

The economy: technologies, standardisation, markets

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Argument

technological development is not determined only by technological innovation itself. Rather, it depends on market structures, investment incentives and standardisation, which together shape **how technologies are deployed and used.**

Research Question

How do market structures and standardisation influence technological development in European telecommunications?

- Telecommunications are the backbone of the digital economy.
- High-quality connectivity, affordable services are fundamental
- Europe faces investment and competitiveness challenges.
- Market organisation affects technological deployment.

- The **OECD**, or Organisation for Economic Co-operation and Development, is an international organisation that conducts policy research and provides comparative economic analysis for member states-its report focuses on connectivity divides and digital inclusion.

Hypotheses

H1: The organisation of telecommunications markets as either fragmented or consolidated significantly influences investment in digital infrastructure.

H2: The economic benefits of technological standardisation depend on market structures that enable efficient investment and deployment.

H3: Technological progress in the European digital economy is primarily driven by the interaction of market incentives, standardisation, and investment rather than by technological innovation alone.

H1- Fragmentation versus Consolidation

- European telecom markets remain highly fragmented.
- Fragmentation may limit scale.
- Consolidation seeks efficiency and stronger investment capacity.
- Mergers and acquisitions are one response.

Connect Europe explicitly states that the European telecom landscape remains "extraordinarily fragmented."

The EU telecom sector remains highly fragmented compared to the US market, with many national operators rather than integrated pan-European firms.

Evidence of European Market Fragmentation

- European telecom sector remains highly fragmented.
- Markets are still largely organised nationally.
- Fragmentation limits economies of scale.
- Connect Europe identifies fragmentation as a challenge for investment and competitiveness.

Europe

- Many national markets
- Many operators
- Fragmented market structure

United States

- Larger integrated market
- Larger operators
- Greater economies of scale

H1 – Why Consolidation Happens

Mergers and Acquisitions

Potential advantages:

- economies of scale
- operational efficiency
- stronger investment capacity

Potential risks:

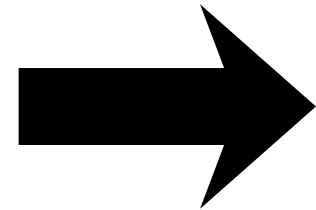
- reduced competition
- market concentration

Telecom mergers and acquisitions are typically motivated by economies of scale, allowing firms to spread high infrastructure costs over a larger customer base.

H2 – Why Standardisation Matters

Standardisation enables:

- interoperability
- compatibility
- network integration
- cross-border communication



A concrete example is 5G standardisation, where global technical standards allow devices and networks from different countries to operate together.

Without standards:

- technologies cannot easily interact
- deployment becomes more costly

H2 – Standardisation Is Not Enough

Need:

- investment
- infrastructure deployment
- competition
- regulatory support

OECD repeatedly links connectivity outcomes to competition and investment

For example, even where internet infrastructure exists, lack of investment or affordability can limit actual usage.

H3 – Technology Beyond Innovation

Three Layers of Digital Development

Network layer:

- access to connectivity

Application layer:

- digital services and data flows

End-user layer:

- adoption and use

This comes directly from OECD.

Network Layer



**Application
Layer**



End-User Layer

A rural household may have internet access but lack digital skills or services to fully benefit from it.

Synthesis

Market Structure



Investment



Technology
Deployment



Connectivity



Economic
Competitiveness

These factors reinforce each other rather than operate independently

Conclusion

- Market organisation influences investment incentives.
- Standardisation facilitates technological deployment but cannot replace investment.
- Technological development in telecommunications should be understood as a systemic outcome of markets, investment dynamics and standardisation rather than technological progress alone.
- Therefore, policy makers must consider not only technological innovation but also the market conditions that enable its deployment

Discussion Questions

1. Should European telecom markets aim for greater consolidation to improve investment capacity, or preserve fragmentation to protect competition?
2. To what extent can standardisation drive technological development if investment incentives are weak?
3. To what extent is technological development in telecommunications determined by market structure versus technological innovation itself?

References

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