firms requiring specific 'nourishment' and 'host environments'.	<i>Neo Triple-Helix</i> - complexity-driven model where the university becomes a proactive 'entrepreneurial hub'.
<b>Market logic</b>	<i>Value creation</i> - based on 'supermodular' (network effects) and 'unique complementarities'.	<i>Agglomeration economies</i> - wealth and job creation driven by the physical proximity of talent and 'angel capital'.	<i>Knowledge-Based Economy</i> - Universities as sources of industrially valuable technical skills and 'knowledge products'.
<b>Governance</b>	<i>Non-hierarchical alignment</i> - coordination through sets of	<i>Collaborative/public-private</i> - Multi-stakeholder partnerships	<i>Hybridity</i> - Blurring of boundaries between business

	roles and rules rather than customized contracts.	and ‘principled’ urban governance.	and scientist roles; state-led development projects.
<b>Critical lever</b>	<i>Assets &amp; investment</i> - collective investment binds members together.	<i>Physical/digital Infrastructure</i> – ‘Collision of ideas’ fostered by placemaking and digital connectivity.	<i>Mission evolution</i> - shift from simple Industry-University collaboration to ‘Quadruple/Quintuple helices’.
<b>Success metric</b>	<i>Alignment and efficiency</i> - coordination through multilateral dependence.	<i>Self-sustainability</i> - social cohesion, and regional prosperity.	<i>Economic and social growth</i> - new knowledge-based spin-offs.

In ‘Towards a Theory of Ecosystems’, Jacobides and colleagues (2018) provide a conceptual framework to distinguish organisational ecosystems from traditional hierarchies (firms) and purely market-based transactions. They argue that these types of ecosystems emerge when ‘technological modularity’ allows a diverse set of interdependent actors to coordinate without a central hierarchical authority. This distinct form of governance is structured around ‘non-generic complementarities’, in which the ecosystem dynamic is held together by defined multilateral dependencies, shared standards, and a balance between participant autonomy and collective alignment.

With a sector-based focus, Marchant-Pérez & Ferreira in ‘From Evolution to Strategy’ (2025) trace the historical evolution toward ‘Neo Triple-Helix’ models where universities act as regional hubs in which a university can act as the ‘anchor’ to transform an entire urban district into an innovation ecosystem.

The World Economic Forum (WEF) 2025 report *Innovation Ecosystems* and Finegold’s ‘High Skills Ecosystems’ model (1999) represent what is termed an ‘institutional-spatial’ approach. The WEF focuses on the formation of ‘Innovation Districts’, while Finegold (1999) argued that market oriented and place-based high-skills ecosystems require the support of four elements including ‘nourishment from university-based talent pipelines’ and a ‘supportive host environment’ provided by physical infrastructure and government spending. A significant portion of the WEF position is dedicated to the infrastructure required in these place-based ecosystems (e.g. IoT sensors, 5G connectivity, and ‘smart city’ technologies) to enable the data sharing and collaboration.

### Chinese state-led ecosystem model

Unlike the conceptualisation of Western models, Chinese scholarship conceptualises GenAI innovation ecosystems as ‘state-mediated institutional architectures’ in which strategic direction, ethical boundaries, and infrastructural investment are centrally coordinated. This model also contains markets relations that are subordinate to state co-ordination. Therefore, the most accurate terminology is a ‘political, state-led hybrid model’.

