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PUBLIC POLICIES TO SUPPORT INNOVATION IN EUROPE: A COMPARATIVE APPROACH OF E-GOVERNMENT

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Abstract: *This article examines the legal and policy frameworks that support innovation across European jurisdictions, employing a comparative approach to identify common strategies, divergences, and best practices. Through analysis of intellectual property regimes, research and development incentives, and regulatory frameworks, we demonstrate how different European states balance innovation promotion with broader policy objectives. Our findings suggest that while harmonization efforts exist within the EU framework, significant variations persist in implementation and effectiveness. This comparative analysis provides insights for policymakers seeking to optimize innovation support mechanisms.*

Keywords: *public, policies, strategies, e-government, European Union.*

1. Introduction

Innovation stands as a cornerstone of economic competitiveness and sustainable development in contemporary Europe. The European Union has consistently prioritized innovation through its policy agenda, most notably through the Lisbon Strategy and subsequent frameworks emphasizing the knowledge-based economy (European Commission, 2010). However, the legal and policy mechanisms supporting innovation vary considerably across member states, reflecting different constitutional traditions, economic structures, and policy priorities.

This article undertakes a comparative legal analysis of public policies designed to support innovation in selected European jurisdictions. By examining intellectual property protection, fiscal incentives, regulatory frameworks, and research funding mechanisms, we identify how different legal systems approach innovation governance and assess the effectiveness of various policy instruments.

2. Public Policies with Role of Innovation Support

2.1. Intellectual Property Protection Frameworks

The EU Patent System

The European Union has developed a multilayered intellectual property (IP) system combining national, regional, and international protections. The European Patent Convention (EPC), established through the Munich Convention of 1973, creates a unified patent prosecution system while maintaining separate national patent rights. More recently, the Unified Patent Court (UPC) and the Unitary Patent represent significant steps toward harmonization, though implementation remains incomplete.

The creation of the unitary patent in 2012 was intended to reduce fragmentation and decrease the costs of patent protection—historically, obtaining patent protection across all EU member states could cost substantially more than in the United States or Japan (European Commission, 2011). However, the UPC's operational launch in 2022 has progressed unevenly, with some major economies initially declining participation.

National Variations in Patent Policy

Significant differences persist in national approaches to patent examination standards and enforcement mechanisms. Germany maintains a reputation for rigorous patent examination and strong enforcement through specialized patent courts, while the Netherlands has developed alternative dispute resolution mechanisms for patent matters (Geertrui van Overwalle, 2008). These variations influence where innovators choose to file patents and establish research facilities.

The Swedish patent system exemplifies a more liberal approach to patent invalidation procedures, while France has traditionally provided stronger protection through its courts. Such variations, though within harmonized EU frameworks, create strategic considerations for multinational innovators regarding where and how to protect intellectual property.

Trade Secrets Protection

Directive 2016/943 on the Protection of Undisclosed Know-How and Business Information represents a significant harmonization effort in trade secrets protection across the EU. However, implementation varies, with some member states providing stronger criminal sanctions for misappropriation than others. Poland and Hungary have implemented particularly stringent penalties, reflecting different policy judgments about the importance of trade secrets protection.

2.2. Fiscal Incentives and Research Support

Research and Development Tax Credits

European states employ diverse fiscal mechanisms to incentivize private investment in research and development. France's Research Tax Credit (Crédit d'Impôt Recherche) represents one of Europe's most generous schemes, providing tax relief of up to 30% for qualifying R&D expenditures and generating substantial innovation investment (French Ministry of Higher Education,2015). This program has been particularly effective in attracting pharmaceutical and biotechnology research.

The United Kingdom's R&D tax relief system, operating both at enhanced deduction and credit levels, similarly encourages private sector research investment. Conversely, Nordic countries—particularly Sweden and Denmark—have historically relied more heavily on direct government funding through research councils rather than tax incentive mechanisms.

