Comprehensive Psychiatry 148 (2026) 152675

Contents lists available at ScienceDirect

Comprehensive Psychiatry

journal homepage: www.elsevier.com/locate/comppsych

Problematic usage of the internet: A policy map of the use of internet and its possible mental health consequences in adolescents across United Kingdom, France, Germany, Italy, Australia, Canada, the United States, and New Zealand[1] ☆

Julia Snegg [a,o,ah], Blanca Larrain [a], Kristin Mosler [an], Robin van Kessel [b,c], Sophia Achab [d,e], Ornella Corazza [f,g], Gabriele Penazzi [g], Dan J. Stein [h], Hamed Ekhtari [i], Henrietta Bowden-Jones [a], Konstantinos Ioannidis [j,k], Vittoria Barbati [g], Zsolt Demetrovics [l,m,n], Samuel R. Chamberlain [j,k], Lior Carmi [p], Joseph Zohar [q], Hans Jurgen Rumpf [r,ax], Natalie Hall [f], Jose M. Menchon [s], Célia Sales [t], Christian Montag [u,au,av], Katajun Lindenberg [v], Mart Susi [w], Anja Huizink [x,y,o], Marc N. Potenza [z,aa,ab,ac,ad,ae], Stefano Pallanti [af], Nick Morgan [ag], Carmen Moreno [aw], Diane Purper-Ouakil [ai,aj], Matthias Brand [ak,al,am], Murat Yucel [ao], Andrea Czakó [m,n,l], Susanne Walitza [an,ap,aq], Julius Burkauskas [ar], Katalin Felvinczi [m], Megan Smith [f], David Wellsted [f], Julia Jones [f], Teresa Silva Dias [t], Simon Foster [an], Meichum Mohler-Kuo [an], Ina Neumann [v], Erica Fongaro [ai,aj], Sara Fally [ai], Hernani Oliveira [t], Renzo Abregú-Crespo [ah], Marta Sepúlveda-Palomo [ah], Naomi A. Fineberg [f,as,2], Andres Roman-Urrestarazu [a,b,at,*]

[a] Department of Psychiatry, University of Cambridge, Cambridge, United Kingdom
[b] Department of International Health, Care and Public Health Research Institute (CAPHRI), Faculty of Health, Medicine and Life Science, Maastricht University, Maastricht, Netherlands
[c] LSE Health, Department of Health Policy, London School of Economics and Political Science, London, United Kingdom
[d] Reconnecte Specialized Unit Head, Addiction Division, University Hospitals of Geneva, Switzerland
[e] Psychological and Sociological Research Unit Head, Department of Psychiatry, Faculty of Medicine, Geneva University, Switzerland
[f] School of Health, Medicine and Life Sciences, University of Hertfordshire, Hatfield, United Kingdom
[g] Addiction Science Lab, Department of Psychology and Cognitive Science, University of Trento, Italy
[h] SAMRC Unit on Risk & Resilience in Mental Disorders, Dept of Psychiatry & Neuroscience Institute, University of Cape Town, South Africa
[i] Department of Psychiatry, University of Texas Southwestern (UTSW), Dallas, TX, USA
[j] Hampshire and Isle of Wight Healthcare NHS Foundation Trust, United Kingdom
[k] Department of Psychiatry, Faculty of Medicine, University of Southampton, UK
[l] Flinders University, Institute for Mental Health and Wellbeing, College of Human Sciences and Culture, Bedford Park, SA, Australia
[m] Institute of Psychology, ELTE Eötvös Loránd University, Budapest, Hungary
[n] Centre of Excellence in Responsible Gaming, University of Gibraltar, Gibraltar, Gibraltar
[o] Department of Psychology, University of Gothenburg, Gothenburg, Sweden
[p] The Data Science Institution, Reichman University, Herzliya, Israel
[q] Sackler Medical School, Tel Aviv University, and Chaim Sheba Medical Center Tel Hashomer, Tel Aviv, Israel
[r] Department of Psychiatry and Psychotherapy, Translational Psychiatry Unit, Research Group S:TEP (Substance Use and related disorders: Treatment, Epidemiology and Prevention), University of Lübeck, Germany
[s] Department of Psychiatry, Bellvitge University Hospital-IDIBELL, Department of Clinical Sciences-Faculty of Medicine and Health Sciences, University of Barcelona, CIBERSAM, Spain
[t] Faculty of Psychology and Education Science at the University of Porto (FPCEUP), Centre for Research and Intervention in Education (CIIE), University of Porto, Porto, Portugal
[u] Centre for Cognitive and Brain Sciences, Institute of Collaborative Innovation, University of Macau, Macau SAR, China
[v] Clinical Psychology of Childhood and Adolescence, Institute for Psychology, Heidelberg University, Heidelberg, Germany

☆ This article is part of a Special issue entitled: 'Problematic use of the internet (Special Section)' published in Comprehensive Psychiatry.

* Corresponding author at: Department of Psychiatry, University of Cambridge, Douglas House, 18b Trumpington Road, Cambridge CB2 8AH, United Kingdom.

[1] Given his/her/their role as Editor in Chief, Naomi Fineberg had no involvement in the peer-review of this article and has no access to information regarding its peer-review. Full responsibility for the editorial process for this article was delegated to another journal editor.

https://doi.org/10.1016/j.comppsych.2026.152675
Received 3 April 2025; Received in revised form 2 February 2026; Accepted 10 February 2026
Available online 21 February 2026