*Table 2. Key features of the Chinese state-led/hybrid ecosystem model*

Features	Chinese state-led innovation ecosystem model
<b>Core concept</b>	<i>Guided ecosystem sovereignty</i> – a deliberately constructed socio-technical formation directed by national strategy to ensure technological autonomy, social stability, and socialist modernisation (Xue & Zhao, 2024).
<b>Innovation logic</b>	<i>Strategic priority over market efficiency</i> – innovation is steered by geopolitical containment, civil-military integration, and ethical self-regulation rather than agglomeration or network effects (Wang, 2023).
<b>Governance mode</b>	<i>Top-down functional differentiation</i> – roles for universities, enterprises, and regions are assigned by policy (e.g., MOE “AI+ Education” Plan), not emergent from market interaction (Li & Chen, 2025).
<b>Role of the state</b>	<i>Architect and sovereign</i> – defines AI trajectory through Five-Year Plans, algorithm registry (Cyberspace Administration), national labs, and talent base designations; enforces boundaries via Cybersecurity Law and Ethical Guidelines for AI.
<b>Role of universities</b>	<i>Strategic mediating institutions</i> – elite universities (e.g., Tsinghua, Fudan) serve as “national AI anchors”; non-elite institutions deliver vocational AI literacy and regional talent supply (Li & Chen, 2025).
<b>Critical lever</b>	<i>Institutional resilience</i> – integration of vocational colleges, provincial AI pilot zones, and domestic LLM stacks (e.g., Qwen, DeepSeek) to reduce dependency on U.S. technology (CAS & DRC, 2024).
<b>Success metric</b>	<i>Ecosystem sovereignty</i> – measured by reduced chip dependency, ethical alignment with socialist core values, and contribution to “high-quality development,” not spin-offs or venture returns.

Xue and Zhao (2024) argue that China’s approach rejects the “spontaneous agglomeration” logic of Silicon Valley in favour of a ‘guided ecosystem sovereignty’ model, where the state defines the technological trajectory through algorithm registries, national AI standards, and talent development plans, to ensure that innovation serves national security, social stability, and socialist modernisation. The ecosystem is thus not an emergent network, but a ‘deliberately constructed socio-technical formation’ shaped by Five-Year Plans and the Cybersecurity Law.

In contrast to the ‘entrepreneurial university’ ideal of the Neo Triple Helix (Marchant-Pérez & Ferreira, 2025), Chinese research positions universities not as autonomous innovation hubs but as ‘strategic mediating institutions’ between national AI strategy and local industrial upgrading. Li and Chen (2025)

demonstrate how elite universities like Tsinghua and Fudan operate as ‘national AI anchors,’ while non-elite institutions are tasked with ‘vocational AI literacy’ and regional talent supply—creating a stratified meso-level landscape.

*Table 3. Leading Chinese university GenAI innovation ecosystems*

Dimension	Fudan University	Tsinghua University
<b>Education</b>	<i>100+ AI literacy courses integrated across disciplines.</i> <i>Global AI Governance Centre</i> for capacity building.	<i>AI+ Talent Cultivation Initiative</i> embedding AI across all disciplines. <i>Mandatory AI ethics coursework.</i> Generative AI Summer Schools with hands-on labs.
<b>Research</b>	Strong emphasis on <i>AI-for-Science</i> (materials, life sciences, earth sciences). <i>Partnerships</i> for ethical AI frameworks.	<i>College of AI (CollegeAI)</i> for foundational breakthroughs. <i>Institute for AI Industry Research (AIR)</i> focusing on LLMs, multimodal AI & healthcare AI.
<b>Industry links</b>	Collaborations with global organizations for <i>governance and ethics</i> .	<i>Deep industry partnerships</i> (e.g. ByteDance, DeepSeek for scalable LLMs SALMONN multimodal project, SIA Lab for large model intelligence).
<b>Governance</b>	<i>Centre for Global AI Innovative Governance</i> launched at WAIC 2025. Works with UN to provide AI public goods and ethical frameworks. - Focus on closing global ‘intelligence divide’.	Leads <i>global discourse on AI ethics and governance</i> (e.g. frameworks like <i>AI Governance Ethics: Shared Values and Rules</i> ). Hosts <i>International AI Cooperation and Governance Forum</i> annually.

Crucially, they show that university roles are ‘assigned by policy’, not market demand: the Ministry of Education’s “AI+ Education” initiative mandates curriculum integration, while the State Council’s AI Development Plan designates specific universities as ‘high-end talent bases.’ This reflects a ‘top-down functional differentiation’ absent in Western ecosystem theories.

Chinese scholars frame GenAI ecosystem development within the context of ‘technological decoupling and geopolitical containment’. Wang (2023) contends that China’s push for open-weight LLMs (e.g., Qwen, DeepSeek) is not merely a market response but a ‘sovereign strategy’ to build alternative technical stacks independent of U.S.-controlled platforms and chips. This ‘ecosystem sovereignty’ requires not only R&D but also ‘institutional resilience’ - vocational colleges train AI deployment technicians, national labs develop domestic frameworks, and provincial governments establish AI pilot zones.