Government Research Funding

The comparative analysis reveals distinct models of public research funding. Germany's dual system, combining university research funding through federal mechanisms with industrial research support through the German Research Foundation (DFG), contrasts with Italy's more fragmented approach and Spain's increasing centralization of research funding decisions (National Research Council, 2012).

These structural differences influence the innovation ecosystem's composition. Countries with strong public research institutions and substantial government funding often develop robust university-industry partnerships, while those relying more heavily on tax incentives may attract different types of innovation investment.

Innovation Vouchers and Small Business Support

Several EU member states have implemented innovation voucher schemes targeting small and medium-sized enterprises (SMEs). The Netherlands, Belgium, and Poland have deployed such schemes with varying success rates. Evaluations suggest that voucher programs are most effective when coupled with advisory services helping SMEs identify appropriate research partners and articulate innovation needs (OECD, 2010).

2.3. Regulatory Frameworks and Innovation

Regulatory Sandboxes

Regulatory sandboxes—controlled environments allowing businesses to test innovations with reduced regulatory requirements—represent an emerging policy tool across Europe. The United Kingdom pioneered application of sandboxes in financial services, while the Netherlands and Estonia have extended the approach to fintech, autonomous vehicles, and other sectors (Financial Conduct Authority, 2018).

However, the legal basis for regulatory sandboxes within EU law remains contested. The tension between national regulatory autonomy and EU harmonization obligations creates uncertainty for businesses operating across multiple jurisdictions. Member states have adopted sandboxes with varying degrees of legal formality, from statutory authorization to administrative practice.

Proportionality in Regulatory Design

Comparative analysis reveals that regulatory design significantly influences innovation incentives. The EU's proportionality principle, requiring that regulations impose burdens no greater than necessary to achieve legitimate objectives, theoretically constrains excessive regulation. Yet implementation varies substantially.

Germany's relatively prescriptive regulatory approach contrasts with the United Kingdom's principles-based regulation, which traditionally granted greater flexibility for innovative business models. These different regulatory philosophies influence where entrepreneurs establish operations and how they structure innovation strategies (Schepel, 2013).

Digital and Data Regulations

The General Data Protection Regulation (GDPR) exemplifies both EU-wide harmonization and its limitations for innovation policy. While GDPR provides uniform baseline protections across member states, its flexibility in implementation—particularly regarding standards of necessity and proportionality—creates de facto variations in data governance for AI and machine learning applications (European Data Protection Board, 2018).

Some member states, notably Estonia and Lithuania, have embraced data-driven innovation more aggressively, developing legal frameworks explicitly designed to facilitate data sharing and algorithmic innovation, while others have adopted more cautious approaches.

2.4. Venture Capital and Startup Support

Legal Frameworks for Venture Capital

The European venture capital landscape reflects substantial fragmentation in legal and regulatory frameworks. The EU Venture Capital Regulation provides some harmonization, but the availability of venture capital, the structure of investment vehicles, and tax treatment of startup investments vary significantly across jurisdictions (Regulation (EU) 2013/1287).

The United Kingdom and Germany have developed mature venture capital ecosystems supported by favorable tax treatment of startup investments. France has implemented specific legal structures (FCPR, FCPE) facilitating venture capital investment, while Southern European countries have historically faced constraints in venture capital availability, though this has begun changing.

Bankruptcy and Second-Chance Provisions

The EU Directive on preventive restructuring frameworks seeks to facilitate business rescue and reduce entrepreneur stigma associated with failure. However, implementation reveals significant variations in how member states balance creditor protection with debtor rehabilitation (Directive (EU) 2019/1023).

Countries with more favorable fresh-start provisions, such as Germany and the United Kingdom, demonstrate higher rates of serial entrepreneurship. Conversely, legal systems imposing substantial personal liability and social stigma on failed entrepreneurs show lower rates of entrepreneurial activity and innovation-driven business formation.

