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Teaching guidelines

Resilience through digitalisation – can the public create the change?

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Material information

This teaching material is designed for courses in International Business, European Studies, Political Economy, Digital Transformation, and Trade Policy, offering students an analytically grounded and empirically rich exploration of how digitalisation shapes national resilience and international trade performance. It introduces learners to a central question of contemporary economic policy: how states can strengthen resilience in an increasingly digital and interconnected global economy, while balancing market competition with strategic public investment.

The material begins with an accessible conceptualisation of resilience, defined as the capacity of economies to withstand, adapt to, and recover from shocks—whether economic, technological, or systemic. It then links this concept to digitalisation, presenting digital infrastructure, connectivity, and data systems as core enablers of resilient economic structures. Students are introduced to the idea that modern resilience is not only about diversification and trade openness, but also about the strength of underlying digital capabilities that sustain economic activity during disruption.

Building on this foundation, the material guides students through a data-driven exploration of how digitalisation influences international trade. Drawing on empirical evidence, it demonstrates that countries investing in digital technologies - particularly broadband infrastructure, secure data systems, and advanced digital tools - achieve stronger export performance, reduce transaction costs, and better integrate into global value chains. Students examine how digital tools reshape trade logistics, facilitate real-time coordination, and significantly expand opportunities for both goods and services exports, with particular emphasis on the rapid growth of digitally delivered services.

A distinctive feature of this resource is its focus on the European Union as a regulatory and policy environment. Learners explore how the EU has developed a multi-level governance system for digital infrastructure through initiatives such as the Digital Agenda, the Digital Decade targets, and the European Electronic Communications Code. The material highlights how EU State aid rules - traditionally restrictive - have evolved to allow targeted public investment in broadband and digital networks, particularly in areas where private incentives are insufficient. This creates a rich context for analysing the tension between maintaining fair competition and enabling strategic, long-term investment in essential infrastructure.

Students are then introduced to a comparative empirical analysis based on a panel dataset covering six EU member states - Germany, France, Italy, Spain, Poland, and Portugal - over the period 2003 to 2023. Through regression analysis, they examine how variations in digital indicators such as broadband penetration and connectivity correlate with export performance across different economic contexts. This section encourages students to interpret real-world data, identify patterns across advanced

and emerging digital economies, and understand the differentiated impact of various types of digital infrastructure.

The material also integrates a strong theoretical component through Public Sponsorship Theory. Students explore how digital infrastructure can be understood as a strategic public good and a “VRIN” resource - valuable, rare, inimitable, and non-substitutable - that underpins long-term national competitiveness. The framework helps explain why markets alone may underinvest in such infrastructure and why state intervention can be both justified and necessary. Importantly, it encourages critical reflection on how public investment in shared digital foundations can enhance, rather than distort, market competition by enabling broader participation in international trade.

Throughout the material, students are encouraged to engage with key contemporary questions:

- What does resilience mean in a digital global economy?
- To what extent can digital infrastructure be considered a strategic national asset?
- How should governments balance competition policy with the need for large-scale digital investment?
- Does public support for digitalisation strengthen or distort market dynamics within the EU?
- Are digitally advanced economies inherently more resilient in global trade systems?

The teaching resource combines theoretical frameworks, empirical analysis, policy discussion, and real-world case comparisons to foster critical thinking. Students are encouraged to connect economic theory with policy design and statistical evidence, and to assess how digital transformation reshapes trade competitiveness, resilience, and state-market relations.

While primarily designed for advanced undergraduate and graduate courses, the material is also well suited for master-level seminars focusing on digital economy, innovation policy, European integration, or global value chains. Its modular structure allows instructors to tailor sessions around themes such as digital infrastructure and trade, resilience and crisis response, EU competition policy, public investment strategies, or the role of digitalisation in shaping future economic growth.

Learning objectives and outcomes

T This teaching material focuses on how digitalisation shapes economic resilience and international trade performance within the European Union. Its core objective is to help students understand how investments in digital infrastructure—particularly broadband and data systems—interact with trade dynamics, export competitiveness, and public policy frameworks. It highlights the strategic role of digital technologies in strengthening resilience, the importance of state support in addressing market failures,

and the tension between EU competition rules and the need for long-term digital investment. Through empirical analysis and theoretical reflection, students evaluate whether digital infrastructure can be considered a strategic public good and how it contributes to more resilient and competitive economies.Learning outcomes are categorized as follows:

Knowledge

- The student is able to explain the concept of economic resilience and its relationship to digitalisation in modern economies.
- The student understands how digital infrastructure - such as broadband networks and secure data systems - affects international trade performance and export competitiveness.
- The student can describe the evolution of EU digital policy frameworks and the role of State aid in supporting digital infrastructure development.
- The student understands the key assumptions of Public Sponsorship Theory and its relevance to digital infrastructure as a strategic economic resource.

