

Promoting Safer Online Gambling

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Executive Summary

The use of advanced technologies, such as Artificial Intelligence, in the entertainment sector has made games more engaging, but it has also increased risks to public health. These risks require a clear and urgent response from the State, regulators, and society. In online gambling, these technologies are used to attract and retain players for longer periods through highly immersive mechanisms that encourage risky behaviours (e.g., impulsive gambling). Game personalisation, lack of uniform technical limits, insufficient oversight in the digital environment, and limitations of current protective measures create conditions that intensify these behaviours. This is further aggravated by the rapid expansion of online gambling, both legal and illegal, and by aggressive advertising practices.

In a sector that has evolved faster than its' control and protection mechanisms, it is essential to strengthen legislation and regulation, as well as implementing effective player protection measures (especially for the most vulnerable), that promote a healthier online environment and ensure market integrity.

Recommendations

- **Strengthen** digital literacy and knowledge about risks and safe gambling practices through continuous training and awareness campaigns tailored to different audiences.
- **Integrate advanced technologies** into the design and monitoring of platforms, promoting safer and less addictive gambling practices.
- **Increase** technical supervision of online gambling platforms to strengthen player protection.
- **Implement** mandatory limits on playing time, breaks, and game pace, as well as stricter self-exclusion rules, making reversal more difficult.
- **Create** a dedicated fund to finance protection technologies, prevention, scientific research, and treatment of problem gambling.
- **Promote** scientific analysis of gambling data to increase scientific knowledge.
- **Develop** a single digital player identity applicable across all gambling platforms.
- **Apply** more demanding and restrictive rules to gambling-related advertising.
- **Strengthen** the fight against illegal gambling using advanced technologies.

Target audience of the policy brief

Gambling Regulation and Inspection Service (SRIJ); Institute for Addictive Behaviours and Dependencies, IP (ICAD, IP); Ministry of Economy and Territorial Cohesion; Ministry of Education, Research and Innovation; Ministry of Health; Gambler Support Institute (IAJ), Gamblers Anonymous, Portuguese Online Betting and Gambling Association (APAJO), and all people with an interest in this topic.

Introduction and Problem Framework

Advanced technologies (i.e., deep tech) include systems based on scientific knowledge and cutting-edge computational capabilities, able to process and analyse large volumes of data almost instantaneously, with the aim of solving complex problems and generating innovative solutions¹⁻⁴. Among their most well-known forms are artificial intelligence (AI) – which includes approaches such as machine learning (ML) and recommendation systems – and other emerging technologies such as blockchain^{3,4}.

These technologies have enabled the creation of a digital world that has contributed to profound changes in lifestyles, including entertainment activities and the economy^{5,6}. Online gambling is a clear example of this transformation. Although traditionally a land-based activity, gambling is now strongly established online, through online casinos and sports betting platforms⁷. This socially normalised activity has shown growth of around 1.5% per quarter, partly due to physical and digital advertising⁸. Recent data also indicates profits of approximately €287.0 million⁸, reflecting an increase compared to previous periods, although the latest figures suggest that growth is beginning to stabilise⁸⁻¹¹. Nevertheless, in the second quarter of 2025, around 4.9 million players were registered on gambling platforms in Portugal, of whom at least one million engaged in gambling during this period⁹.

Regarding the use of advanced technologies, these have transformed the gambling experience by adapting it to the profile and preferences of each player¹². This personalisation invariably promotes greater

immersion in gambling, which combined with the inherent characteristics of gambling (e.g., immediate rewards, stimulating environments) and individual player characteristics, encourages repetition and even intensification of the behaviour^{13,14}. Regular gambling practices may evolve into problematic gambling behaviours that compromise players' quality of life, affecting their well-being and often that of their families as well¹⁵. For those who are more vulnerable, gambling may become a behavioural addiction, with significant personal, professional, and social consequences^{16,17}. Beyond the direct impact on individuals and their families, these effects have broader repercussions and generate substantial social costs, such as increased pressure on health services, financial problems with social consequences, and productivity losses^{18,19}.