2.5. Knowledge Transfer and University-Industry Collaboration

Legal Frameworks for Technology Transfer

The Framework Agreement on Intellectual Property Rights in University-Industry Cooperation, adopted by European universities and industry representatives, establishes principles for IP sharing in collaborative research. However, national laws governing university IP ownership vary considerably.

The UK's "ownership to the researcher" tradition contrasts with continental European models where institutions typically own IP arising from research conducted within their facilities. These different approaches create distinct incentive structures for academic entrepreneurship and commercialization of research (Mowery et al., 2005).

Institutional Autonomy and Innovation

Countries granting greater institutional autonomy to universities—particularly regarding IP management and commercial activities—generally demonstrate higher technology transfer rates. The Netherlands and Scandinavian countries, with strong traditions of institutional autonomy, show robust academic spin-off creation, while more centrally directed systems show lower commercialization rates.

Mobility of Researchers

The EU's Freedom of Movement for workers facilitates researcher mobility within the EU, theoretically enhancing knowledge transfer and innovation diffusion. However, practical barriers persist, including pension systems, family considerations, and language requirements. Certain jurisdictions—particularly the UK, Germany, and Switzerland—have developed explicit policies facilitating researcher mobility through visa provisions and research infrastructure investments.

2.6, Sectoral Policy Approaches

Biotechnology and Pharmaceuticals

European policy toward biotechnology reflects the intersection of innovation promotion and safety regulation. The European Medicines Agency (EMA) provides a unified approval pathway, but member states maintain some regulatory discretion regarding research conduct, particularly involving genetic modification (European Medicines Agency, 2025).

Germany and France have emerged as European biotech leaders partly through supportive regulatory environments and substantial public research funding. Conversely, countries with more restrictive stances on genetic modification research, such as Austria and Italy, have seen reduced biotech investment.

Green Technology and Energy Innovation

The European Green Deal and associated policies create unified frameworks for sustainable innovation, yet implementation varies. Denmark and Germany have developed comprehensive legal frameworks supporting renewable energy innovation, while Southern European countries face infrastructure and financing constraints despite favorable renewable resources (European Commission, 2021a).

Artificial Intelligence Governance

The proposed EU AI Act represents an ambitious attempt at harmonized AI regulation, yet its approach—risk-based classification requiring different compliance levels—permits significant member state variation in implementation (European Commission, 2021b). This creates both opportunities for regulatory experimentation and risks of innovation fragmentation.

3. Comparative Assessment and Policy Implications in e-Government

3.1. E-government in France

France is among the first European countries to have invested significantly in the creation of e-government tools, with the aim of guaranteeing a more efficient, transparent and citizen-friendly administration. The modernization process began in the 2000s, when the first digital platforms were launched at national level. However, after 2010, when the government became aware of the importance of digitizing public services, the process accelerated significantly. It is necessary to reduce costs, simplify bureaucratic procedures and increase citizen satisfaction with public administration.

An important step in this direction was the adoption of the Digital Agenda for France, which aimed to expand high-speed internet access and introduce online public services for all citizens. The national strategy focused on two main directions: the creation of centralized, easy-to-use platforms, and interoperability between different public databases. In this way, local and central administrations began to share information more quickly, and citizens were no longer required to repeatedly submit the same documents to different institutions.

At the heart of French e-government is the service-public.fr platform. It serves as a single portal providing access to information and administrative services in various areas, including taxation, health, education, social security and employment. Users can download forms, submit applications, check the status of their applications and obtain official documents without having to visit counters in person. This system now allows millions of interactions that previously required face-to-face presence to be carried out online. This reduces time and costs for the administration and citizens.

Impots.gouv.fr, the official portal of the tax administration, is another important tool. It is used to file income tax returns, make payments and obtain personalized information on the tax situation. Following its implementation, the degree of voluntary compliance has increased, as the procedure has become simpler and more visible. In addition, the system allows for the maintenance of a payment history and the sending of electronic notifications, increasing citizens' confidence in the efficiency and fairness of the process.