Mareno and colleagues in a wide-ranging literature review (2020) have argued that China's innovation ecosystem represents a distinctive hybrid model, characterised by strong state primacy, decentralised experimentation across competing city-regions, and the catalytic role of large digital platform firms. This state-led mixed system is seen to operate as an 'asymmetric' Triple Helix in which government sets strategic direction while allowing local policy laboratories, firms and universities to drive rapid application and scaling.

Like their Western counterparts, Chinese-based innovation ecosystem literatures also tend towards an idealisation logic – conceptualising the optimal operation of the state-led model with the core assumption that it creates a predictable environment in which Chinese universities operate smoothly as responsive institutional actors whose strategies, partnerships, and resource allocations are shaped by predictable macro forces, enabling them to assume orchestrating roles in an ecosystem that is dynamic yet fundamentally orderly, opportunity rich, and institutionally coherent.

### **Part 3. Challenges of the political state-led/hybrid model**

A multi-level critical analysis of the political state-led/hybrid model, however, provides a complex contradictory picture of innovation and uneven development.

#### **Macro-level – intersection of technological, spatial and governance contradictions**

China's GenAI ecosystem and its vocational education and training (VET) system are not isolated domains but co-constitutive pillars of a broader 'state-led techno-industrial strategy' aimed at achieving high-quality development, technological sovereignty, and socialist modernization. Both systems operate under a 'politically coordinated model', characterized by top-down strategic direction, legal-institutional innovation, and alignment with national missions such as "Made in China 2025," "Digital China," and "dual carbon" goals. Yet this coordination generates profound internal contradictions that manifest across three interlocking dimensions: technological, spatial, and governance.

##### **1. Technological contradiction - acceleration vs. substitution**

China exhibits rapid endogenous innovation in AI software and algorithms while remaining structurally dependent on foreign advanced semiconductors—particularly high-end GPUs restricted under U.S. export controls. The state's response—massive investment in SMIC, RISC-V, and alternative computing paradigms—seeks to resolve this through internal reconfiguration.

However, this effort is mediated by the same 'centralized governance logic' that shapes VET reform in which strategic clarity from the centre meets fragmented, uneven implementation on the ground. For instance, domestic AI chip development requires not only capital, but a skilled workforce trained on cutting-edge hardware—a capacity currently constrained by VET institutions' limited access to advanced equipment due to sanctions. The 2022 Vocational Education Law mandates 'dual-qualified' teachers and industry-aligned curricula, yet without reliable access to global-standard tools, vocational colleges resort to 'simulated or symbolic training', reproducing what the document terms 'institutionalized performativity.' Thus, the hardware-software dissonance in GenAI is mirrored in a 'pedagogy-reality gap' in VET.

##### **2. Spatial contradiction - core-periphery accumulation**

The concentration of AI and VET resources in coastal megaregions (Beijing-Tianjin-Hebei, Yangtze River Delta, Greater Bay Area) reflects a deliberate state strategy to achieve global competitiveness at the frontier. This spatial selectivity, however, exacerbates internal disparities. Inland provinces—already

fiscally constrained and educationally under-resourced—find it hard to access talent pipelines, often supplying low-cost labour without reciprocal investment in upskilling infrastructure.

This mirrors the VET system's 'urban-rural and regional inequities' results in a 'dual-track system' - one oriented toward global technological leadership, the other toward poverty alleviation and social stability. This bifurcation undermines the long-term cohesion required for sustainable AI sovereignty that depends on a broad, deep, and geographically distributed talent base.

### **3. Governance contradiction - compulsory coordination vs. organic collaboration**

At the heart of both GenAI and VET lies a 'centralized governance paradox' in which the state seeks to orchestrate complex, multi-actor ecosystems (firms, schools, local governments, SOEs, SMEs) through administrative mandates and incentive schemes with the risk that top-down control stifles the adaptive, trust-based collaboration these systems require.