[w] Tallinn University, Tallinn, Estonia
[x] Faculty of Behavioural and Movement Sciences, Department of Clinical, Neuro, Vrije Universiteit Amsterdam, Amsterdam, Netherlands
[y] Developmental Psychology, Vrije Universiteit Amsterdam, Amsterdam, Netherlands
[z] Department of Psychiatry, Yale School of Medicine, New Haven, CT, USA
[aa] Yale Child Study Center, Yale School of Medicine, New Haven, CT, USA
[ab] Connecticut Mental Health Center, New Haven, CT, USA
[ac] Connecticut Council on Problem Gambling, Hartford, CT, USA
[ad] Department of Neuroscience, Yale University, New Haven, CT, USA
[ae] Wu Tsai Institute, Yale University, New Haven, CT, USA
[af] Istituto di Neuroscienze, Firenze, Italy
[ag] Euro Youth Mental Health CIC, United Kingdom
[ah] Department of Child and Adolescent Psychiatry, Institute of Psychiatry and Mental Health, Hospital General Universitario Gregorio Marañón, IiSGM, CIBERSAM, ISCIII, School of Medicine, Universidad Complutense, Madrid, Spain
[ai] CHU de Montpellier–Hôpital Saint-Éloi, Service de Médecine Psychologique de L'enfant et de L'adolescent (MPEA1), Université de Montpellier, Montpellier, France
[aj] Équipe psychiatrie, développement et trajectoires, Inserm U1018, CESP, Université Paris-Saclay, Villejuif, France
[ak] General Psychology: Cognition, Faculty of Computer Science, University of Duisburg-Essen, Duisburg, Germany
[al] Center for Behavioral Addiction Research (CeBAR), Center for Translational Neuro- and Behavioral Sciences, University Hospital Essen, University of Duisburg-Essen, Essen, Germany
[am] Erwin L. Hahn Institute for Magnetic Resonance Imaging, Essen, Germany
[an] Child and Adolescent Psychiatry and Psychotherapy, University of Zurich, Zurich, Switzerland
[ao] QIMR Berghofer Medical Research Institute, Herston, Queensland, Australia
[ap] Neuroscience Center Zurich, Swiss Federal Institute of Technology and University of Zurich, Zurich, Switzerland
[aq] Zurich Center for Integrative Human Physiology, University of Zurich, Zurich, Switzerland
[ar] Laboratory of Behavioral Medicine, Neuroscience Institute, Lithuanian University of Health Sciences, Palanga, Lithuania
[as] Department of Clinical, Pharmaceutical and Biological Science, Centre for Health Services and Clinical Research, Cognitive Neuropsychology, School of Life and Medical Sciences, University of Hertfordshire, United Kingdom
[at] Departamento de Psiquiatría, Pontificia Universidad Católica de Chile, Santiago de Chile, Chile
[au] Department of Computer and Information Science, Faculty of Science and Technology, University of Macau, Macau SAR, China
[av] Department of Psychology, Faculty of Social Sciences, University of Macau, Macau SAR, China
[aw] Department of Child and Adolescent Psychiatry, Hospital Universitario La Paz, IDIPaz, CIBERSAM, ISCIII, Madrid, Spain
[ax] Center for Behavioral Addiction Research (CeBAR), University Duisburg-, Essen, Germany

ARTICLE INFO

Keywords:
Problematic usage of internet
Public policy
Mental health
Adolescents

ABSTRACT

This work analyses policies related to the Problematic Usage of the Internet (PUI) and its relationships to adolescent mental health across the United Kingdom, France, Germany, Italy, Australia, Canada, the United States, and New Zealand. Using a policy path dependency framework, national legislation was examined to assess relationships with PUI. The study maps policy by reviewing governmental legislation and databases, analysing them on macro (societal), *meso* (market/intermediary organisations), and micro (citizen rights, duties, and protection) levels. It explores legal instruments related to PUI, including data protection, cybersecurity, content regulation, and harassment, offering both historical and comparative analyses across the eight countries. Findings indicate that while several countries have policies indirectly regulating PUI, significant legislative gaps persist relating to adolescent mental health. Most policies address broader internet concerns without specifically targeting PUI or its effects on mental health. Overall, the analysis highlights the need for more targeted public health policies to address the root causes of PUI, advocating for tailored interventions focused on adolescent well-being.

1. Introduction

The advancement of digital technologies has significantly reshaped daily human interactions, offering both considerable benefits and substantial challenges [1]. Adolescents, who heavily use digital media, may be particularly vulnerable to both its positive and negative impacts. Problematic Usage of the Internet (PUI) encompasses a spectrum of maladaptive online behaviours, including excessive video gaming, shopping, gambling and use of pornography and social media, which are associated with detrimental health features such as functional impairment, mental health issues, and physical health problems [2,3]. Nevertheless, there is little consistency regarding the terminology used in research, and PUI is commonly also referred to as internet addiction or compulsive internet use, for example [4]. Due to its far-reaching impact on health and well-being, the concept of PUI has been increasingly accepted and will therefore also be used in this study [2].

Over the past decade, the public health implications of PUI have garnered increasing attention, particularly concerning vulnerable populations such as adolescents [5]. A key concern is the rise of harmful and constantly evolving unregulated social media trends that promote risky behaviours, such as misleading inspirative contents which promote the pursuit of unrealistic body ideals through unhealthy lifestyle habits and engagement in potentially harmful practices [6]. These trends, often fuelled by algorithm-driven content amplification, have been associated with body image dissatisfaction, eating disorders, and use of substance to boost appearance and performance, exacerbating risks associated with PUI [7]. Current estimates show that approximately 25% of the global population is affected by some degree of PUI, with the issue being more widespread in low and lower-middle-income countries [8]. Beyond the individual-level effects, the proliferation of PUI raises broader societal concerns, including economic costs and political ramifications [5,9,10].

From a social justice perspective, PUI could be analysed through the lens of social, digital, economic, and commercial determinants of health inequity. Under this approach, PUI presents a dynamic vector of

[2] School of Health, Medicine and Life Sciences, University of Hertfordshire, Hatfield, United Kingdom. N A Fineberg has received grants or material support for research from Innovate UK (UKRI), NIHR, Orchard, COST Action, Compass Pathways, payment for lectures from Global Mental Health Academy, support for attending meetings and travel from COST Action, ECNP, BAP, Hellenic Society for Clinical Psychopharmacology. She has an unpaid leadership or fiduciary roles in NHS England, International College of OC Spectrum Disorders, Orchard.

engagement that includes the digital sphere, social influence, and individual (algorithm-driven) behaviour, which together create a complex and risky digital landscape. This interconnected structure not only immerses individuals in vast digital networks, but also subjects them to advanced algorithmic systems, potentially triggering certain types of social interactions, amplifying influences of the digital world in today's society and affecting people's daily lives and well-being.

Adolescents, among other groups, are particularly vulnerable to PUI due to their deep engagement with the digital world [11] and their neurodevelopmental stage characterised by substantial physical, emotional, and social changes, increased susceptibility to addictive behaviours, and heightened sensitivity to peer influences [12–14]. These factors amplify their risk of experiencing a range of mental health issues, including addictions, eating and body dysmorphic disorders [1,5,15]. Additionally, reports indicate that commercial priorities of technology companies often prioritise engagement of individuals and profit over individuals' well-being, exacerbating concerns [5,16,17]. In response to this growing issue, the European Problematic Use of the Internet (EU-PUI) Research Network was established to define research priorities, policy objectives, and diagnostic criteria for PUI [2,18]. In this line, in 2019 the World Health Organization included gaming disorder in the International Classification of Diseases (ICD-11). However, PUI itself is not formally recognized as a mental health condition yet, and no classifications exist for other problematic online behaviours aside from gaming and gambling [18,19]. An analysis of European Union (EU) legislation (Larrain et al., in press A), as well as a study in seven selected nations belonging to the EU or related to it (Larrain et al., in press B), reveals a significant gap in policies and approaches specifically related to PUI. Although some regulations touch on aspects of digital and internet governance, as well as mental health, there are no legal instruments explicitly targeting PUI at the EU level. However, the analysis shows that relevant policy recommendations have been proposed, such as funding research on responsible use of the internet, promoting education among adolescents, and enhancing family support services [17,20,21]; so as a result, these topics remain underexplored. Our recent EU analysis also suggests that the EU's narrow health mandate and devolution to member states may limit its ability to directly address PUI, leaving the possibility that relevant legislation might be part of the legislation of each country (Larrain et al., in press A). As conse, knowledge gaps remain, including variations in PUI by age, race, and sex/gender, the early identification of at-risk individuals, and the development of effective prevention strategies [16,22,23]. Moreover, the COVID-19 pandemic heightened these concerns, highlighting the need for further research on PUI's impact on adolescents, who were already at high risk before the pandemic [24,25], with pre-existing vulnerabilities potentially worsening since 2020 [26]. This study systematically explores the policy landscape surrounding PUI by examining policies across eight selected countries. The research aims to map internet, public health, and mental health policies within these nations, while also assessing the historical and cultural contexts that have shaped them. By analysing the historical and regulatory roles and the macro, *meso*, and micro level effects of PUI-related policies, the paper provides individual country analyses followed by a comparative assessment. This critical evaluation contributes to a nuanced understanding of how these policies may prevent, protect against, treat, and mitigate the risks associated with PUI.

