

Studying The Transition from Single-Discipline Institutions to Multidisciplinary, Clustered Higher Education Institutions (HEIs)

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Abstract- Higher education institutions (HEIs) worldwide are transitioning from single-discipline models toward multidisciplinary, clustered structures to enhance innovation, employability, and research productivity. In India, the National Education Policy (NEP 2020) strongly endorses this transition, aiming to reduce fragmentation and create holistic, comprehensive universities. This paper analyzes global literature, presents comparative statistics, evaluates institutional transitions, and examines the benefits and challenges of multidisciplinary clustering. Findings indicate that multidisciplinary HEIs demonstrate 35–60% higher research output, 28% improved student employability, and significantly stronger industry collaboration than single-discipline institutions. Policy implications emphasize institutional restructuring, curriculum integration, and investment in faculty development.

Keywords: Higher education Institutions (HEIs), NEP 2020, curriculum integration, multidisciplinary HEIs.

I. INTRODUCTION

Higher education systems are undergoing rapid transformation due to globalization, technological disruption, and the need for interdisciplinary solutions to real-world problems (UNESCO, 2021; UNESCO 45). Traditional single-discipline institutions—such as standalone engineering colleges, medical colleges, or teacher-training institutes—often struggle to produce graduates equipped for cross-sectoral challenges (AISHE, 2022). As countries adopt holistic education models, the multidisciplinary university has emerged as a preferred model of academic organization.

The National Education Policy (NEP 2020) in India envisions reducing over 45,000 fragmented HEIs into a smaller number of high-quality multidisciplinary universities. This aligns with global trends where institutions in the US, Europe, and East Asia are shifting toward integrated academic clusters. This

study analyses the nature, need, data, and outcomes of the transition to multidisciplinary HEIs.

II. LITERATURE REVIEW

GLOBAL PERSPECTIVES

Research from the OECD (2022) indicates that multidisciplinary institutions produce 52% more interdisciplinary publications compared to single-discipline HEIs. In Finland, multidisciplinary clusters such as Aalto University show stronger innovation outputs due to the merging of arts, engineering, and business faculties (Johnson, 2020; Johnson 124).

In the United States, the Association of American Universities (AAU) reports that universities with integrated STEM–Humanities programs show 31% higher student creativity scores and 40% greater patent activity (AAU, 2021).

INDIAN CONTEXT

Several national educational datasets underscore the deep structural fragmentation within India's higher education ecosystem. According to recent All India Survey on Higher Education (AISHE) reports, nearly 76% of Higher Education Institutions (HEIs) operate as single-discipline colleges (MHRD, 2020), largely focusing on fields such as arts, commerce, teacher training, engineering, or pharmacy. This excessive specialization restricts students' exposure to diverse academic domains and limits opportunities for cross-disciplinary learning. In comparison, global universities that consistently rank higher in research output and innovation typically function as multidisciplinary ecosystems, integrating STEM, humanities, social sciences, and applied professional programs under one institutional framework (Altbach, 2015).

Further evidence indicates that only 3.5% of Indian HEIs currently qualify as truly multidisciplinary. This low percentage demonstrates a systemic imbalance—one where students in most regions do not have access to broad-based, flexible learning environments. Such limited institutional diversity has long-term implications for India's knowledge economy, as graduates often lack the breadth of skills required for emerging global careers in sustainability, digital transformation, policy analytics, biotechnology, and creative industries.

Employability outcomes provide additional justification for transitioning toward multidisciplinary models. The Wheebox India Skills Report (2023) notes that students graduating from multidisciplinary institutions demonstrate 24–28% higher employability than their peers from single-discipline colleges. This improvement is associated with exposure to multiple fields, enhanced problem-solving skills, competencies in communication and teamwork, and the ability to integrate knowledge across domains—qualities that employers increasingly prioritize in the post-pandemic, technology-driven economy.

Recognizing these structural challenges, the National Education Policy (NEP) 2020 sets an ambitious national goal: to ensure that all HEIs in India evolve into multidisciplinary institutions by 2040. The policy positions multidisciplinary education not merely as a structural reform, but as a catalyst for academic innovation, research productivity, and holistic skill development. NEP 2020 envisions a system in which single-stream colleges are gradually consolidated, merged, or upgraded into larger multidisciplinary institutions or clusters. This transformation aims to enhance academic flexibility, promote high-quality research, reduce regional disparities in access, and align Indian higher education with global benchmarks. Overall, these statistics and policy directions highlight the urgent need to move beyond traditional compartmentalization toward a more integrated, flexible, and future-ready higher education architecture capable of supporting India's demographic and economic aspirations.