- *Bureaucratic fragmentation* - multiple ministries (MOE, MIIT, MOHRSS, NDRC) can issue overlapping directives without effective horizontal coordination, in which lower tier institutions are forced to operate under conflicting mandates.
- *Misaligned incentives* - private enterprises—especially SMEs—face high training costs and labour poaching risks, making deep engagement in either AI talent development or VET partnerships economically challenging. In this context, tax incentives and subsidies are often insufficient, and performance metrics for local officials prioritize GDP and stability over long-term human capital investment.
- *Elite-centric focus* – under the international pressure to achieve rapid results, policy prioritizes flagship institutions (e.g., "Double-High" colleges, national AI labs) and elite talent, neglecting the mid-tier engineering and technician base essential for scaling innovation. This reproduces the 'cultural bias' against vocational pathways, despite legal declarations of equality, because prestige remains tied to academic and urban elites.
- *Security-driven closure vs. innovation openness* - the push for rapid technological self-reliance restricts access to global open-source ecosystems, international standards, and collaborative research—precisely

the inputs that drive iterative improvement in both AI models and VET pedagogy. Centralized control intensifies this isolation, treating knowledge flows as security risks rather than innovation opportunities.

### **Meso level - contradiction between elite institutional innovation and under-development**

Chinese universities are not monolithic actors but differentiated sites of accumulation and exclusion. Institutions like Tsinghua, Peking University, and Zhejiang University operate as semi-autonomous innovation cores (talent pipelines), deeply embedded in both state planning and global knowledge circuits, producing not only research capacity but also entrepreneurial cadres—founders who bridge academia, industry, and state labs.

At the same time, the majority of China's 3,000+ higher education institutions lack the critical mass to engage meaningfully in GenAI. This creates a dual structure: a narrow apex of globally competitive AI hubs versus a broad base of under-resourced institutions tasked with mass upskilling but lacking computational infrastructure, faculty expertise, or curricular autonomy. The result is a meso-level over-determination: national policy demands universal AI integration, but institutional capacity is overdetermined by historical funding hierarchies and regional inequalities.

Moreover, the governance gap between enthusiastic policy pronouncements and underdeveloped implementation frameworks—reflects a deeper contradiction in state rationality in which the state seeks to mobilise universities as instruments of techno-industrial policy while failing to devolve the organisational autonomy necessary for agile adaptation.

### **Micro Level -the contradiction between everyday pragmatism and institutional oversight**

These higher-level contradictions become reproduced at the micro level, reflected in student and faculty behaviours in which high adoption rates signal a grassroots embrace of GenAI as a tool of contradictory trends - cognitive offloading, research acceleration, and creative expression.

This 'risk decoupling' (trust without ethical constraint) is not irrational but structurally induced, when institutional frameworks fail to provide clear, pedagogically grounded guidance on GenAI use, users default to utility maximisation, producing a 'micro-politics of improvisation', where students develop tacit norms (e.g., "use but don't cite," "paraphrase outputs"). Crucially, this micro-level agency feeds back

upward, in which faculty experimentation can outpace administrative oversight where bottom-up pragmatism strains top-down control.

These three levels form a dialectical totality - macro dependencies shape meso resource allocations which, in turn, condition micro behaviours. Yet within these tensions lie emancipatory potentials, explored in Part 4.