2. Methodology

2.1. Methodological strategy: Policy path dependency approach

A policy path dependency methodology was employed to analyse historical events related to PUI, exploring their contingency, interdependence, and influence on current policies, in order to develop a comprehensive policy map [27]. This methodological strategy aims to highlight the evolution of the political environment through pivotal moments or turning points that have shaped fundamental aspects of policies, in this case, related to PUI [27].

By focusing on policy outcomes influenced by previous legislation, critical moments, and societal processes driving the evolution of PUI-related policies, this study provides a context-specific and critical analysis of the policymaking, understanding it as a fluid and dynamic process that is constantly evolving based on historical policy developments broadly aligned with shared social values aimed to promote a safer online environment (Larrain et al., in press A). These methods have been successfully employed and validated across various policy domains, including education [28,29], employment [30], digital health and artificial intelligence [22,31], and PUI (Larrain et al., in press A).

2.2. Selecting the cases and collecting data

This study examined policies from eight countries that represented a mix of political and healthcare systems. These countries were chosen through convenience sampling [32], considering countries that either belong to the G7 or have had recent important policy developments; therefore, they cooperate on issues like trade, education, health, and governance. Likewise, the selection of countries aimed to include diverse sizes and levels of digital development [33], aiming to inform an analysis and comparison.

The policies included in this analysis are exclusively legal instruments (namely acts, laws, decrees, regulations, and orders, among others) from various periods (no time restriction) enacted by each of these countries. Eligible legal instruments were required to be issued by government institutions and possess binding authority, meaning they carry legally enforceable obligations for the entities to which they apply (e.g., laws, policies, acts, decrees). While various national plans, strategies, and social programs are relevant to this area, they were excluded from the analysis as they do not constitute legally enacted instruments.

The data collection was developed via targeted searches using official national policy repositories and EU policy databases (Eur-LEX; N-Lex) (See Table 1), supplemented by searches in academic and grey literature databases. Consequently, all data utilized in this article are publicly available. The first step involved creating a list of general topics, primarily focused on use of the internet, such as digital space,

Table 1
Data collection strategy.

Source	Key words	Action
PubMed and Google Scholar.	"problematic internet use" OR "internet addiction" OR "digital addiction" AND policy [insert country of interest].	The first 10 pages of each of the databases were reviewed, and relevant articles were selected and added to the EndNote repository.
Official policy repositories and databases (United Kingdom: legislation.gov.uk, France, Germany, Italy: eur-lex.europa.eu, Australia: legislation.gov.au, Canada: laws-lois.justice.gc.ca, United States: congress.gov, New Zealand: legislation.govt.nz)	Variations of the following search string: (Digital OR Cyber* OR Internet OR Network) AND ((Protection OR Market OR Service OR Device OR Media) AND (Health OR Wellbeing OR Disease OR Illness OR Abuse)))	
European policies from EUR-LEX, N-Lex	Variations of the following search string: (Digital OR Cyber* OR Internet OR Network) AND ((Protection OR Market OR Service OR Device OR Media) AND (Health OR Wellbeing OR Disease OR Illness OR Abuse)))	

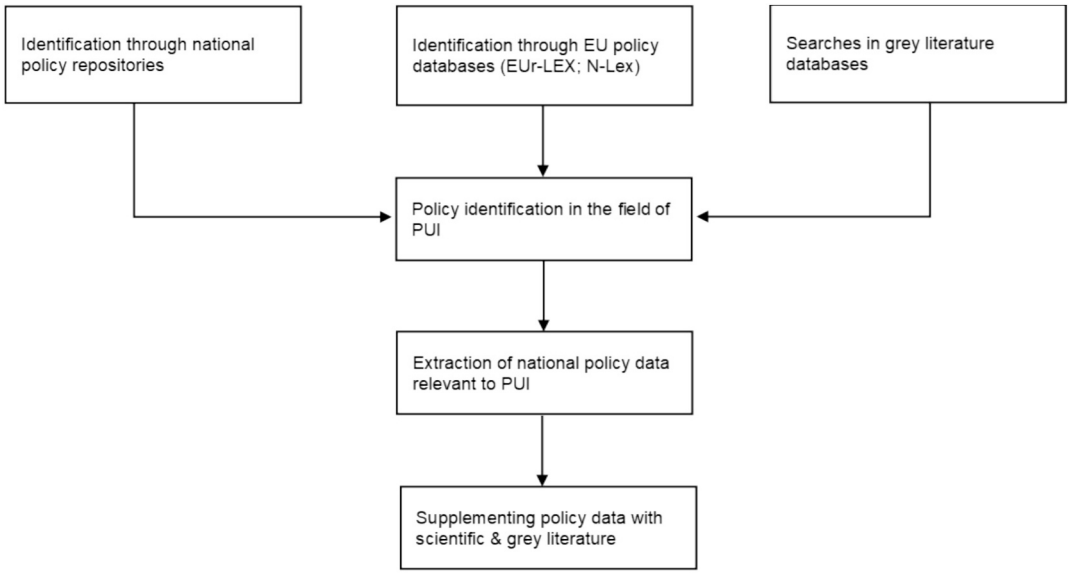

Fig. 1. Flow-Chart of the data collection processA systematic search was conducted in MEDLINE. Targeted grey literature searches were performed using Google Scholar, with only the first 300 hits screened. This limit was chosen based on multiple trial searches, where results beyond this threshold were unlikely to yield relevant findings or were too numerous and/or unrelated to the topic [34]. Finally, data from both the policy and supplementary searches were consolidated into a single dataset.

data protection, age checks, cybersecurity, and online gambling and pornography, particularly in relation to adolescents. Keywords were then translated into the respective languages of the studied countries. The second step, policy identification, entailed locating policies relevant to the field of PUI, particularly in relation to adolescents, as well as policies related to internet and market regulation and/or public health. In the third step, national policy data related to PUI were extracted from their original sources (refer to Appendix 1 for the list of policy repositories consulted). The fourth step involved supplementing the policy data with scientific and grey literature to reduce the risk of overlooking relevant policy developments. Fig. 1 depicts this process of data collection.