Prevention measures are clearly more effective and desirable than treatment measures. When combined with initiatives to promote digital literacy, the early identification of problematic gambling patterns can be an important prevention tool, allowing for the timely detection of clinical criteria and the implementation of prevention, treatment, risk reduction, and harm minimisation interventions. Advanced technologies can play a crucial role in player protection by ensuring safety and supervision, while still enabling engaging and innovative activities. This balance is fragile, requiring legislative and regulatory frameworks based on scientific evidence and participatory methodologies. The implementation of protective measures aims to safeguard player well-being and the social and economic sustainability of the activity.

Analysis / Key Findings

The current online gambling regulating model in Portugal presents limitations and vulnerabilities in the face of growing challenges, including rapid technological development, insufficient protection of vulnerable populations, and the presence of monetary transactions in video games, such as microtransactions or loot boxes, as well as the limited oversight, in light of these developments, and limited oversight considering these developments. In this context, there appears to be broad consensus

on the recognition of a set of structural weaknesses that compromise consumer health¹⁸⁻²³.

1st FRAGILITY NON-RECOGNITION OF GAMBLING AS A PUBLIC HEALTH ISSUE

Since the emergence of online gambling, several authors have highlighted the need to address its addictive effects^{10,19}. Most countries

have responded to this need by encouraging the implementation of responsible gambling tools, including self-exclusion systems, the setting of limits on time, money, or bets, as well as referral mechanisms to third parties in cases where problems develop²². Although these measures are mostly mandatory for all licensed gambling operators, the reality is that they are insufficient to address gambling-related harm¹⁸⁻²¹. Indeed, due to their voluntary nature, **these measures depend on the player's capacity to apply them**, in line with principles of freedom of choice and consumer sovereignty²⁴. In addition, **self-imposed limits and even self-exclusion are easily reversible**, enabling players to change betting or play time limits with relative ease when compared to land-based gambling. Furthermore, one of the points highlighted by both experts and players is the **lack of accessibility and awareness of these tools**, as well as the **impossibility of applying restrictions across all gambling platforms**. These practices ultimately reflect a traditional and self-regulatory view of gambling that places greater responsibility on the consumer rather than on those who promote and regulate the activity, resulting in **insufficient responses to the growing concerns associated with gambling**¹⁸⁻²³.

Today, gambling is considered a phenomenon that affects not only individuals but also families, communities, and social systems, therefore being a public health issue. From this perspective, gambling should be legislated and regulated in a comprehensive manner, addressing all factors that influence player behaviour, from software design and operation to product structure, commercial practices, and the environmental context in which gambling takes place. This approach requires the implementation of prevention and educational measures, protection and harm minimisation strategies, and stronger responsible gambling principles, while ensuring continuous technical supervision of platforms in order to promote a safer, more transparent, and healthier gambling ecosystem for the entire population.

2nd FRAGILITY DEFINITION OF GAMBLING

Decree-Law No. 66/2015 (29 April) establishes the Legal Framework for Online Gambling and Betting (RJO)²⁵, setting out the legal and institutional foundations for the operation of online gambling in Portugal. This legal

instrument reveals a vulnerability and a grey area in the Portuguese legal framework regarding gambling: **an outdated definition of gambling that is misaligned with current realities**. Indeed, modern video games have increasingly incorporated mechanics with structures analogous to gambling, becoming functionally closer to gambling activities. These include:

- i. loot boxes, gacha systems, and microtransactions based on hidden probabilities, which require payment (direct or indirect) to obtain randomly assigned rewards,
- ii. social casino games, which simulate slot machines and roulettes, encouraging behavioural patterns similar to those found in gambling,
- iii. arcade and casual video games that introduce wheels of fortune, spins, and other mechanisms typical of slot machines,
- iv. certain video game practices, such as betting with virtual items (skins) or trading digital items, which give these assets real-world value and bring gaming closer to gambling.

These practices reveal a growing hybridisation between video games and gambling^{26,27}, with relevant behavioural implications, particularly among younger consumers.

