International Relations · GS - II

Strategic dependence on imported technologies can expose India's infrastructure development to geopolitical pressures. Examine the implications of export controls on critical machinery and suggest measures to strengthen India's technological resilience.

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MARKS	WORD LIMIT
15	~250 words

Answer Hint

Export controls; India-China relations; tunnel-boring machines; infrastructure development; supply-chain security; strategic autonomy; domestic manufacturing; technology transfer; research and development; diversification of imports.

Model Answer

Introduction

Modern infrastructure projects increasingly depend on specialised machinery and advanced engineering technologies. Export restrictions imposed by supplier countries can create delays and raise costs, highlighting the importance of technological resilience.

Implications for India

1. Infrastructure Delays: Restrictions on specialised machinery, such as tunnel-boring equipment, may affect metro, railway and underground construction projects.

2. Higher Costs: Dependence on alternative suppliers may increase procurement expenses, transportation costs and project completion timelines.

3. Strategic Vulnerability: Concentrated dependence on foreign suppliers can expose critical infrastructure to geopolitical tensions and changes in export policy.

4. Technological Dependence: Limited domestic capabilities may reduce India's ability to maintain, repair or upgrade specialised equipment independently.

5. Broader Economic Effects: Delays in transport infrastructure can affect logistics, urban mobility, regional connectivity and economic productivity.

Measures to Strengthen Resilience

India should diversify import sources and develop domestic capabilities in advanced machinery through research and development, industrial partnerships and skill development. Public procurement can encourage innovation while maintaining technical standards and value for money.

Technology transfer, joint ventures and collaboration between research institutions and manufacturers can improve domestic engineering expertise. Strategic assessments of critical imports should identify supply-chain vulnerabilities and encourage alternative sourcing.

India should also engage in diplomatic dialogue and use established trade mechanisms to address restrictive measures. Domestic manufacturing initiatives should prioritise competitiveness, reliability and long-term technological capability rather than indiscriminate import substitution.

Conclusion

Technological resilience is essential for infrastructure security and strategic autonomy. A combination of diversified imports, domestic innovation and international cooperation can reduce vulnerabilities while supporting India's infrastructure ambitions.