In the field of healthcare, France has introduced the Dossier Médical Partagé (DMP), an electronic medical record accessible to patients and healthcare professionals. It centralizes essential medical information (prescriptions, test results, treatment history) and makes it available in real time to doctors, facilitating a faster and safer medical act. Through this platform, citizens have greater control over their own medical history and benefit from integrated services, without syncope caused by lack of information.

In addition, the pole-emploi.fr platform is in the social and employment sector and offers advice, mediation and support to employers and the unemployed. Job seekers can access offers, apply online and speak directly to advisors through it. This type of tool has significantly reduced the operating costs of employment agencies and increased the likelihood of unemployed people re-entering the workforce.

Digital identity is an additional component of French e-government. The FranceConnect system, created by France, allows citizens to access all public services on the internet with a single set of authentication data. Using this solution avoids creating multiple accounts and passwords for different institutions, which facilitates communication with the government. FranceConnect has become a model of good practice at European level and has been taken up by other states. The data.gouv.fr platform, which offers open datasets on a variety

of subjects, such as economic statistics, public spending and information related to health and education, helps promote government transparency. This project encourages civil society, academia and the media to get involved in monitoring the state's activity. In addition, it has helped the private sector develop new applications based on public data.

The introduction of participatory budgets in major cities such as Paris and Marseille is a distinctive aspect of the French model. These platforms allow citizens to propose and vote on local funding projects. When implemented in the digital environment, they have allowed an increasing number of residents to get involved, which has led to an increase in trust between citizens and local administrations. Overall, the French experience shows that the digitalization of administration is not only a way to improve efficiency, but also to strengthen participatory democracy. A more open relationship between the state and society has been fostered by easy access to information, transparent spending and the direct involvement of citizens in decision-making. However, obstacles persist, particularly in terms of protecting personal data and ensuring digital inclusion for vulnerable groups (European Commission, 2022).

3.2. E-government in Germany

Germany is known for its organized and decentralized way of implementing e-government, which reflects the federal structure of the state. While the federal government sets general guidelines for digitalization, states and local authorities have significant autonomy in developing and adapting the digital services they offer. This diversity can be a challenge, but it also offers an opportunity to develop adaptable solutions that suit the needs of each community. A key moment in the evolution of German e-government was the adoption of the Online Access Act (German Federal Government, 2017).

This means that all government institutions in Germany must offer administrative services in a digital format, which can be accessed via a single national portal. By 2022 at the latest, the reform aims to simplify the interaction between citizens and institutions so that every service can be accessed online.

Germany has created the Bundesportal to implement this law. From, a single place where people can access digital services offered by federal, state and municipal authorities. Citizens can do things like request civil status certificates, register vehicles, pay taxes or submit applications for financial support through it. The interface is designed so that users can quickly find the service they are looking for, regardless of the responsible institution, which reduces confusion and bureaucracy.

The electronic identity system (eID), which is integrated into the German identity card, is another vital tool. Users can securely authenticate to access online services and sign legally binding digital documents with this mechanism. The use of eIDs has increased public confidence in the use of digital services, particularly due to Germany's strict cybersecurity standards.

Many cities in Germany have demonstrated good practices in implementing digital technology for more efficient local government. Hamburg, for example, is a “Smart City” that combines the digitalization of public services with AI and sensors to manage traffic, public lighting and environmental protection. This method shows how e-government can improve the state-citizen relationship and the quality of life in the city. Open data platforms such as govdata.de, which publish data on socio-economic indicators, procurement contracts and public spending, promote transparency and public participation. Access to this data facilitates monitoring by citizens and the media, as well as the creation of digital and environmental applications. A distinctive element of the German model is the emphasis on collaboration between institutions. In many countries, government, academia and the private sector work together to create innovative digital solutions. This cooperation is necessary to ensure that the platforms are both technically functional and adapted to the needs of the population. Finally,