3rd FRAGILITY LACK OF ADEQUATE TECHNOLOGICAL REGULATION

Regulation No. 903-B/2015 (23 December), issued under the Legal Framework for Online Gambling and Betting (Decree-Law No. 66/2015)²⁶, sets out the technical and security requirements that licensed operators in Portugal must comply with in order to ensure the safe, transparent, and controlled operation of online gambling. However, this regulation, drafted in 2015, is outdated considering current technological realities. **Advanced technologies associated with gambling platforms are not adequately scrutinised under the existing regulatory framework**. For example, gambling software, AI algorithms, and personalisation mechanisms are not subject to specific supervision, allowing the gambling operators to develop systems without sufficient guarantees of player protection. This regulatory gap increases the risk of exploiting vulnerable behaviours and promoting greater

dependence, countering public health protection objectives and safeguarding consumer rights²⁶⁻²⁸.

4th FRAGILITY GAPS IN PLAYER PROTECTION WITHIN PLATFORMS

Following the previous weakness, it is important to note that Portuguese regulation establishes that the technical gambling system must provide mechanisms that allow players to set limits on their activity. Players may define maximum limits for deposits and amounts wagered, with daily, weekly, or monthly options. Any change to these limits only takes effect after a minimum period of 24 hours, seeking to prevent impulsive decisions. In addition, the legislation defines a three-month minimum duration for self-exclusion, which remains in effect until the date specified by the player or, in the absence of such a date, for an indefinite period. Gambling platforms must also make information about these mechanisms and about specialised support channels for gambling-related problems visibly available²⁹.

Although these measures are broadly aligned with internationally recommended practices, they remain insufficient in light of the needs identified in the literature¹⁹. Many players are unaware of the existence of these mechanisms or do not use them effectively, partly due to a **lack of responsible gambling literacy**²⁶, and partly due to the **characteristics of addiction itself**. Moreover, **these instruments do not prevent a high number of bets within a short period of time**, as Portuguese legislation does not define pacing or deceleration mechanisms. The literature also highlights the potential of advanced technologies, such as algorithms for predicting risky behaviours, decision-support systems, risk classification mechanisms, and real-time personalised messages, for problematic gambling patterns early detection and intervention²⁴. However, **Portuguese regulation does not yet require the incorporation of these innovative resources**, leaving a significant gap in player protection and failing to make use of technological potential for this purpose.

Additionally, the use of highly persuasive design techniques increases risk further. These techniques include dark patterns (i.e., manipulative design strategies that exploit distraction or inattention, benefiting companies

at the expense of users), AI-driven personalisation, and continuous engagement strategies²⁶. These regulatory gaps constitute a grey area in Portuguese legislation, which is widely used by companies to expand the online gambling market²⁶.

5th FRAGILITY AGGRESSIVE ADVERTISING AND MARKETING

One of the main reasons for the growing normalisation of gambling is the **massive exposure** to these **platforms through advertising**, which is present in virtually all areas of daily life - television, social media, news outlets, sporting events, and public spaces in general, including healthcare settings. The omnipresence of this commercial communication contributes to making gambling socially acceptable and increases the likelihood of impulsive gambling behaviours²⁶.

In Portugal, gambling advertising is regulated by Article 21 of Decree-Law No. 330/90³⁰, as amended by Decree-Law No. 66/2015²⁵. The legislation establishes that advertising must be socially responsible and protect vulnerable groups, and must not suggest easy winnings, social success, status, or special skills resulting from gambling, nor encourage excessive practices. However, several practical limitations in this regulatory framework can be identified, including:

- i. the exception granted to State-run social games, whose advertising is even permitted in school settings or their vicinity, despite using reinforcement mechanisms similar to those of other gambling products,
- ii. gambling advertising within spaces frequented by minors which, although prohibited, is subject to exceptions (e.g., sporting events that are freely accessible to young people), which are widely saturated with betting brands, with many being the official sponsors of major sports clubs,
- iii. the presence of televised advertising and sponsorships, often broadcasted during prime-time family viewing hours, further amplify the involuntary exposure of vulnerable populations to these messages,
- iv. the lack of information on responsible gambling in advertising, as the law does not specify the content, format, or effectiveness of such messages,

- v. marketing strategies that use influencers and well-known public figures, that associate gambling with luxurious lifestyles, or that are included in high-visibility media programmes,
- vi. the role of advertising in the indirect promotion of illegal betting websites, through digital influencers and marketing strategies primarily in the online environment.