## Part 4. A multi-level GenAI innovation framework

### Key dynamics of the multi-level 45-degree innovation model

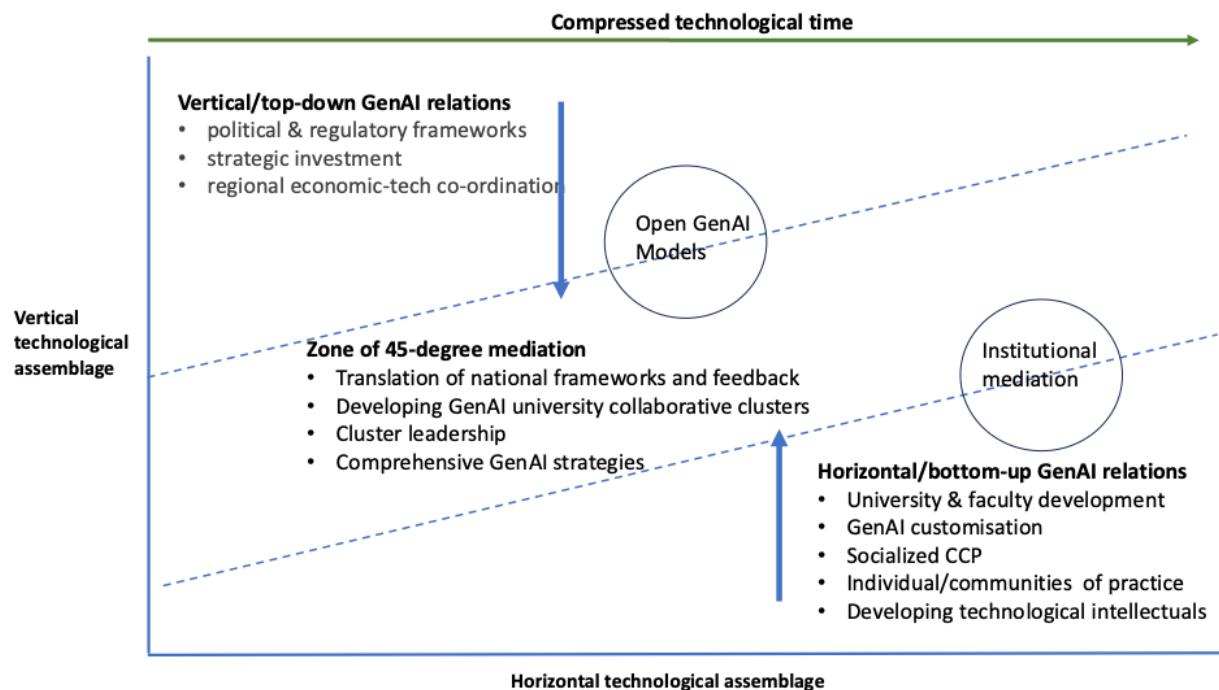
Following this critical analysis of GenAI challenges in the Chinese context, Part 4 explores how GenAI ecosystem dynamics can be created at each of the levels as part of the overall argument that China needs to develop efficient and effective GenAI innovation ecosystems because it does not have recourse to the ‘brute force’ of the almost unlimited computing power of the US. In terms of the market and state-led GenAI models, innovation ecosystem development could be viewed as a hybrid strategy to enhance lateral collaboration at all three levels with the overall aim of creating a productive balance between top, middle and bottom. This multi-level dynamic is illustrated in Figure 2.

The 45-degree GenAI model in Figure 2 conceptualises innovation as the outcome of dynamic interaction between three mutually constitutive forces - the ‘verticalities’ of top-down strategic direction, the ‘horizontalities’ of bottom-up practice, and the ‘45-degree zone of mediation’ through which these forces are translated into coherent institutional action.

- On the vertical axis, political authority, regulatory frameworks, strategic investment and regionally coordinated economic-technological planning compress the time available for technological development and set the overarching trajectory of GenAI ecosystems.
- On the horizontal axis, everyday GenAI practices—customisation, faculty experimentation, student agency, community-of-practice formation and the cultivation of technological intellectuals—generate local innovations, tacit knowledge and adaptive techniques that no central authority can fully script.
- The 45-degree zone of mediation provides the critical connective tissue by converting national priorities into workable institutional strategies, fosters university collaborative clusters, aligns diverse actors, and provides the organisational leadership required to anchor open GenAI models within specific educational and regional contexts.

These three dimensions operate in coordinated tension by forming a ‘multi-level innovation model’ in which macro-level strategic direction shapes meso-level institutional architectures, and these in turn nurture micro-level creativity and adoption—creating a recursive, upward-downward feedback system capable of sustaining high-quality GenAI ecosystem development under conditions of compressed technological time.