Germany combines the flexibility of decentralization and legislative rigor to characterize e-government. Germany has built a complex and efficient system using measures such as the national single portal, electronic identity and open data platforms. However, challenges remain, especially in harmonizing digital solutions across nations and accelerating the pace of implementation to quickly meet citizens' expectations. . E-government in Germany

One thing that defines e-government in Germany is that it is decentralized, which is unique for a federal state. Accordingly, each nation is responsible for implementing and adapting digital measures in public administration, which implies a wide range of applicable options. However, diversity does not mean a lack of cooperation. Although national programs are provided by the federal government to provide a general framework, the implementation in practice is adaptable and adaptable to local circumstances. A key feature of the German e-government model is the combination of central coordination and autonomy of the nations.

BundOnline 2005, which was launched in the early 2000s, was one of the first large-scale projects to digitize the administration. With this program, the federal state aimed to provide the most important public services on the Internet by 2005. This program laid the foundation for the concept of "standardized electronic services", which can be accessed regardless of the institution. Despite the fact that the goals were not fully achieved, BundOnline 2005 laid the foundation for future efforts, demonstrating that digitizing the administration is both possible and necessary in an administratively complex state like Germany.

Subsequently, the Digital Agenda 2025 was approved, a strategic plan that set goals for the digitalization of Germany in areas such as public administration, the economy, education and infrastructure. This plan focused on modernizing government portals and connecting services with each other so that people and businesses no longer need to interact with multiple institutions separately. Instead, the “once-only” principle was introduced. This means that people only have to provide data to the administration once, and the data is then distributed between institutions via interconnected IT systems.

The “Verwaltungsportal Bund”, which serves as a central platform for accessing public services, is another important project. It reduces administrative fragmentation by bringing together administrative data and procedures from different nations and providing them in a unified way. The federal portal facilitates interoperability, and citizens see the system as a more user-friendly and coherent mechanism, despite the autonomy of each state.

It has not been easy to implement these platforms. Since each nation and even each local level may have its own procedures and IT systems, administrative fragmentation remains one of the biggest problems. This has sometimes caused duplication of work and significant differences in the quality of digital services. In addition, there is still a difference between eastern areas that have better internet access and lower levels of digital literacy and western ones that are more developed.

Cybersecurity is another critical component. Germany has been forced to improve its security systems against cyber attacks, especially with the increasing amount of data that the administration manages. Currently, there are specialized centers that constantly monitor the digital security of public institutions and alert when dangers arise. It is obvious that these initiatives have an impact on both the business environment and citizens. Procedures such as paying taxes, registering a business, obtaining licenses or submitting administrative applications can be completed online, which has significantly reduced bureaucracy and time lost at the counters. However, the digitalization of the administration has offered companies fewer expenses and better predictability of interactions with the state.

Germany has recently begun to experiment with new technologies in public administration. Pilot projects using artificial intelligence to analyze data and provide personalized solutions, as well as blockchain to secure transactions and official documents, are underway. These initiatives demonstrate that Germany is not limited to the traditional

digitalization of services, but aims to become a European leader in the use of emerging technologies in public administration.

Overall, e-government in Germany serves as a model that balances decentralization and coordination, as well as the federal tradition and the need for modernization. Despite the difficulties caused by administrative diversity, the German state has managed to establish a unified framework, build large-scale projects and ensure that citizens are actively involved in the decision-making process. Recent breakthroughs with artificial intelligence and blockchain demonstrate openness to innovation and offer positive prospects for the future.

3.3. E-government in Poland

Poland is an Eastern European country that has made great progress in e-government and managed to reduce the digital divide compared to Western EU countries. Since 2011, the launch of the "Polska Cyfrowa" program, which was financed by the government and European funds, has accelerated the process of digitizing public administration. The program aimed to build an accessible online administration that would provide fast, transparent and citizen-centered services.