2.3. Outcomes

The raw output produced 209 results from the United States; 68 results from the United Kingdom, 276 results from Eur-Lex (specifically, France: 102 results. Germany: 98 results, Italy: 76 results), 25 results from Australia, 29 results from Canada, and 15 results from New Zealand. After that, there was a revision of each instrument aiming to select the relevant policies in relation to PUI. For this, we used broad categories of analysis, such as data protection and privacy, cybercrime and security, harassment and abuse prevention, content and communication regulation, e-commerce, and artificial intelligence, and general understanding of PUI. The resulting number of legal instruments included was 85 (See Appendix 1); specifically, 14 for the United Kingdom, 16 for the United States, 11 for Canada, 10 for Italy, 9 for Australia, 9 for Germany, 7 for New Zealand and 9 for France. A final review was implemented to ensure quality and additional checks for new or updated policies were conducted throughout the research project to ensure up-to-date sources.

2.4. Strategy of analysis

The analytical strategy was developed following the previously described, policy path dependency framework, allowing an historical analysis of the evolution of the policy frame as well as an analytical exploration, that included an individual analysis (each country) and then a comparative analysis between the eight nations included.

The historical review aimed to identify key legislative instruments in each country related to internet usage, offering both a temporal and contextual reflection on the evolution of policies in these nations. This review visually tracks the policies and examines the progression of legal frameworks, providing a comprehensive look at how political and social forces intersect to shape PUI policies within a broader context. Therefore, also policies established before the arrival of the internet are included, where relevant, as these provide an important basis for contextualising subsequent legislation and understanding the legal frameworks succeeding them.

The analytical exploration was conducted through two levels of policy mapping. First, an individual analysis was performed for each of the eight countries, focusing on enacted legal instruments, their objectives, implementation strategies, and the potential impact on PUI. This analysis followed a three-level framework: (a) macro level, examining policies addressing interactions at the broadest scale, including regulations that govern social interactions, norms, and the economic and health dimensions of PUI; (b) *meso* level, focusing on policies that regulate and set norms for interactions between groups, such as private companies, corporations, and public services. It includes policies that balance the protection of rights and freedoms with the regulation of activities in line with social norms and legal protections; (c) micro level, where the analysis centres on policies that regulate individuals and engagement with PUI. This includes fostering political agency and protecting individual rights, autonomy, and freedom, as well as establishing social responsibilities and duties of citizens.

These individual analyses provided insights into each country's local context, forming the foundation for the comparative assessment. The comparative analysis evaluated the development, effectiveness, and gaps in PUI policies, highlighting differences and similarities in policy approaches across the countries, and identifying areas for improvement and potential alignment in addressing PUI challenges.

3. Results

3.1. Historical analysis

The countries included in this policy mapping have implemented numerous policies addressing various aspects of internet use over the years. Initially, these policies took a more general approach, lacking

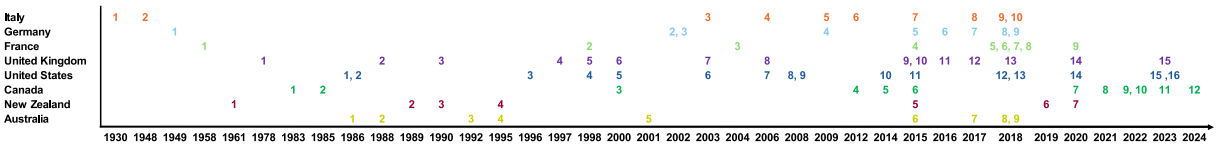

Fig. 2. Historical policy path concerning Problematic Usage of the Internet (PUI), illustrating key legislative and institutional milestones over time.

Table 2
Key to policies for Fig. 2.

Italy	Germany	France	United Kingdom
1 Italian Penal Code 2 Constitution of the Italian Republic 3 Italian Data Protection Code (Legislative Decree No. 196/2003) 4 Protection of Children from Online Sexual Exploitation Act, Law No. 38 5 Protection from Stalking Act (Law No. 38/2009) 6 Media and Minors Code (Law No. 203/2012) 7 Digital Republic initiative (Law No. 107/2015) 8 Cyberbullying Prevention Law (Law No. 71/2017) 9 Cybersecurity Act (Legislative Decree No. 65/2018) 10 General Data Protection Regulation (GDPR)	1 Basic Law (Grundgesetz) 2 Protection Against Violence Act (Gewaltschutzgesetz) 3 Youth Protection Act (Jugendschutzgesetz, JuSchG) 4 Federal Office for Information Security Act (BSI-Gesetz) 5 IT Security Act (IT-Sicherheitsgesetz) 6 Interstate Treaty on the Protection of Minors in the Media (JMStV) 7 Network Enforcement Act (NetzDG) 8 Federal Data Protection Act (BDSG) 9 General Data Protection Regulation (GDPR)	1 French Constitution 2 Law on the Protection of Minors (Loi relative à la protection des mineurs). 3 Law for Confidence in the Digital Economy (LCEN) 4 National Cybersecurity Strategy 5 French Data Protection Act (Loi Informatique et Libertés) 6 Law on the Fight Against Fake News 7 Law on the Prevention and Punishment of Sexual and Sexist Violence 8 Military Programming Law (Loi de Programmation Militaire) 9 Avia Law (Loi Avia)	1 Protection of Children Act 2 Malicious Communications Act 3 Computer Misuse Act 4 Protection from Harassment Act 5 Human Rights Act 6 Investigatory Powers Act 7 Communications Act 8 Terrorism Act 9 Criminal Justice and Courts Act 10 Serious Crime Act 11 Investigatory Powers Act 12 Digital Economy Act 13 Data Protection Act 14 Online Harms White Paper 15 Online Safety Act
United States	**Canada**	**New Zealand**	**Australia**
1 Computer Fraud and Abuse Act (CFAA) 2 Electronic Communications Privacy Act (ECPA) 3 Communications Decency Act (CDA) 4 Children's Online Privacy Protection Act (COPPA) 5 Children's Internet Protection Act (CIPA) 6 CAN-SPAM Act 7 Adam Walsh Child Protection and Safety Act 8 PROTECT Our Children Act 9 Protecting Children in the 21st Century Act 10 Cybersecurity Enhancement Act 11 Cybersecurity Information Sharing Act (CISA) 12 California Consumer Privacy Act (CCPA) 13 STOP School Violence Act 14 California Privacy Rights Act (CPRA) 15 Child Online Safety Modernization Act 16 Social Media Child Protection Act	1 Privacy Act 2 The Canadian Human Rights Act 3 Personal Information Protection and Electronic Documents Act (PIPEDA) 4 Safe Streets and Communities Act 5 Canada's Anti-Spam Legislation (CASL) 6 Digital Privacy Act 7 Digital Charter Implementation Act (Bill C-11) 8 The Canadian Human Rights Act 9 Broadcasting Act (Amendments) 10 Cybersecurity Enhancement Act (Bill C-26) 11 Protecting Children from Online Sexual Exploitation Act (Bill C-22) 12 Online Harms Act (Bill C-63)	1 The Crimes Act 1961 2 Broadcasting Standards Act 1989 3 New Zealand Bill of Rights Act 1990 4 Domestic Violence Act 1995 5 The Harmful Digital Communications Act 2015 6 The Cybersecurity Strategy 2019 7 The Privacy Act 2020	1 Australian Human Rights Commission Act 2 Privacy Act 3 Broadcasting Services Act 4 Criminal Code Act 5 Cybercrime Act 6 Enhancing Online Safety Act 7 Privacy Amendment (Notifiable Data Breaches) Act 8 Enhancing Online Safety (Non-consensual Sharing of Intimate Images) Act 9 Telecommunications and Other Legislation Amendment (Assistance and Access) Act 10 Online Safety Amendment (Social Media Minimum Age) Act 2024