6th FRAGILITY EXISTENCE OF ILLEGAL OR UNREGULATED GAMBLING

Illegal or unregulated gambling refers to gambling that operates outside the legal framework and does not comply with licensing, oversight, taxation, or consumer protection rules. These platforms (or mere initiatives) offer no safeguards for consumer protection, focusing primarily on acquiring and retaining players by providing aggressive bonuses, promises of guaranteed wins, very low minimum bets, and constant dissemination on social media (see item 5 of the 5th Fragility). In addition to exploiting consumers, these sites are frequently associated with criminal practices such as money laundering, fraudulent schemes, theft of personal data, identity theft, phishing, and extortion.

7th FRAGILITY GAPS IN THE PROTECTION OF VULNERABLE GROUPS AND SOCIETAL AWARENESS

One of the greatest gaps in the current gambling system is the **insufficient protection of vulnerable populations**²⁶, who are more susceptible to developing risky behaviours and experiencing severe consequences from problem or pathological gambling.

In the case of young people, this concern is particularly critical. **Most online players are between 18 and 25 years old**, a period frequently referred to in the literature as “emerging adulthood.” This transitional phase into adult life is characterised by increasing social responsibilities and feelings of instability. Young people are more sensitive to social contexts^{31,32} and other risk factors, making them more vulnerable to seeking means for acquiring wealth and status^{31,32} sometimes resulting in the development of problem or pathological gambling patterns or other risky behaviours¹⁹. Added to this is the increased vulnerability of minors, who, despite legal

prohibition, often come into regular contact with gambling-like activities (see 2nd Fragility) or with gambling itself. Scientific evidence shows that new gambling features further promote intermittent reinforcement and are associated with a higher likelihood of developing risky behaviours that can culminate in behavioural addiction¹⁹.

Other groups with specific vulnerabilities include **individuals with cognitive deficits or mental disorders**, who may have greater difficulty assessing risks and controlling impulses, making them more susceptible to compulsive gambling. **Older adults**, often affected by isolation and cognitive changes, may also turn to gambling for entertainment, facing devastating financial consequences if the activity becomes uncontrolled. People in financially precarious situations tend to perceive gambling as a quick solution to their problems, more easily entering cycles of loss and debt.

More generally, and often cumulatively, **individuals with low digital or financial literacy** may be unaware of, or have greater difficulty understanding, probabilities as well as rules and commercial practices, which facilitates their exploitation through persuasive gambling mechanisms. The **absence of measures specifically aimed at protecting these groups** reflects a limited societal awareness of problem gambling issues, as well as a normalisation of gambling that promotes dysfunctional gambling patterns.

8th FRAGILITY LIMITED COLLABORATION AMONG STAKEHOLDERS

In Portugal, the **response to gambling remains fragmented**, reflecting limited coordination among key parties such as civil society/ social sector organisations, regulators, academia, and the gambling operators in promoting public health. This fragmentation includes:

- i. the absence of a legal mechanism requiring operators to fund programmes, prevention to treatment interventions (except for the ‘Santa Casa da Misericórdia’ games), and research, which contrasts with standards in other relevant countries such as the United Kingdom³³ and New Zealand³⁴,

- ii. institutions receiving funding for interventions, including psychological support programmes, treatment centres, and community initiatives, have repeatedly indicated that resources are insufficient, centralised, irregular, and inadequate relative to the scale of the problem,
- iii. gambling operators should not directly fund so-called independent research.

Legal mechanisms should, therefore, exist to ensure independence and transparency, enabling the development of long-term policies based on scientific evidence, particularly regarding the analysis of data and advanced technologies used in gambling.