The Obywatel.gov.pl platform is a key component of the Polish e-government system, uniting most government services into a single digital portal. Citizens can access public registers, consult information about tax obligations and submit applications for official documents on this platform. A significant advantage of this system is its accessible structure, which is also addressed to people who are less familiar with technology. This demonstrates the concerns of the Polish authorities regarding digital inclusion.

Zaufany Profile, also known as Trusted Profile, is another reference tool that is used to perform secure authentication on government portals. Electronic signing of documents and access to digital services are possible with this system without the need for physical presence at the institution. By implementing it, Poland has significantly reduced bureaucracy and made it easier for people in the diaspora or rural areas to access public services. Tax returns are also filed online with the Trusted Profile, a process that has become almost completely digital in recent years.

The obligation of local governments to publish official documents, draft decisions and minutes of municipal council meetings online helps to ensure decision-making transparency. In many cities, these meetings are broadcast live, so people can follow the discussions and ask questions. Therefore, digitalization not only makes things easier, but also helps to build local democracy by involving people more directly. An example of good practice is the Emp@tia platform, which deals with social services and allows users to submit online applications for allowances, financial aid and other benefits. This system has considerably reduced the time spent waiting at the counters of social welfare institutions and improved the efficiency of processing applications. In addition, the simple and accessible interface of the platform has made it easy to use even for those who are not very good with computers.

In addition, Poland has invested in expanding the ePUAP (Elektroniczna Platforma Usług Administracji Publicznej) platform, which allows public institutions to interact with each other and provides citizens with access to a variety of online services. ePUAP is key to the digitalisation of the Polish government, as it facilitates communication between citizens, local administrations and the central government. In the area of taxation, the Twój e-PIT system, or "Your Tax Return", was introduced to allow citizens to automatically complete their tax returns based on data that is available in state registers. Errors and delays have been significantly reduced, as the taxpayer only needs to check and confirm the document. The European Commission has praised this measure as an example of simplifying administrative procedures and encouraging voluntary compliance.

In addition to these tools, Poland has encouraged public participation by implementing participatory budgeting in several municipalities, where citizens can propose investment projects and vote online on community priorities. These mechanisms have increased civil society engagement and created a clearer relationship between local governments and citizens. Overall, Poland's experience demonstrates that digitalizing administration can be a means of reducing bureaucracy and increasing public trust in state institutions. Platforms such as Twój e-PIT, Obywatel.gov.pl and Profil Zaufany have helped Poland move from a rigid and complicated system to one that is flexible and adapted to the needs of the 21st century.

However, challenges remain, especially in terms of standardizing service quality between urban and rural regions, but also ensuring cyber protection in a context of increasingly complex digital threats (OECD, 2020).

The development of high-speed internet infrastructure is a significant component of the digitalisation of the Polish administration. Without it, e-government platforms would not have been able to function. In order to reduce the digital divide between urban and rural areas, the government has invested in expanding broadband networks in underdeveloped and rural areas. Millions of people in less accessible areas have benefited from the same opportunities as people in large cities to use public services online as a result of these programmes. This process of equalising access has helped digital and social inclusion.

Poland is also focusing on the digital education of the population. To help seniors and people with difficulties in using government portals, training campaigns have been implemented. To help citizens understand basic e-services, such as paying taxes online or using the electronic authentication profile, workshops have been organized in libraries, community centers and schools. These measures demonstrate that the success of e-government depends on both the availability of technological infrastructure and the level of digital literacy of citizens.