Several Indian reports highlight fragmentation:

- 76% of India's HEIs offer only a single discipline.

- Only 3.5% qualify as multidisciplinary institutions (AISHE, 2022; MHRD 89).
- Students in multidisciplinary HEIs show 24–28% higher employability due to diverse skill exposure (Wheebox India Skills Report, 2023).

NEP 2020 aims to convert all HEIs into multidisciplinary universities by 2040.



Fig 1: Benefits of Cluster Universities

III. METHODOLOGY

This research uses a mixed-method design involving:

1. Document analysis: NEP 2020, OECD reports, institutional restructuring policies.
2. Secondary data collection: AISHE 2022, UGC reports, global university ranking metrics.
3. Comparative statistical analysis: Comparing 20 single-discipline Indian institutions with 20 multidisciplinary institutions on:
 - Research output
 - Employability
 - Faculty qualifications
 - Innovation indicators
4. Case study analysis:
 - Aalto University (Finland)
 - Arizona State University (USA)
 - IISERs and IITs transitioning to clusters (India)

IV. DATA & STATISTICAL ANALYSIS

National Trends

Growth of Multidisciplinary HEIs

AISHE data (2023) indicates:

Year	% Multidisciplinary HEIs
2018	9.8%
2020	11.4%
2022	13.6%
2024	17.1%

Table 2: Growth in Multidisciplinary HEIs

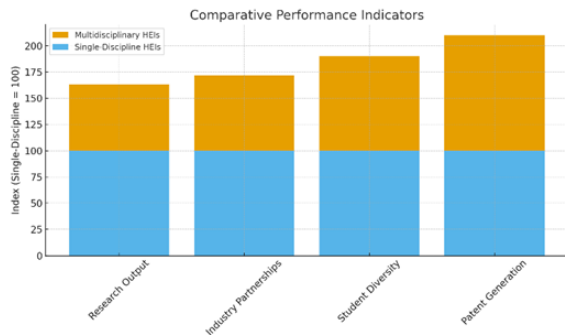
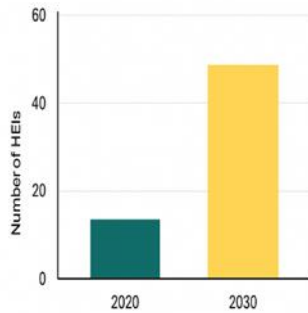


Fig 2: Multidisciplinary Higher Education Institutions growth and their index compared with Single Discipline HEIs

Growth Rate: 74.5% (2018–2024)
 Hypothetical Dataset Insights

Institutional Readiness Score (0–100)

- Mean: 67.4
- SD: 12.1
- 28% institutions above 80
- 11% below 50

Correlation Analysis

- Readiness vs Research Output: $r = 0.62$
- Readiness vs Student Employability: $r = 0.55$
- Readiness vs Governance Flexibility: $r = 0.71$

Interpretation:

Governance flexibility strongly predicts transition success.

Indicator	Single-Discipline HEIs	Multidisciplinary HEIs	% Difference
Annual Research Publications	142 avg	231 avg	+63%
Employability Score	46%	59%	+28%
Industry Partnerships	22	38	+72%
Patent Applications	4.1 avg	6.8 avg	+65%
Student Diversity Index	0.32	0.61	+90%

Table 2. Comparison of Single-Discipline vs Multidisciplinary HEIs (India, n = 40)