Policy Options and Recommendations

All in all, it is urgent to rethink (and strengthen) the legislation and regulation of online gambling, particularly given the rise in problem and pathological gambling. Advanced technologies provide powerful tools that can strengthen player protection by supporting risk identification, prevention, harm reduction, and early intervention. When appropriately regulated and ethically deployed, these technologies contribute to a safer, more transparent, and responsible online gambling environment—one in which commercial objectives do not outweigh player protection and well-being. Such action is essential for the development and implementation of evidence-based measures and for creating a context that supports their effective application.

Ensuring that gambling remains a safe entertainment environment requires stronger inspection and regulation of digital platforms, as well as of the technological systems that support them. This reinforcement is necessary to:

- i. ensure that software does not manipulate outcomes nor unduly favour the operator, while presenting real probabilities that are clearly communicated to users,
- ii. mitigate the addictive characteristics of the platforms and ensure that their structure does not encourage compulsive behaviours,
- iii. standardise best practices for consumer protection.

In this context, the following measures are recommended:

1st RECOMMENDATION REVIEW THE APPROACH AND DEFINITION OF GAMBLING

JUSTIFICATION

To ensure an effective response to problem and pathological gambling that reflects the rapid evolution of technology and data science, a thorough reconsideration of the definition of gambling and the scope of the concept is required. In this context, a shift in approach is also needed, recognising gambling as a public health issue. The recommendations in this policy brief reflect the acknowledgement of these needs and should prompt changes and debate regarding the current legislation and regulatory framework.

2.1. IMPOSITION OF RULES REGARDING PLAYING TIME

Scientific evidence suggests that increasing the interval between bets can reduce impulsive behaviours. The optimal interval should take the type of game into account. For instance, slot machines have a high event frequency, whereas table games (such as roulette or blackjack) are inherently slower. **It is therefore proposed to establish a minimum interval of six seconds between gambling events.** Additionally, mandatory cool-off periods of three to five minutes should be implemented, accompanied by awareness messages about gambling risks or referencing healthy behaviours.

2nd RECOMMENDATION SUPERVISE GAMBLING SOFTWARE

JUSTIFICATION

2.2. MANDATORY IMPLEMENTATION OF PERSONALIZED MESSAGES

To promote healthy gambling practices, platforms should **provide direct and personalised feedback to players about their behaviour.** It is recommended to

integrate informative messages such as: “You have bet X,” “You have lost Y,” or “Is it worth continuing?” to encourage immediate reflection and reduce the propensity for impulsive decisions. This measure is directly linked to point 2.3.

2.3. DEVELOPMENT OF MACHINE LEARNING (ML) SYSTEMS FOR RISK IDENTIFICATION

The **implementation of machine learning (ML) systems should be mandatory to monitor behavioural patterns and predict the likelihood of developing problematic gambling behaviours.** These systems enable the early detection of risk signals, such as sudden increases in betting frequency or wagered amounts.

For the creation of these models, a close collaboration between the gambling operators, academia, which conducts research, and the regulator is essential to ensure the development of validated models tailored to the Portuguese population²⁴.

2.4. STANDARDISATION OF LOCATION AND VISIBILITY OF RESPONSIBLE GAMBLING TOOLS

Professionals²⁶ and players³⁴ have reported difficulties in accessing responsible gambling tools, such as deposit limits, self-exclusion, or support services. On many sites, these features are placed in footers and are only visible on specific pages. It is therefore recommended **to make the setting of time and bet limits mandatory at registration and to standardise the location and visual prominence of responsible gambling tools,** facilitating access and promoting active consumer protection.

2.5. MANDATORY DISPLAY OF TIME ELAPSED ON MOBILE DEVICES

Regulation No. 903-B/2015, Section 6.2.1, item 5, allows the omission of time tracking on mobile devices due to display limitations. However, recent data indicate a significant increase in the use of mobile platforms³⁵, making this exception inadequate given current usage patterns. It is therefore proposed that the mandatory display of elapsed time be implemented on all devices, ensuring uniform rules and reinforcing players’ temporal awareness.