Figure 2. 45-degree GenAI framework



### The 45-degree zone of mediation and developing institutional GenAI innovation ecosystems

#### Different mediation approaches

Exploring the concept of mediation requires an elaboration as a central part of a 45-degree model of the dialectic between the horizontal and vertical dimensions of power, social and technological relations. In the context of political economy analysis of Chinese technological development, a key question concerns the precise role of mediation. By way of comparison, in market-led Platform Capitalism 2.0 the role of mediation is not a middle-ground for conflict resolution but to act as a strategic bridge, linking the mobilisation of horizontal civil society relations and the democratisation of hierarchical vertical relations to build an 'socialised historical and technological bloc'. Alternatively, in the context of the Chinese state-led/hybrid GenAI model, the main aim could be seen as building mediating structures, human capacity and activities to address governance, spatial and practice contradictions.

#### Multiple mediation activities for GenAI innovation in the Chinese Context

In China's political state-led/hybrid model, GenAI innovation is produced through **multi-layered mediation processes** that operate across the **macro, meso and micro levels**. These three levels are not

separate domains but are connected through **45-degree mediation**, which translates vertical strategic direction into institutional architectures and everyday practices, and in turn carries micro-level innovation upward into institutional and national frameworks. Together they constitute a three-tier innovation ecosystem in which state strategy, organisational capacity and grassroots technological culture co-evolve.

### **Macro-level mediation - strategic verticalities and sovereign coordination**

At the macro level, the Chinese state functions as the sovereign orchestrator of GenAI development, shaping the ecosystem through political, regulatory and spatial-economic mediation activities. These verticalities anchor innovation within a coordinated national project aimed at technological sovereignty, security, and socialist modernisation.

*Political-regulatory mediation* - the central state defines the strategic direction of GenAI via Five-Year Plans, the Cybersecurity Law, the algorithm registry system, and the “AI+ Education” initiative. These instruments establish the legal, ethical and strategic boundaries within which universities and firms operate. This political-regulatory mediation ensures alignment with national missions while embedding ethical norms aligned with socialist core values.

*Economic mediation* - macro-level investment—including national AI labs, funding for elite universities, domestic LLM development, and provincial subsidies—creates the **material conditions** for ecosystem formation. This includes incentives for domestic LLM adoption and the integration of vocational colleges into sovereign technology strategies.

*Spatial mediation* - the state mediates regional imbalances through **AI pilot zones**, targeted investments in inland provinces, and the deliberate concentration of frontier capabilities in coastal megaregions. This spatial mediation structures a core-periphery dynamic that the meso level must actively manage.

*Temporal mediation* - the national strategy imposes compressed technological time, accelerating AI development to close gaps with the U.S. and respond to geopolitical containment. Temporal mediation thus sets the pace at which institutions must update curricula, infrastructure and governance.

Together, these macro-level mediation forces form the vertical technological assemblage, providing direction but depending heavily on meso-level institutions to translate strategy into reality.

## **2. Meso-level mediation - institutional A=architectures and the 45-Degree Zone**

The meso level—comprising universities, regional clusters, joint labs and governance platforms—is the critical 45-degree zone of mediation. It is here that macro directives are translated into organisational forms and where micro innovations are aggregated and scaled. In China’s ecosystem literature, universities are explicitly defined as ‘strategic mediating institutions’ whose roles are assigned by policy rather than market emergence.

*Institutional mediation* - universities such as Tsinghua and Fudan function as **national AI anchors**, developing cluster leadership, shared digital infrastructure, and governance mechanisms that convert state strategy into operational plans. This includes the design of GenAI literacy programmes, ethics integration, and interdisciplinary research platforms.

*Socio-technical mediation* – at this level, institutions bridge human workflows and the technical stack. They standardise model evaluation, ensure safe deployment of domestic LLMs (e.g., Qwen, DeepSeek), and translate regulatory requirements into MLOps pipelines, compliance routines and model governance frameworks.

*Ethical–governance mediation* – meso-level bodies operationalise national ethical guidelines by creating university ethics committees, embedding transparency protocols and building teaching materials that promote responsible GenAI use. For example, Tsinghua mandates ethics coursework for all students; Fudan hosts governance centres.

*Industrial mediation* - regional clusters and university–industry labs mediate between research and application in priority fields such as AI-for-Science, healthcare AI and manufacturing. Institutes like AIR broker these relations, ensuring that research outputs are aligned with national missions.