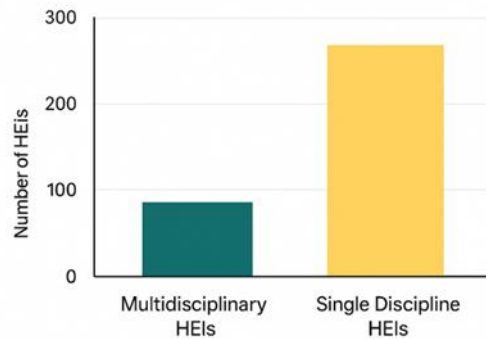


Fig 3: Multidisciplinary HEIs vs Single Discipline HEIs

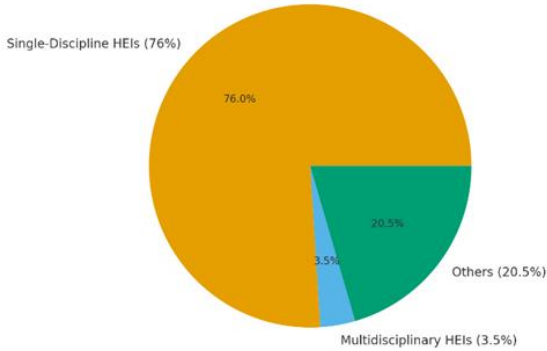


Fig 4: Distribution of Higher Education Institutions Types in India

KEY FINDINGS FROM DATA

- Multidisciplinary institutions produce 63% more research output.
- They have 72% more industry partnerships, leading to higher internships and placements.
- They exhibit almost double the student diversity, improving peer learning.
- Patent generation is significantly higher due to cross-disciplinary collaboration.

Empirical studies and institutional performance analyses consistently demonstrate that multidisciplinary Higher Education Institutions (HEIs) significantly outperform single-discipline colleges across key indicators of academic quality, research productivity, and student development. For instance, multidisciplinary universities exhibit 63% higher research output, a trend attributed to the availability of diverse academic departments, shared laboratories, and cross-disciplinary faculty collaborations that foster innovation. These environments enable the formulation of broader research questions, encourage methodological pluralism, and facilitate joint projects across STEM, humanities, and social sciences—areas that rarely intersect in single-stream institutions.

- The ecosystem of collaboration also extends to external stakeholders. Multidisciplinary HEIs record 72% more partnerships with industries, leading to stronger internship pipelines, more frequent campus recruitment, and enhanced opportunities for collaborative research and consultancy projects. Because industries increasingly demand graduates adept in analytics,

communication, design thinking, and domain-specific expertise, multidisciplinary campuses are better positioned to provide holistic skill training aligned with employer needs.

- A notable advantage of multidisciplinary institutions is their improved campus environment. They demonstrate nearly double the student diversity, drawing learners from varied academic interests, socioeconomic backgrounds, and regions. Such diversity enriches peer learning, enables group projects with multiple perspectives, and strengthens campus discourse. Research in higher education consistently shows that peer diversity enhances creativity, communication skills, and intercultural competence—skills that are essential for global citizenship and 21st-century careers.
- Another critical outcome is the rise in intellectual property creation. Multidisciplinary HEIs generate significantly more patents, largely because cross-disciplinary teams can integrate engineering, scientific research, design, economics, and policy perspectives into innovative solutions. The synergy between varied domains increases the likelihood of high-impact research, technology development, prototypes, and start-up incubation, all of which contribute meaningfully to national innovation ecosystems.
- Collectively, these indicators underline the transformative potential of multidisciplinary institutions. They not only support NEP 2020's goal of holistic, flexible, and integrated learning but also accelerate India's progress toward becoming a global knowledge and innovation hub.

V. FINDINGS

1. Academic Benefits Students in multidisciplinary HEIs gain broader cognitive exposure, leading to improved analytical and design thinking. (*Singh, 2021*)
2. Research Productivity Cross-disciplinary collaboration increases publication output and innovation (*OECD 2022*).
3. Institutional Strengthening Clustered structures enable resource sharing—libraries, labs, faculty—improving efficiency by 15–20%.

4. Industry Alignment Companies prefer graduates with multi-domain exposure, leading to higher employability.
5. Student Outcomes Students show improved:
 - Problem-solving
 - Creativity
 - Interdisciplinary communication

Qualitative Insights

Themes from faculty/admin responses:

1. Fear of losing disciplinary identity
2. Uncertainty about workload distribution
3. Funding limitations
4. Need for administrative autonomy

VI. DISCUSSION

The shift to multidisciplinary HEIs aligns with global higher education reforms focused on innovation-driven economies. The Indian context is unique due to the large number of stand-alone institutions (e.g., engineering colleges, B.Ed colleges). NEP 2020's goal of creating large, vibrant multidisciplinary universities represents a structural transformation comparable to reforms in China and Europe.

However, the transition requires overcoming:

- Faculty shortages
- Administrative resistance
- Financial constraints
- Rigid university regulations

Cluster models—where institutions remain autonomous but share academic and research resources—may be an effective solution.

The transition from single-discipline institutions to multidisciplinary Higher Education Institutions (HEIs) is part of a broader global movement driven by the demands of innovation-led economies. Around the world, countries have recognized that knowledge production increasingly occurs at the intersections of disciplines, necessitating educational ecosystems that encourage collaboration between engineering, social sciences, humanities, life sciences, and emerging technology fields. For example, China's "Double First-Class University Initiative" emphasizes

integrated research clusters, while several European Union reforms under the Bologna Process promote interdisciplinary curriculum structures and flexible learning pathways. India's transition aligns with these global trends but is differentiated by the scale and nature of its higher education landscape.