The integration of e-health services is another relevant example of progress. Poland has introduced an electronic prescription system, also known as e-prescription. This system allows patients to obtain medical prescriptions in digital format, accessible through a unique code. This mechanism has reduced the risk of medical errors, eliminated the need to keep prescriptions on paper and made communication between doctors, pharmacists and patients better. However, e-health platforms allow patients to access their treatment history, which facilitates faster and more efficient healthcare. In addition, it is worth noting the collaboration in the field of e-government between the public and private sectors. Polish IT companies, in partnership with public institutions, have helped to develop several digital products. This has made it possible to quickly introduce innovative services and has stimulated the development of the country's digital industry. At the same time, cooperation with academia has helped to improve IT systems and educate a new generation of digital governance professionals.

Finally, as cyberattacks on government digital infrastructures have become a global issue, Poland has always been concerned about cybersecurity. The Polish government collaborates with the European Union and NATO in the field of cybersecurity, creating specialized centers for monitoring and preventing cyberattacks. This guide emphasizes that a solid infrastructure for protecting data and critical infrastructure is essential for the success of e-government.

However, the increase in internet access, digital education, the introduction of mobile applications and improved cybersecurity demonstrate that Poland has adopted a comprehensive and well-planned approach to modernizing public administration. The Polish state has reduced bureaucracy through these initiatives and created the premises for a more interactive and connected society in line with European digital standards.

4. Results and Discussion

Our comparative analysis reveals that successful innovation ecosystems typically combine multiple policy instruments: robust IP protection, substantial public research funding, favorable tax treatment of R&D and startup investment, skilled workforce development, and regulatory frameworks that balance innovation encouragement with legitimate public protection.

No single jurisdiction exemplifies optimal policy in all dimensions. Rather, different member states have developed distinctive innovation strengths reflecting their particular legal, economic, and institutional contexts. Germany's manufacturing innovation ecosystem, the Netherlands' logistics and agricultural technology innovation, and Estonia's digital innovation ecosystem each reflect tailored policy approaches appropriate to regional comparative advantages.

The analysis reveals persistent tension between EU-level harmonization efforts and member state policy autonomy. While EU-wide frameworks (the UPC, GDPR, research funding programs) provide some coherence, substantial variation persists in implementation, enforcement, and complementary policies.

This variation creates both costs (fragmentation, strategic forum shopping, reduced economies of scale) and benefits (regulatory experimentation, competitive federalism, tailoring to local conditions). Optimal policy likely involves accepting some variation while ensuring minimum harmonization on core issues affecting cross-border innovation activity.

Several emerging challenges warrant attention:

Digital Sovereignty and Strategic Autonomy: European policymakers increasingly view innovation support through a strategic lens, seeking to reduce dependence on non-European technology platforms and establish European champions in AI, semiconductors, and cloud computing. This may create tensions with competition law and international trade commitments (European Commission, 2021c).

Ethical Innovation: Growing emphasis on responsible innovation, particularly regarding AI ethics, privacy, and environmental sustainability, creates new regulatory burdens potentially affecting innovation incentives. Balancing ethical considerations with innovation encouragement remains unresolved.

Equitable Innovation: Regional disparities in innovation capacity and investment persist, with Central and Eastern European member states facing disadvantages in attracting research investment and venture capital. Addressing these disparities requires both EU-level policy and member state initiatives.

5. Conclusion

European public policies supporting innovation reflect diverse approaches reflecting different legal traditions, institutional structures, and policy priorities. While EU-wide harmonization efforts have reduced fragmentation in intellectual property protection and established common frameworks for research funding and startup support, substantial variation persists in implementation and complementary policies.

Successful innovation support systems combine multiple policy instruments tailored to regional contexts and comparative advantages. Rather than pursuing complete harmonization, European policymakers might focus on ensuring compatibility of core frameworks while permitting experimentation in complementary policies and sectoral approaches.

The comparative approach reveals that innovation policy effectiveness depends not on particular policy measures in isolation but on coherent combinations of IP protection, fiscal incentives, research funding, regulatory frameworks, and institutional arrangements. Future policy development should attend to these systemic dimensions while remaining responsive to technological change and emerging policy challenges.

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