specificity and focus. However, recent developments indicate a shift toward more specific and targeted regulations, reflecting a growing recognition of the relevance of internet use and its possible pervasive influences on societies. Similarly to what has been happening recently in Europe (Larrain et al., in press A and B), these countries have become increasingly productive in developing policies related to internet governance, signalling PUI's emergence as a critical sociopolitical topic. The key legislative and institutional milestones are visualized in Fig. 2 and Table 2.

Despite this progress, the policies enacted often relate only tangentially to the regulation of PUI among adolescents. Most existing regulations focus broadly on issues such as data protection, content regulation – including pornography and potentially harmful materials – abuse prevention, and cybercrime. While these concerns are vital for safeguarding individuals, they do not explicitly address the complexities of PUI. This lack of direct focus reveals a significant gap in the policy landscape, underscoring the need for more nuanced and targeted strategies to effectively tackle PUI and its associated challenges.

3.2. *Policy mapping: an analysis by country*

This section explores the development of policies and regulation related to PUI in each of the analysed countries. By focusing on three levels of analysis (macro – *meso* - micro) it aims to provide a short overview on each nation (See Appendix 1 for the list of policies mentioned in this paper).

3.2.1. *United Kingdom*

In the United Kingdom, the regulatory approach to internet use operates within a framework that indirectly touches on aspects related

to PUI. At the macro level, the Investigatory Powers Act (2000, updated in 2016) provides a legal framework for government surveillance. The 2016 amendment expanded the powers of law enforcement to access personal data for "legitimate purposes," prioritising national security over individual privacy protections. Additionally, there are a handful of policies in place (such as The Computer Misuse Act of 1990, Terrorism Act of 2006, and Serious Crime Act of 2015) to safeguard the UK against incidents of cybercrime, as well as generally establishing measures that ensure the safety of individuals using the internet.

At the meso level, policies such as the Investigatory Powers Act of 2000 and the Data Protection Act of 2018, which enforces GDPR (General Data Protection Regulation) standards, focus on regulating the interactions between private companies and individuals, especially regarding data privacy and online safety. These laws ensure that organisations handling data adhere to privacy and security standards, limiting exposure to harmful influences online, which can contribute to PUI. The Communications Act (2003) and the Digital Economy Act (2017) lay a broad foundation by setting guidelines for digital communication and media regulation. While primarily aimed at controlling online content and safeguarding consumers from harmful media, they indirectly affect PUI by creating a more regulated digital environment. The Online Harms White Paper (2020) proposes a regulatory framework for tackling disinformation, cyberbullying, and consumer safety by establishing a regulatory body to enforce platform accountability. Although it notes associations between screen time and mental health issues like anxiety and depression in adolescents, it does not implement direct mental health regulations but suggests further research and parental guidance on screen time limits. The subsequent Online Safety Act (2023) builds on this, becoming a key legislation on PUI by holding platforms accountable for removing harmful content, particularly that involving cyberbullying, a major factor in adolescent PUI. At the micro level, the Protection from Harassment Act (1997) and the Malicious Communications Act (1988) provide legal protections for individuals, criminalising online harassment and harmful communications. These policies contribute to a safer digital environment by protecting individuals from the personal harms that may often exacerbate PUI, such as cyberbullying and online abuse. Discussions are being also held about following Australia age restrictions for those under 16 years of age.

3.2.2. United States

In the United States at the federal level, internet regulation is largely driven by security and citizens protections, but also strongly guided by privacy concerns and protecting minors from harmful content, with limited direct attention to PUI. The macro level is defined by laws like the Cybersecurity Enhancement Act (2014) and the Cybersecurity Information Sharing Act (CISA) of 2015 that strengthen the digital infrastructure by focusing on securing the broader internet ecosystem. CISA facilitates the sharing of cybersecurity threat information between the private sector and the federal government to improve collective cybersecurity defences, indirectly mitigating risks associated with PUI but opening a debate about privacy protection.

At the *meso* level, laws like the Children's Internet Protection Act (CIPA) (2000) and the Adam Walsh Child Protection Act (2006) safeguard institutions such as schools and libraries by requiring content filters, creating safer online environments for children, regulating the interaction between public institutions and children's internet use, and creating safer online environments in educational settings. In market regulation, Section 230 of the Communications Decency Act grants website platforms immunity for third-party content, promoting free speech and impacting how platforms manage individual-generated content and balances free expression with the need to protect consumers from harmful material. Enacted in the 1990s, it remains central to internet law and online content management. Likewise, the Social Media Child Protection Act (proposed in 2023) limits data collection and screen time for minors by imposing stricter regulations on social media platforms regarding data collection, content moderation, and time limits for minors. The micro level approach is exemplified by The Children's Online Privacy Protection Act (COPPA) of 1998, which set early standards for protecting children's data online, requiring parental consent for collecting data from children under 13. While mainly a privacy law, COPPA helps limit targeted marketing toward youth. Other key policies like the Protecting Children in the 21st Century Act (2008) and the Child Online Safety Modernization Act (proposed in 2023) focus on internet safety education, age verification, and content regulation to protect minors. Though the US policy landscape for PUI is limited, these measures mark progress.

3.2.3. Canada

In Canada, the legal framework is well-developed in terms of privacy and online safety but remains blurred when it comes to PUI. At the macro level, the Cybersecurity Enhancement Act (Bill C-26, proposed in 2022) aims to strengthen Canada's cyber defences by mandating actions to secure Canada's telecommunications system, creating a safer online environment.

At the *meso* level, laws like the Personal Information Protection and Electronic Documents Act (PIPEDA) of 2000 and the Digital Privacy Act of 2015 create a privacy-first regulatory environment that ensures personal data are securely managed and protected online. While these laws primarily protect consumer privacy, they indirectly help mitigate PUI by limiting the data collected from youth, thereby reducing their exposure to harmful online influences. The Digital Charter Implementation Act (Bill C-11) of 2020 was established to modernise the regulation of digital platforms, adhering to international standards to address such concerns. Likewise, the Canada's Online Harms Act (proposed in 2024) mandates platforms to take proactive measures to detect and remove harmful content, including cyberbullying and sexually exploitative material. At the micro level, The Safe Streets and Communities Act of 2012 and the Protecting Children from Online Sexual Exploitation Act (Bill C-22) of 2023 increase protection for online risks (harassment and general online sexual exploitation) by increasing penalties for perpetrators and enhancing law enforcement capabilities. Although not focused explicitly on PUI, this law directly aims to protect adolescents from the kind of harmful interactions that can lead to PUI.