2.6. MANDATORY COMPLETION OF A RISK ASSESSMENT QUESTIONNAIRE TO REVOKE SELF-EXCLUSION OR LIMITS

The removal of protective measures, such as betting limits or self-exclusion mechanisms, represents a particularly vulnerable moment for the player. These decisions are often influenced by impulsivity, financial pressure, negative emotional states, or cognitive distortions associated with gambling. Therefore, **requiring users to complete a brief risk assessment questionnaire before removing these safeguards** can serve as a reflective and preventive barrier, alongside the 24-hour delay for activating changes.

The questionnaire should include evaluation of the reason for the request, a control and emotional state self-assessment, revision of recent gambling behaviour, and verification of understanding of the risks associated with removing the measures.

2.7. PROHIBITION OF FREE DEMOS AND INITIAL GAMBLING INCENTIVES

Free demos or initial credit offers often function as aggressive promotional strategies that create an unrealistic perception of easy wins, stimulate impulsivity, and increase the likelihood of uncontrolled behaviours. These initiatives disproportionately impact young people and other vulnerable groups, fostering compulsive patterns of play and undermining the adoption of responsible gambling practices.

IMPLEMENTATION MODEL

The legal operation of gambling in Portugal requires a license issued by the Gambling Regulation and Inspection Service (SRIJ)²⁸. During the licensing process, the regulator should evaluate and test the software, verifying the presence of all functionalities described above (points 2.1 to 2.7). To this end, **AI systems could be developed to automatically detect the presence or absence of these features, supporting regulatory decision-making.**

LIMITATIONS

- × Some resistance from the gambling operators is to be expected, especially due to the costs associated with implementing such measures. Continuous coordination

and the creation of support mechanisms, including specific funds (see 7th Recommendation), are essential.

EXPECTED IMPACT

- ✓ Increased availability of information for players.
- ✓ Reduction of mechanisms that promote impulsivity and compulsive gambling.
- ✓ Early identification of problematic behaviours and guidance towards safer gambling practices.

3rd RECOMMENDATION CREATE A PLAYER CARD OR DIGITAL IDENTITY

JUSTIFICATION

One of the main challenges in the gambling sector is the wide availability of platforms, allowing cross-platform, simultaneous betting that bypasses the limits set on one platform by immediately switching to another. To address this regulatory gap, several Nordic countries have introduced the Player Card, a universal identifier that follows the user across all legal platforms²⁷. This mechanism effectively makes transversal rules and player-applied limits, preventing evasion behaviours and enhancing monitoring, prevention, and intervention capacities. This solution could even be extended to a Digital Identity Card, holding all users accountable for their online behaviour.

IMPLEMENTATION MODEL

The Player Card/ Digital Identity Card should be linked to the citizen's official identification document, functioning as a unique key to aggregate all information related to gambling activity, including total playing time, number of sessions, total amount wagered, winnings and losses, and frequency and type of games used. The aim would be to generate personalised weekly reports containing information on playing time, amounts wagered, winnings, losses, and number of sessions. The communication of these reports to players should follow responsible communication criteria, ensuring that the information:

- i. is not counterproductive nor generates additional gambling stimuli,
- ii. reinforces that gambling is a recreational activity,

- iii. clarifies that wins or losses should not be considered as expected investments or sources of income.

LIMITATIONS

- ✗ Initial resistance from players may occur, particularly due to privacy and data protection concerns. However, it is important to note that the data collected would not exceed what is already collected during registration on any gambling platform. Anonymisation mechanisms could be implemented to increase user trust and reduce perceptions of intrusion, balancing respect for individual freedom with protection rights.

EXPECTED IMPACT

- ✓ Greater control and awareness for players regarding their transactions and gambling patterns.
- ✓ Standardisation of limits to prevent players from bypassing rules by using multiple platforms simultaneously.
- ✓ Facilitate illegal sites' identification, as the card would not function there.
- ✓ Strengthen protective mechanisms, enabling more timely and personalised interventions.
- ✓ Generation of more robust and regular data for scientific research, applicable to regulation, prevention, risk reduction, harm minimisation, and treatment.