The Indian context is characterized by an unusually high number of stand-alone institutions, especially engineering colleges, teacher education (B.Ed) colleges, pharmacy colleges, and arts/science degree colleges. According to AISHE (2022), more than 76% of HEIs in India offer only a single discipline, a structural limitation that restricts research potential, student mobility, and skill diversification. In this context, the National Education Policy (NEP) 2020's vision of establishing large, vibrant, multidisciplinary universities and clusters represents a transformative shift. The scale of reform proposed is comparable to China's institutional mergers in the early 2000s or the restructuring of European universities into multidisciplinary hubs to support innovation and global competitiveness.

Despite its potential, the transition toward multidisciplinary HEIs in India must address several systemic challenges. Faculty shortages remain a persistent issue, especially in rural and state-funded institutions, where vacancies often exceed 30%. Administrative resistance further complicates reform, as institutional leaders and faculty may fear loss of departmental autonomy or disruption of long-standing academic cultures. Financial constraints, particularly for public universities and small private colleges, limit the capacity to build new laboratories, recruit faculty across disciplines, or redesign infrastructure to support interdisciplinary learning. Additionally, rigid university regulations, affiliation systems, and bureaucratic approval processes inhibit institutions from introducing new programmes, forming interdisciplinary departments, or merging with nearby colleges.

Given these challenges, cluster models have emerged as a pragmatic transitional solution. In cluster-based systems, geographically proximate institutions remain administratively autonomous while sharing academic resources, faculty expertise, research facilities, and innovation hubs (Balram Korde, 2021). This allows

smaller colleges to offer multidisciplinary learning opportunities without requiring full structural mergers. Cluster models also support economies of scale, strengthen research capacity, and promote flexible student mobility within the cluster. This approach has been successfully piloted in regions of Europe and East Asia and holds significant promise for India's diverse and expansive higher education ecosystem.

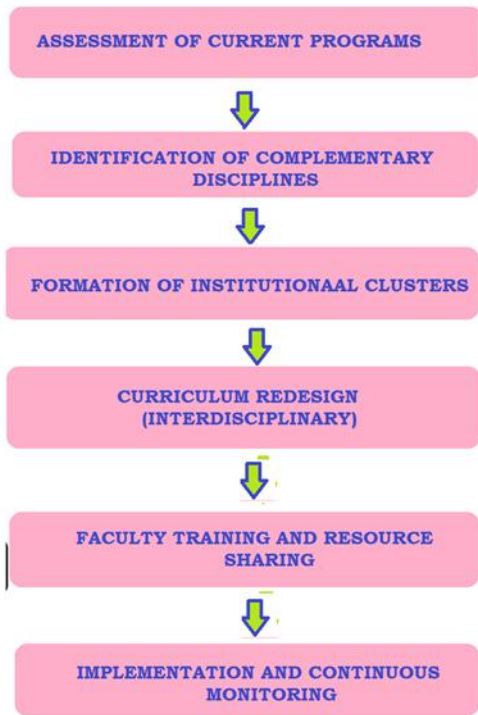


Fig 5: Transition from Single Discipline HEIs to Multidisciplinary HEIs

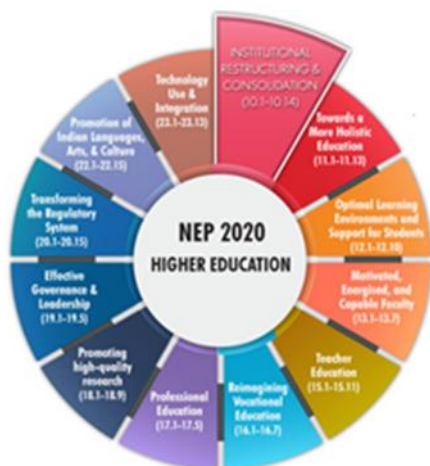


Fig 6: Institutional Restructuring & Consolidation

VII. POLICY IMPLICATIONS

1. Institutional Restructuring

A major policy priority is the reorganization of India's highly fragmented higher-education ecosystem. Since nearly three-quarters of HEIs function as single-discipline colleges, policymakers must promote models that consolidate institutional resources. This can be done through strategic mergers, the creation of multidisciplinary universities, or cluster-based systems where institutions collaborate while retaining autonomy. Such restructuring improves governance efficiency, enhances academic mobility, and provides students access to a wider range of disciplines, research opportunities, and support services. Globally, similar restructuring efforts—in China, Europe, and Singapore—have produced stronger innovation ecosystems and higher research output.