Skills

- The student is able to evaluate the effectiveness of public investment in digital infrastructure within the constraints of EU competition policy.

Social Competences

- The student is able to formulate and defend informed opinions on the role of public intervention in building national digital resilience.
- The student can engage in discussions on the balance between market competition and strategic investment in the context of digital transformation and trade.
- The student is able to reflect on the broader economic and societal implications of digitalisation for resilience, inclusiveness, and long-term growth.

Overview

The teaching materials - consisting of a PowerPoint presentation and an accompanying video - are designed to support instruction in International Business, European Political Economy, Digital Economics, and Trade Policy, with a particular focus on how digitalisation contributes to economic resilience and reshapes international trade performance. Both materials follow an identical structure, enabling instructors to use them flexibly in classroom settings or as part of asynchronous learning environments.

The lecture begins by introducing the concept of resilience in a modern economic context, defining it as the ability of countries to withstand shocks, maintain core functions, and recover efficiently from disruptions. This foundation is then directly

linked to digitalisation, with particular emphasis on how digital infrastructure - such as broadband networks, secure data systems, and connectivity platforms - supports continuity in economic activity. Students are guided to understand why resilience increasingly depends on digital readiness, especially in times of crisis when traditional systems may fail or become disrupted.

Building on this conceptual groundwork, the material explores how digitalisation interacts with international trade. The lecture explains that economies with stronger digital capabilities tend to trade more efficiently, integrate more deeply into global value chains, and demonstrate higher export performance. Special attention is given to the role of broadband infrastructure in reducing transaction costs, facilitating real-time coordination, and enabling firms - especially small and medium-sized enterprises—to engage more actively in cross-border trade. The session also highlights how digit - l technologies are transforming trade in services, where digitally delivered outputs such as IT, finance, and consulting are expanding rapidly and contributing significantly to economic resilience.

A central part of the lecture is dedicated to the European Union as a policy and regulatory framework shaping digital transformation. Students are introduced to key EU initiatives, including the Digital Agenda, the Digital Decade targets, and the European Gigabit Society, which collectively aim to ensure widespread, high-quality connectivity across Member States. The lecture explains how the European Electronic Communications Code harmonizes regulations and promotes investment while maintaining competitive markets. At the same time, it addresses the critical tension between EU competition policy and the need for substantial public investment, particularly through State aid mechanisms that support broadband deployment in underserved areas.

The core analytical section of the lecture presents an empirical study based on a panel dataset covering six EU member states, Germany, France, Italy, Spain, Poland, and Portugal, over the period 2003–2023. Students are introduced to the logic of comparative analysis and regression methods used to examine the relationship between digital indicators (such as broadband penetration and connectivity) and export performance. The lecture demonstrates how improvements in digital infrastructure correlate with stronger export outcomes, while also showing that different indicators have varying levels of impact. Particular emphasis is placed on the long-term benefits of early investment and the role of broadband as a foundational enabler of digital competitiveness.

Following the empirical analysis, the lecture introduces Public Sponsorship Theory as a framework for understanding the role of the state in digital development. Students explore how digital infrastructure can be interpreted as a strategic public good and a “VRIN” resource - valuable, rare, difficult to imitate, and non-substitutable. The session explains why private markets may underinvest in such infrastructure due to high costs and diffuse benefits, and how targeted public support can correct these market failures. Importantly, the lecture situates this discussion within the EU context, demonstrating

that such interventions can be compatible with competition policy when they enhance overall market functioning rather than distort it.

The final section situates these insights within broader debates on Europe's economic future. It encourages students to reflect on whether digital infrastructure should be considered a core element of strategic autonomy and how public investment in digital systems can strengthen both resilience and competitiveness. The lecture concludes by examining potential policy pathways, including coordinated EU-level investment, improved regulatory alignment, and continued support for digital innovation, while also acknowledging the challenges posed by uneven development across Member States and the need to balance efficiency with inclusiveness.