3.2.4. Italy

In Italy, internet regulations indirectly touch on PUI through a combination of data-protection and content-regulation policies. At the macro level, the EU's GDPR (2018) and the Italian Data Protection Code (2003) form the backbone of data-protection laws, promoting protection and transparency and creating a safer digital environment. Italy's Cybersecurity Act of 2018 (Decree No. 65) enhances the security of information systems across several sectors, including energy, transportation, banking, and healthcare.

At the *meso* and micro levels, the Media and Minors Code (2012) establishes comprehensive guidelines for protecting minors from harmful online content, mandating that content providers restrict access to material that could impair youth mental or moral development. The Cyberbullying Prevention Law (2017) specifically targets harmful online behaviours like cyberbullying, providing legal recourse for victims and mandating educational programs in schools to raise awareness about online safety. The Digital Republic Initiative (2015) emphasises digital literacy among students, integrating internet safety and responsible use into school curricula. This approach directly addresses one of the root causes of PUI by equipping adolescents with the skills to manage their online behaviour responsibly.

3.2.5. Germany

In Germany, the regulatory approach aligns closely with EU standards and provides comprehensive protections that indirectly influence PUI. At the macro level, the Federal Data Protection Act (2018) and GDPR (2018) provide robust protections for personal data, helping to create a controlled digital space where misuse of information is

minimised. The Federal Office for Information Security Act (2009) established Germany's central authority for cybersecurity, responsible for preventing and responding to Information Technology (IT) security risks. Together with the IT Security Act (2015), these policies enhance cybersecurity in Germany, indirectly impacting PUI by creating a safer online environment.

At the *meso* level, the Youth Protection Act (2002) and the Interstate Treaty on the Protection of Minors in the Media (2016) regulate content that can impair minors' development, ensuring that harmful media are limited. These laws shape interactions between content providers and adolescent consumers by enforcing age verification systems and classifying certain content as inappropriate for younger audiences. The Network Enforcement Act (2017) is also noteworthy at this level, requiring social media platforms to remove illegal content, including hate speech, within 24 h. At the micro level, the Protection Against Violence Act (2002) provides legal avenues for individuals to seek protection against online harassment, including through restraining orders. This law, alongside the Network Enforcement Act, helps protect youth from harmful online interactions, although it does not specifically address PUI prevention strategies.

3.2.6. France

At a macro level, the French regulatory framework addressing internet use operates broadly through foundational laws like the French Constitution of 1959 and the GDPR of 2018, implemented via the French Data Protection Act of 2018. These policies focus on safeguarding privacy, data protection, and freedom of expression, establishing the broader norms and rules for internet use. However, they do not directly address PUI.

The *meso* level is marked by The Law for Confidence in the Digital Economy (2004). This further regulates online content and fosters trust in the digital economy, ensuring illegal content is restricted but without focusing on PUI. At this level, policies such as the Avia Law (2020) and the Law on the Fight Against Fake News (2018) regulate the responsibilities of online platforms, holding companies accountable for the removal of harmful content. These regulations focus on the interaction between corporations and consumers, aiming to protect public interests but without addressing PUI directly. On the micro level, laws like the Law on the Prevention and Punishment of Sexual and Sexist Violence (2018) provide individual protections against cyberbullying and harassment, while the Law for Confidence in the Digital Economy (2004) also introduces measures like age verification to safeguard minors from harmful content. However, while these policies protect consumers from possible harm, they focus on reactive solutions rather than proactively addressing the public health concerns linked to PUI.

3.2.7. Australia

The Australian regulatory framework surrounding internet use focuses on consumer safety and privacy, with limited direct reference to PUI. At the macro level, the Privacy Act (1988) and its amendment, the Notifiable Data Breaches (NDB) scheme, introduced in 2017, are significant laws aimed at protecting personal data and privacy. These laws set the foundation for a safe online environment by mandating that both government and private sector organisations handle personal data responsibly, thereby indirectly contributing to reducing risks associated with PUI by safeguarding consumers' data from misuse. Aiming to create a safer environment, The Cybercrime Act (2001) targets hacking, unauthorised access, and malware, and the 2018 Telecommunications Amendment enhances law enforcement's access to encrypted communications to boost cybersecurity and combat terrorism.

At the *meso* level, the Broadcasting Services Act (1992) established the Australian Communications and Media Authority (ACMA), which regulates online content and digital safety standards. This act is essential in monitoring the interaction between media companies and consumers, ensuring that content accessible to the public, especially minors, is safe and appropriate. This regulatory framework indirectly addresses PUI by controlling what kinds of media and interactions are allowed in public digital spaces. At the micro level, the Enhancing Online Safety Act (2015) plays a more direct role by creating the Office of the eSafety Commissioner, which has the authority to demand the removal of cyberbullying content aimed at children. This policy, focused on individual protection, highlights the Australian government's recognition of the mental health risks posed by online harassment and cyberbullying, which are contributing factors to PUI. As of December 10, 2025, Australia has implemented a strict ban on children under 16 accessing major social media platforms, with companies facing fines up to AU $49.5 million for non-compliance. The law forces platforms to take "reasonable steps" to prevent under-16s from holding accounts.

3.2.8. New Zealand

The legal framework is structured around privacy protection and safe digital communication, with limited direct policies aimed at PUI. At the macro level, the Privacy Act (2020) governs how personal data are collected, used, and stored, providing individuals with protections against data misuse and emphasising transparency. New Zealand's Cybersecurity Strategy 2019 strengthens national cybersecurity, protects infrastructure, and promotes international cooperation. The Crimes Act (1961) criminalises unauthorised access and data breaches, both indirectly influencing PUI.

At the *meso* level, the Broadcasting Standards Act (1989) regulates broadcast content, ensuring that harmful material is not disseminated via television and radio, indirectly shaping norms for safe media consumption. At the micro level, the Harmful Digital Communications Act (2015) is New Zealand's primary policy addressing PUI-related concerns. This act aims to prevent and reduce harm caused by digital communications, including cyberbullying, by allowing courts to issue orders for the removal of harmful content. Similarly, the Domestic Violence Act (1995) addresses digital harassment by allowing victims to seek protection orders if they are harassed through digital means, including psychological abuse via online platforms. While not exclusively focused on PUI, this law provides essential protections for individuals from harmful digital interactions that could contribute to PUI.

3.3. Policy mapping: A comparative analysis

In analysing the regulatory frameworks of the eight countries through the lens of market development and public health, specifically focusing on PUI, it was possible to observe strong similarities and a few differences. These countries, while diverse in their approaches, reveal a shared challenge in addressing PUI explicitly within their legislative agendas. This comparative analysis will critically assess their strategies by examining how they balance market interests with mental health concerns.