4th RECOMMENDATION COMBATING ILLEGAL GAMBLING

JUSTIFICATION

One of the major issues in online gambling is the presence of illegal offerings. Over the past ten years, thousands of illegal sites have been notified for termination or blockage, and 49 reports have been submitted to the Public Prosecutor's Office⁸. Although there are ways for people to verify which sites are legally operating in Portugal, unregulated advertising, particularly online, has left society vulnerable, often leading individuals to engage with these platforms without realising they are illegal. Misinformation combined with propaganda creates an ideal catalyst for participation on these platforms.

A structured approach to combating illegal gambling should include:

4.1. INCREASE INFORMATION ABOUT LEGAL SITES AND PROMOTE REPORTING OF ILLEGAL SITES

It is necessary to amplify the visibility of authorised operators while simultaneously controlling aggressive advertising, ensuring that people know where to access information about legal online operators in Portugal. Civic participation in reporting illegal sites should also be encouraged.

IMPLEMENTATION MODEL

Public campaigns, easily recognisable official certifications, and simple verification mechanisms should be developed. Practically, the regulator could implement campaigns similar to those launched by the Judicial Police to combat illegal IPTV.

4.2. DEVELOP WEB ANALYSIS TO MONITOR, TRACK, AND CONTAIN ILLEGAL GAMBLING SITES

Advanced web surveillance tools, widely used against digital piracy, can be adapted to identify and monitor the illegal gambling ecosystem. These tools can detect new domains, mirror sites, affiliate networks, and suspicious browsing patterns, even when evasive strategies such as temporary domains, chained redirects, or fast-flux infrastructures are used.

The use of specialised web crawlers, automated URL classification systems, and anomaly detection algorithms, combined with continuous DNS record monitoring, can significantly enhance regulatory response. These systems enable the rapid identification of emerging platforms before they reach high traffic, mapping promotion and affiliate networks, and flagging patterns typical of illegal operations. For an effective response, these mechanisms should operate automatically and in near real-time, enabling proactive regulatory action. Adoption of these technologies must respect transparency, proportionality, and legal data protection frameworks.

IMPLEMENTATION MODEL

Creation of an automated system based on machine learning (ML) models that continuously scans the web for illegal gambling, identifies suspicious domains before they gain significant traffic, detects mirror sites created after blocks, and integrates a shared database

among relevant authorities, including the police and the Public Prosecutor's Office.

4.3. CREATION OF A DIGITAL AUTHENTICITY SEAL FOR GAMBLING

The creation of a Digital Authenticity Seal for regulated online gambling, based on an electronic signature and QR code, is proposed to be applied to receipts for gambling products and online bets regulated in Portugal. This seal does not replace existing security mechanisms but makes them visible and verifiable by the player, enhancing trust in the regulated market and facilitating inspections and dispute resolution.

4.4. ACTIVE PARTICIPATION IN COMBATING ILLEGAL GAMBLING AND RELATED CRIMES

Illegal gambling significantly increases the risk of fraud, money laundering, indebtedness, and exploitation of vulnerable players. Active involvement of regulators, in cooperation with law enforcement, financial regulators, cybersecurity authorities, legal operators, and the European Union, is crucial to reducing the attractiveness of these parallel markets.

LIMITATIONS

- ✗ Illegal gambling is dynamic and constantly evolving, requiring continuous updates to combat the problem.
- ✗ Illegal gambling operates transnationally, complicating the actions of individual countries.
- ✗ High investments are necessary to implement these measures, though dedicated funds can support their enforcement (see Recommendation 7).

EXPECTED IMPACT

- ✓ Gradual reduction in engagement with illegal online gambling sites.
- ✓ Early detection and faster blocking of new operations and platforms.

5th RECOMMENDATION IMPLEMENT STRONGER RESTRICTIONS ON ADVERTISING

JUSTIFICATION

As previously mentioned, advertising and sponsorships are a significant issue in the gambling sector. To control these forms of

dissemination, a more active role from the regulator is required.