Together, these meso-level activities form the **zone of 45-degree mediation**, where vertical state logics meet horizontal institutional adaptation, producing the organisational ‘connective tissue’ of the innovation ecosystem.

### **Micro-level mediation – horizontal practices and everyday innovation**

The micro level is seen as a broad level embracing individual and group users - **student experimentation, staff communities of practice, and distributed adoption behaviours**. While shaped by top-down frameworks, this layer generates localised innovation, tacit knowledge and new norms that feedback upward through the meso level.

*Epistemic mediation at the micro level* - faculty and students reinterpret official GenAI frameworks through local practice. They develop their own prompt strategies, teaching artefacts, classroom norms and informal rules (“use but cite,” “paraphrase outputs”) when institutional guidance is incomplete. This constitutes a bottom-up epistemic mediation that stabilises GenAI usage.

*Pedagogical mediation* - learning communities, student groups, and faculty development programmes generate ‘technological organic intellectuals’—actors capable of combining technical and social reasoning. These micro-level innovators personalise and extend GenAI within local contexts through customisation, peer-learning and classroom-level experimentation.

*Community and social mediation* - communities of practice develop shared norms around responsible AI, risk management and creative use that act as social infrastructures that absorb technological shocks and generate indigenous innovation cultures within institutions.

Together, these micro activities form the horizontal technological assemblage, producing diverse innovations that the meso level can identify, codify and scale.

### **A relational three-level innovation ecosystem**

Across macro, meso and micro strata, mediation binds the Chinese GenAI landscape into a unified multi-level innovation ecosystem:

- Macro mediation provides direction, pace, boundaries and resources.
- Meso mediation provides translation, institutionalisation, coordination and scaling, operating as the pivotal 45-degree zone.
- Micro mediation provides adaptation, creativity, cultural uptake and tacit knowledge.

This architecture reflects the dynamic interplay described in both your GenAI ecosystem analysis and your 45-degree mediation framework: a vertically directed, horizontally adaptive and meso-coordinated system in which innovation emerges through structured mediation rather than market spontaneity.

## Part 5. Methodology: Primary Research and Actor Interrogations

- **Research Design:** Qualitative interviews with "key university actors" identified as Technological Organic Intellectuals<sup>10</sup>.
- **Baseline Transition:** Investigating the challenges of moving from a low development baseline to a recognizable innovation ecosystem<sup>11</sup>.
- **Identifying Catalysts and other high skill ecosystem factors** required to kickstart institutional change<sup>12</sup>.

### Challenges from Literature: A Guide for Participatory Action

This section identifies systemic tensions to guide the interrogation of university actors, focusing on avoiding "top-down" rigidity through a participatory approach:

- **The Integration vs. Hierarchy Challenge:** Addressing the risk of top-down technological determinism by incorporating student-led clubs and open forums<sup>21</sup>.
- **The Praxis Gap:** Bridging the distance between institutional governance and pedagogical shifts through "Collaborative Critical Praxis".
- **The Agency of the 'Micro' Level:** Empowering individual users (staff and students) to be co-authors of the ecosystem rather than passive recipients.
- **Ethical Scalability:** Balancing risk management (bias, security) with the need for physical and virtual "Innovation Hubs" that encourage experimentation.

## 7. Conclusion: The Synergistic Meso-Level

The article concludes that a GenAI ecosystem is only sustainable when the meso-level functions as a participatory space. Synergy is achieved when infrastructure, governance, and culture interact through a reciprocal relationship that empowers the Technological Organic Intellectual to drive social praxis.

In the context of critical technological Praxis and the evolution of social movements, the tension between **network idealism** (the horizontal) and **structured coordination** (the vertical) remains a central dialectic. Network idealism—often associated with the "rhizomatic" structures of Deleuze and Guattari or the "multitude" of Hardt and Negri—posits that spontaneous, leaderless, and non-hierarchical networks are sufficient for systemic transformation.

From a critical Praxis perspective, this often leads to "tactical freezing" or what Jo Freeman famously termed the "tyranny of structurelessness." Mediation, therefore, is the process of synthesizing these two dimensions to ensure both democratic participation and strategic efficacy.