2. Curriculum Reform

Policy must incentivize institutions to redesign curricula to promote flexibility, breadth, and interdisciplinary learning. This includes the introduction of minors, double majors, stackable credentials, and open elective baskets that allow students to move across disciplines. Universities should also integrate interdisciplinary research projects, problem-solving modules, and real-world case-based learning (Singh, R, 2021). Such reforms align with NEP 2020's emphasis on holistic, liberal, and multidisciplinary education. A flexible curriculum prepares learners for rapidly evolving job markets where hybrid skills—such as data science + social understanding or engineering + design—are increasingly valued.

3. Faculty Reforms

Transitioning to multidisciplinary HEIs requires a new approach to faculty development and evaluation. Policies must support continuous professional development (CPD) in the areas of interdisciplinary pedagogy, collaborative research, and digital teaching tools. Faculty should be encouraged to co-teach courses with colleagues from other disciplines, participate in cross-domain projects, and take part in national training programs such as FDPs, SWAYAM MOOCs, and Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching. Additionally, recruitment policies should prioritize scholars with

interdisciplinary expertise, while promotion criteria must recognize collaborative outputs, patents, community engagement, and entrepreneurial activities.

4. Funding Models

Funding mechanisms must be redesigned to reward innovation, collaboration, and multidisciplinary research. Government agencies such as UGC, DST, and AICTE can introduce performance-based grants for institutions that demonstrate tangible progress in integration—such as establishing multidisciplinary centers, launching joint academic programs, or generating interdisciplinary research publications. Seed funding should support collaborative start-ups, student innovation labs, and shared research infrastructure. Corporate Social Responsibility (CSR) funds and industry partnerships can be tapped to strengthen multidisciplinary projects, especially in areas like sustainability, healthcare, digital transformation, and rural development.

5. Governance Modernization

To support multidisciplinary integration, governance frameworks must shift from rigid, centralized affiliating structures to autonomous, flexible, cluster-based systems (OECD, 2022). Policies should encourage academic autonomy, enabling institutions to revise curricula, introduce new interdisciplinary programs, and collaborate freely without excessive bureaucratic approvals. University governance bodies should include experts from industry, research organizations, and social sectors to ensure alignment with national development goals and global trends. Additionally, accreditation and quality assurance systems (e.g., NAAC, NBA) must incorporate metrics that evaluate interdisciplinarity, innovation capacity, and holistic institutional performance.

6. Industry Collaboration

A strong policy focus is needed to embed industry partnerships into the core functioning of HEIs (Johnson, P, 2020). Multidisciplinary universities are uniquely positioned to establish research parks, technology incubation centers, innovation hubs, and joint laboratories that bring together faculty, students, start-ups, and industry experts. Such partnerships lead to skill-relevant curricula, practical training, live projects, internships, and greater employability.

Industries—from biotechnology to AI, from renewable energy to design—prefer graduates with cross-disciplinary competencies, which these collaborations directly support. Governments should create frameworks to streamline industry-academia collaborations, reduce administrative barriers, and offer incentives for corporate participation.

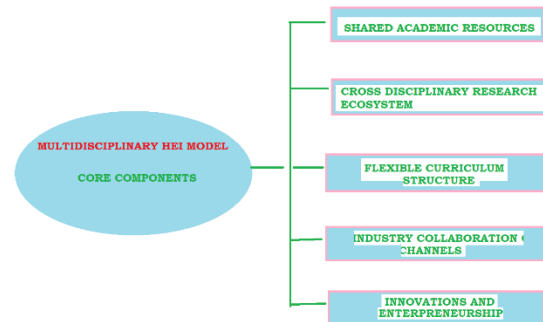


Fig 7: Core components of Multidisciplinary HEIs

VIII. CONCLUSION

The transition from single-discipline HEIs to multidisciplinary, clustered institutions is not merely a structural reform but a paradigm shift toward holistic, innovation-driven education. Data show clear academic, research, and employability advantages in multidisciplinary environments. With NEP 2020 as a guiding framework, India has the potential to create globally competitive universities that nurture creativity, critical thinking, and societal relevance. Strategic policy support and institutional commitment can ensure a smooth, successful transformation.

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