Overall, the materials guide students through the conceptual, empirical, and policy dimensions of digitalisation and resilience, encouraging them to critically assess how digital transformation is reshaping trade systems, state-market relations, and the foundations of economic stability in Europe.

Pre-lecture preparation

No specific prior preparation is required to benefit from this lecture. The material is designed to be accessible to students without advanced background knowledge, as all key concepts are introduced and explained during the session. However, students may find it helpful to have a general understanding of structural barriers to trade and investment, particularly those related to infrastructure. Familiarity with how limitations in digital networks, broadband access, data systems, and connectivity can constrain economic activity will support a deeper understanding of how digitalisation helps reduce these barriers and enhances both trade performance and economic resilience.

Suggested usage

These teaching materials can be used in both synchronous and asynchronous formats, depending on the instructor's preference. The lecture is structured in a way that allows students to engage effectively without requiring prior specialised knowledge, as all core concepts related to digitalisation, resilience, and trade are introduced during the session.

However, to make the most of the lecture, students may benefit from having a general understanding of how structural factors influence trade and economic performance. In particular, familiarity with barriers related to infrastructure - such as limitations in digital connectivity, broadband access, and data systems - can help students better appreciate how digitalisation reduces frictions and supports international economic activity.

This optional preparation enables students to more easily connect conceptual discussions with real-world challenges and to engage more actively in follow-up discussions or analytical exercises, depending on how the instructor structures the session.

Engagement activities

This lecture can be supplemented with a range of interactive activities designed to enhance student engagement and deepen understanding of the topic. These activities are flexible and can be used either before the lecture to activate prior knowledge, or after to reinforce key concepts and encourage critical thinking. They are suitable for both live and asynchronous teaching formats.

Activity	Description
Digital resilience mapping	**Objective:** Students identify how digital infrastructure contributes to economic resilience across countries. **Activity**: Students are divided into small groups and assigned one EU country (e.g., Germany, Poland, Portugal). Each group investigates the country's level of digital infrastructure (broadband access, connectivity, digital services) and identifies potential strengths and weaknesses in terms of resilience. They present short "resilience maps" showing how well the country can respond to economic disruptions. The activity encourages linking digital capacity with real-world crisis preparedness.
Policy Debate - State aid vs competition	**Objective:** Students develop critical thinking about the balance between public investment and market competition in the EU. **Activity:** Students are split into two sides: one advocating for increased public funding for digital infrastructure, and the other defending strict EU competition and State aid rules. Each group prepares arguments based on economic efficiency, fairness, and long-term growth. A moderated debate follows, where students must defend their position using both theory (Public Sponsorship Theory) and empirical insights. This activity builds argumentation skills and policy awareness.
Data insights workshop	**Objective**: students strengthen their ability to interpret empirical data linking digitalisation and trade. **Activity:** Students are provided with simplified datasets (or visualisations) showing broadband penetration and export performance across selected EU countries. Working individually or in pairs, they identify patterns, correlations, and differences between countries. They are then asked to interpret whether digital infrastructure appears to influence exports and justify their conclusions. The activity develops analytical skills and confidence in working with real-world data.

Post-lecture activities

Following the lecture, students can deepen their understanding by applying the concepts of digitalisation, resilience, and trade performance to new empirical contexts. Post-lecture activities may include analysing how differences in digital infrastructure influence export capacity and economic resilience across a broader set of countries. Students can work with recent data or case studies from various EU member states or other global economies, comparing how digital readiness shapes trade outcomes and crisis response.

Students are encouraged to identify similarities and differences in digital development, focusing on which countries have advanced infrastructure, which are catching up, and which face structural constraints. They should analyse how these variations translate into trade advantages or vulnerabilities, paying attention to factors such as SME participation, service exports, and integration into global value chains. By replicating the analytical steps introduced in the lecture, students can assess whether stronger digital capabilities consistently lead to better trade performance and higher resilience.

This comparative approach allows students to evaluate how digitalisation functions as a strategic resource across different economic contexts. It also encourages reflection on the role of public policy - particularly state support for digital infrastructure - in shaping long-term competitiveness. By engaging with these activities, students expand their analytical skills while gaining a deeper understanding of how digital transformation is reshaping global trade and economic resilience.