## References

Bonefeld, W. (1987) 'Marxism and the Concept of Mediation', *Common Sense*, (2), pp. 106–123.<sup>5</sup>

Finegold, D. (1999) 'Creating self-sustaining, high-skill ecosystems', *Oxford Review of Economic Policy*, 15(1), pp. 60-81. Available at: <https://doi.org/10.1093/oxrep/15.1.60>.

Jacobides, M. G., Cennamo, C. and Gawer, A. (2018) 'Towards a theory of ecosystems', *Strategic Management Journal*, 39(8), pp. 2255-2276. Available at: <https://doi.org/10.1002/smj.2904>.

Marchant-Pérez, P. and Ferreira, J. J. (2025) 'Integrating historical approaches of university ecosystems: reviewing the literature streams and future directions', *Management Review Quarterly*, 75, pp. 3555-3614. Available at: <https://doi.org/10.1007/s11301-024-00467-4>.

Feenberg, A. (2017) *Technosystem: The Social Life of Reason*.<sup>1</sup> Cambridge, MA: Harvard University Press. Available at: <https://www.hup.harvard.edu/catalog.php?isbn=9780674971783>

Gramsci, A. (1971) *Selections from the Prison Notebooks*.<sup>2</sup> Edited and translated by Q. Hoare and G. N. Smith. London: Lawrence & Wishart. Available at: <https://www.marxists.org/archive/gramsci/>

Hardt, M. and Negri, A. (2017) *Assembly*.<sup>3</sup> Oxford: Oxford University Press. Available at: <https://global.oup.com/academic/product/assembly-9780190677015>

Li, H., & Chen, Z. (2025). 高校在生成式人工智能创新生态中的角色重构 [The Reconfiguration of Universities' Roles in GenAI Innovation Ecosystems]. \*Higher Education Exploration\*, (1), 45–52.  
<https://kns.cnki.net/kcms2/article/abstract?v=3uoqlhG8C44YLTIOAiTRKibYIV5Vjs7i0kFkFncuH2Rw7mJvZ7QxW5JfJcJxJdDdKbJxYqQ=&uniplatform=NZKPT>

Moreno, Ana & Arenal, Alberto & Feijóo, Claudio & Armuña, Cristina & Ramos, Sergio & Xu, Zimu. (2020). Innovation ecosystems theory revisited: The case of artificial intelligence in China. *Telecommunications Policy*. 44. 10.1016/j.telpol.2020.101960.

Rossiter, N. (2006) *Organized Networks: Media Theory, Creative Labour, New Institutions*.<sup>4</sup> Rotterdam: NAI Publishers.

Srnicek, N. and Williams, A. (2015) *Inventing the Future: Postcapitalism and a World Without Work*.<sup>5</sup> London: Verso. Available at: <https://www.versobooks.com/books/2315-inventing-the-future>

Spours, K. (2025) 'Transitioning to socialised systems of generative artificial intelligence in an era of Platform Capitalism 2.0', *Systems*, (Forthcoming).

Verbeek, P-P. (2015) 'Beyond Interaction: A Short Introduction to Mediation Theory', *Interactions*, 22(3), pp. 26–31.

Wang, F. (2023). 人工智能时代的创新生态系统：从市场逻辑到制度逻辑 [Innovation Ecosystems in the AI Era: From Market Logic to Institutional Logic]. \*Journal of Tsinghua University (Philosophy and Social Sciences)\*, 38(5), 112–125.  
<https://qks.tsinghua.edu.cn/CN/10.13613/j.cnki.qhdz.003215>

World Economic Forum (2025) *Innovation Ecosystems: A Toolkit of Principles and Best Practice*. Geneva: World Economic Forum. Available at: <https://www.weforum.org/reports/innovation-ecosystems-2025>.

Xue, L., & Zhao, Y. (2024). 构建生成式人工智能创新生态系统的中国路径 [Constructing the Chinese Pathway for Generative AI Innovation Ecosystems]. \*Science and Technology Management Research\*, 44(12), 1–9. <http://www.kjgl.cbip.cn/CN/10.3969/j.issn.1000-7695.2024.12.001>