3.3.1. Market development perspective

From a market development standpoint, most of the studied countries have developed robust legal frameworks that protect and prioritise market development and regulation, data protection, and corporate responsibility in the digital space. These laws create a structured environment in which digital industries can operate, encouraging innovation while intending to protect consumers, particularly minors, from harmful content and data exploitation.

The United Kingdom's Communications Act (2003) and Digital Economy Act (2017) regulate digital communication sectors, creating market oversight primarily through OFCOM, the UK's communication regulator. This approach is mirrored in Germany through the Network Enforcement Act (2017), which requires social media platforms to remove harmful content swiftly. In both cases, the emphasis is placed on the efficient operation of the digital market, fostering competition, and safeguarding consumers without overly encumbering corporate freedom. Similarly, France's Law for Confidence in the Digital Economy (2004) establishes market rules for online service providers, ensuring

that illegal content is removed while also protecting corporate freedom. However, none of these regulations focus directly on PUI; instead, they aim to create an environment where internet use is safer, but the burden of addressing PUI falls primarily on individuals. Conversely, Canada has taken a somewhat stricter approach with PIPEDA and Digital Privacy Act (2015), requiring rigorous data protection standards that govern corporate behaviour regarding consumer data collection and processing. These laws, while vital for consumer privacy, also regulate how companies interact with personal data, restricting business activities that might encourage PUI, such as targeted advertising to minors. The US takes a more market-friendly approach, focusing on privacy through COPPA, but prioritising corporate freedoms with laws like the Communications Decency Act. While this protects companies and fosters innovation, it also creates an environment where harmful content, potentially contributing to PUI, can proliferate with limited accountability. In Australia and New Zealand, market regulation focuses more on safety within corporate practices, notably with the Broadcasting Services Act of 1992 (Australia) and Broadcasting Standards Act of 1989 (New Zealand), both of which regulate harmful content. Although these laws protect consumers from exposure to harmful media, their market emphasis is on ensuring business compliance without significantly impeding corporate growth. Meanwhile, Italy stands out with a more fragmented approach, such as the Cyberbullying Prevention Law (2017) and Digital Republic Initiative (2015), which focus on specific sectors, like education and media content, fostering safe digital spaces while promoting digital literacy.

3.3.2. Public mental health perspective

From a public health perspective, the legislative frameworks in these countries are generally reactive rather than preventive and tension public health to market directives, focusing more on addressing the symptoms of harmful internet use – such as cyberbullying and online harassment – than on treating or preventing PUI. The intersection of mental health and internet use is underexplored in most of the legal frameworks.

The UK, for example, has taken significant steps with the Online Harms White Paper (2020) and Online Safety Act (2023), which both address cyberbullying, harmful content, and disinformation. However, these laws largely stop short of framing PUI as a public health crisis, instead treating it as an issue of platform responsibility. Similarly, Germany's Youth Protection Act (2002) and Interstate Treaty on the Protection of Minors in the Media (2016) aim to protect minors from harmful content but do not explicitly address PUI from a mental health standpoint. These laws highlight a reactive rather than preventive approach, addressing harms after they occur rather than preventing internet overuse or its mental health effects. In contrast, Canada's Online Harms Act (2024) stands out as a more comprehensive policy, directly targeting harmful online content, including cyberbullying and sexually exploitative material, with a clear focus on protecting children's mental health. While not explicitly labelled as a PUI regulation, it comes closest to addressing the psychological impacts of harmful digital interactions. However, even in Canada, PUI is not framed as a public health concern requiring proactive intervention. Italy's approach is also noteworthy for its focus on educational interventions. The Digital Republic Initiative (2015) integrates digital literacy into the school curriculum, teaching responsible internet use and helping adolescents manage their digital behaviours. While this policy indirectly addresses PUI, it provides a critical public health perspective by empowering adolescents to make healthier decisions online. Similarly, Australia's Enhancing Online Safety Act (2015) creates the Office of the eSafety Commissioner, which directly tackles cyberbullying, offering individual protections that align with mental health concerns by focusing on reducing online harassment's negative psychological impacts. The US takes a more fragmented approach, with laws like the Social Media Child Protection Act (2023) limiting minors' social media use and regulating harmful content on these platforms. While these policies aim to protect mental health, they mostly address symptoms rather than the systemic issues contributing to PUI. Likewise, New Zealand's Harmful Digital Communications Act (2015) addresses the mental health consequences of cyberbullying but falls short of framing PUI as a broader public health issue. France is perhaps the least progressive in addressing mental health concerns linked to PUI. While the Law for Confidence in the Digital Economy (2004) and Law on the Protection of Minors address harmful content, their focus is on content regulation and safety, with minimal emphasis on the mental health impacts of internet use or the behavioral factors leading to PUI. Australia has moved further toward age-based regulation with the Online Safety Amendment (Social Media Minimum Age) Act 2024, which introduces a legislated minimum age requirement for access to certain social media services, generally set at 16 years. The Act places the compliance burden on platforms rather than children or parents, requiring companies to implement reasonable age-verification measures and face significant penalties for systemic non-compliance. While framed primarily as a child safety and harm-reduction measure, aimed at limiting exposure to cyberbullying, harmful content, and addictive platform design, it also reflects growing recognition of the developmental risks associated with early and intensive social media use. Internationally, similar conversations are underway. The UK has debated stricter age-verification mechanisms under the Online Safety Act framework; several U.S. states have introduced or passed laws requiring parental consent or age checks for minors; and the European Union continues discussions on strengthening child protections under the Digital Services Act. These developments indicate a broader global shift toward preventive, age-based regulatory strategies, even if most jurisdictions still stop short of explicitly framing problematic internet use as a public health crisis.

4. Discussion

The comparative analysis of national-level regulatory frameworks regarding PUI reveals significant variations across the eight selected countries. The absence of explicit regulatory measures targeting the complexities of PUI highlights a critical gap in current legislative approaches. A key trend observed is the prioritization of market regulations across most countries. Governments tend to focus on ensuring the safe operation of digital platforms and reinforcing consumer protections, yet comprehensive strategies addressing the mental health implications of PUI, particularly among adolescents, remain underdeveloped. This regulatory imbalance suggests a need for more integrative policies that not only regulate digital environments, but also consider their psychological and social impact.

The current state of regulation highlights a broader challenge in aligning economic growth with important public health protections. To bridge this gap, policymakers should explore innovative approaches that embed mental health considerations into digital governance strategies. This would require a shift from reactive policies, which address issues only after harm has occurred, to proactive and preventive measures that promote responsible digital consumption. This could include introducing policies specifically designed to mitigate the risks of PUI, such as educational campaigns, guidance for parents, and readily available mental health resources, particularly for youth. Equally important is the need for parental guidance and support programs, as many parents struggle to regulate their children's digital consumption. Providing families with resources, workshops, and tools to set appropriate boundaries can be instrumental in preventing PUI. At the same time, accessible mental health resources should be integrated into digital platforms and public health services, ensuring that adolescents and other vulnerable populations can seek help when needed.

Additionally, it is also vital to evaluate the already implemented policies, in regards to their effects on PUI and youth's well-being. This knowledge is essential in order to adopt evidence-based policies which effectively address the challenges posed by PUI. An issue in the policy evaluation in regards to mental health, although, is the lack of

appropriate measurement tools [35]. Furthermore, there is no consensus regarding diagnostic criteria or measurement instruments for PUI [36,37], which makes it more difficult to find suitable indicators to evaluate these policies. These challenges are even exacerbated as there are no regulatory measures explicitly targeting PUI, as this study shows, making the evaluation of these policies in relation to PUI even more demanding. Nevertheless, many nations are implementing pieces of legislation which target PUI, demonstrating the importance of evaluating their effects on adolescents.

Countries with different political systems and cultural backgrounds have adopted different approaches in addressing PUI at policy level. China, for example, limits the total time youth can spend on online video games, as well as the daytime they are available for them [38,39]. India has also introduced stricter policy approaches in handling minor's digital data via the Digital Personal Data Protection Act (2023) [40]. Section 9 thereof prohibits the processing of minor's data that could harm their well-being without a guardian's consent, behavioral monitoring and targeted advertising. These approaches illustrate, how political systems and cultural values shape the policy responses which countries implement to tackle the rising issue of PUI. These policy approaches demonstrate, that the issue of PUI has prompted legislators globally, to address this challenge and seek individual solutions within their legal systems.

Based on these research results, there are great opportunities to build upon existing frameworks by incorporating a more sophisticated approach to the use of the internet and its relationship with mental health, especially regarding adolescents and proof of this are policy discussions around age of access. This study has explored the progression of digitalization and its associated challenges, providing a critical analysis of internet-related policies across eight nations. Nonetheless, it is essential to recognize certain limitations inherent in the study's narrow focus, sampling approach, and chosen analytical framework. One limitation originates from the authors' disciplinary and regional backgrounds, as well as the received funding. These factors may have influenced the selection of specific countries. A key limitation lies in its emphasis on legislative measures, which may not fully capture the broader efforts of national and regional authorities or the significant role of non-governmental organisations in addressing PUI at multiple societal levels. Therefore, these findings should be interpreted within a wider context that also incorporates evidence from related initiatives.

5. Conclusion

The examination revealed that while these countries have developed sophisticated legal frameworks that indirectly touch on issues related to PUI through policies concerning data protection, privacy, cybercrime, content regulation, and protection of children, the majority of these policies remain reactive rather than proactive. As such, they generally fail to fully address the root causes of PUI. The study found that despite growing awareness of the importance of protecting developing youth in the digital space, many of these regulatory efforts are limited in scope, fragmented, and focused more on market regulation than on youth mental health as a public concern. The findings suggest that while there are indirect measures in place to protect youth using the internet, such as controlling harmful content and ensuring privacy, none of the countries approach PUI from a public health perspective. Countries like Canada, the UK, and Italy have made some progress in integrating digital literacy, online safety, and cyberbullying prevention into their policies, but no country in this study has fully recognized PUI as a public health crisis requiring targeted, preventive measures. These existing frameworks often prioritise corporate freedoms, data privacy, and content moderation, leaving the responsibility of managing PUI to individuals rather than addressing the social, economic, and psychological factors that contribute to PUI. Looking forward, it is crucial that governments develop a more integrated approach that combines both market regulation and public health initiatives. Policymakers should collaborate with public health professionals to address PUI more effectively, focusing on preventative measures that safeguard adolescent mental health in the digital age. Additionally, future research is needed to assess the effectiveness of current regulations and their impact on reducing PUI among adolescents. Long-term studies should be conducted to inform policymakers and guide the development of legislation that addresses both the market and mental health dimensions of PUI. Only through such collaborative, research-informed efforts can we ensure that youth may explore and benefit from the digital world in a safe and supportive environment.

CRediT authorship contribution statement

Julia Snegg: Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Blanca Larrain:** Project administration, Methodology, Investigation, Formal analysis, Data curation. **Kristin Mosler:** Visualization, Methodology, Writing – review & editing. **Robin van Kessel:** Project administration, Methodology, Conceptualization. **Gabriele Penazzi:** Data curation, Writing – review & editing. **Vittoria Barbati:** Conceptualization, Writing – review & editing. **Anja Huizink:** Conceptualization, Writing – review & editing. **Andres Roman-Urrestarazu:** Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Matthias Brand:** Writing – review & editing. **Murat Yucel:** Writing – review & editing. **Carmen Moreno:** Writing – review & editing. **Diane Purper-Ouakil:** Writing – review & editing. **Stefano Pallanti:** Writing – review & editing. **Nicholas Morgan:** Writing – review & editing. **Marc N. Potenza:** Writing – review & editing. **Andrea Czakó:** Writing – review & editing. **Samuel Chamberlain:** Writing – review & editing. **Lior Carmi:** Writing – review & editing. **Zsolt Demetrovics:** Writing – review & editing. **Katajun Lindenberg:** Writing – review & editing. **Susanne Walitza:** Writing – review & editing. **Julius Burkauskas:** Writing – review & editing. **Célia Sales:** Writing – review & editing. **Christian Montag:** Writing – review & editing. **Natalie Hall:** Writing – review & editing. **Jose M. Menchon:** Writing – review & editing. **Joseph Zohar:** Writing – review & editing. **Hans Jurgen Rumpf:** Writing – review & editing. **Naomi A. Fineberg:** Writing – review & editing. **Konstantinos Ioannidis:** Writing – review & editing. **Mart Susi:** Writing – review & editing. **Hamed Ekhtari:** Writing – review & editing. **Henrietta Bowden-Jones:** Writing – review & editing. **Ornella Corazza:** Writing – review & editing. **Dan J. Stein:** Writing – review & editing. **Sophia Achab:** Writing – review & editing.

Funding

This work was funded by the European Union (BootStRaP project grant number:101080238). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency (HaDEA). Neither the European Union nor the granting authority can be held responsible for them. This work was supported by UK Research and Innovation program (the University of Cambridge project number: 10077671, the Euro Youth Mental Health project number: 10082693, the University of Hertfordshire project number: 10075008, the University of Southampton project number: 10075760). UK Research and Innovation accepts no liability, financial or otherwise, for expenditure or liability arising from the research funded by the Grant except as set out in these Terms and Conditions, or otherwise agreed in writing. This work has received funding from the Swiss State Secretariat for Education, Research and Innovation (SERI).

Declaration of competing interest

N A Fineberg has received grants or material support for research from Innovate UK (UKRI), NIHR, Orchard, COST Action, Compass Pathways, payment for lectures from Global Mental Health Academy, support for attending meetings and travel from COST Action, ECNP,

BAP, Hellenic Society for Clinical Psychopharmacology. She has an unpaid leadership or fiduciary roles in NHS England, International College of OC Spectrum Disorders, Orchard.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.comppsych.2026.152675.

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