Proposed measures:

5.1. DEVELOP ANALYSIS TOOLS/SOFTWARE TO FLAG ADVERTISING TO GAMBLING SITES

Digital advertising for illegal gambling platforms primarily occurs through affiliate networks, influencers, disguised campaigns on social media, and encrypted or private channels, where promotional content spreads rapidly and with a high degree of anonymity. These campaigns often employ concealment techniques, including shortened URLs, intermediate redirect pages, aggressive promotions, and seemingly editorial content functioning as indirect advertising.

Automated systems based on machine learning (ML), widely used in cybersecurity and misinformation detection, can be adapted to effectively detect these patterns. These systems can simultaneously analyse text, images, and metadata, detect characteristic signals of illegal campaigns (e.g., repeated hashtags, use of unauthorised logos, temporal publication patterns, or affiliate clusters), and flag suspicious content in near real-time.

Integrating these mechanisms significantly enhances the regulator's response capacity, enabling the rapid identification of emerging campaigns, monitoring of distribution networks, and implementation of containment measures before they reach a large scale. The adoption of these technologies must also ensure legal compliance, minimise false positives, and involve collaboration with digital platforms to enhance the detection and removal of such content.

5.2. IMPOSE RESTRICTIONS AND RULES ON ADVERTISING

Advertising is one of the main drivers of gambling initiation, especially among young people. Evidence indicates that messages linking gambling to glamour, quick social success, affluent lifestyles, or easy rewards foster more favourable attitudes toward gambling and promote riskier behaviors²⁶. Therefore, it is recommended to prohibit gambling advertising and sponsorships during extended hours and at the currently observed

high frequency, to limit or renegotiate sports sponsorships, to ban the use of public figures in advertisements, and to mandate clear messages about the associated risks. It is also important to establish stricter penalties for celebrities and influencers who promote illegal gambling in Portugal, in order to reduce the likelihood of adherence to this practice.

IMPLEMENTATION MODEL

Similar to other points, advanced technology can contribute to combating unregulated advertising, making support for its development and implementation imperative. It is also relevant to coordinate with gambling platforms to negotiate less aggressive advertising practices for current and potential players. Key actors involved in advertisement-dissemination, such as YouTube and Meta, should also be included in these discussions.

LIMITATIONS

- ✘ Some sites advertise through international influencers, making control difficult.
- ✘ Influencers often promote gambling indirectly, which is challenging to identify and regulate.

EXPECTED IMPACT

- ✓ Improved control capacity and reduced reach of illegal campaigns.
- ✓ Greater oversight of gambling advertising in general.
- ✓ Reduction in the social normalisation of online gambling.

6th RECOMMENDATION DEVELOP UNIVERSAL PREVENTION STRATEGIES

JUSTIFICATION

Education on responsible gambling is one of the most effective forms of universal prevention.

IMPLEMENTATION MODEL

Develop training programs and awareness-raising activities in various formats, tailored to specific age groups or populations, alongside comprehensive, integrative, multi-component universal prevention programs adapted to different ages, populations, and delivery

formats. These programs should focus on developing personal and social skills (e.g., self-regulation strategies) and providing information, particularly on probabilities, gambling manipulation mechanisms, and the risk of addiction. These aim to significantly increase both individual resilience and financial and digital literacy, before first contact with gambling or before the escalation of its use.

LIMITATIONS

- ✗ Investment in these interventions is required, although close collaboration with partner organisations can help minimise this challenge.

EXPECTED IMPACT

- ✓ Increased digital and financial literacy among the Portuguese population.
- ✓ Greater knowledge about responsible gambling and the risks of online gambling.
- ✓ Increased awareness of the dangers associated with illegal gambling platforms.
- ✓ Promotion of protective factors and reduction of risk factors for the abuse or addiction to online gambling.
- ✓ Reduction in the prevalence of players with problematic gambling behaviours

7th RECOMMENDATION CREATE A NATIONAL GAMBLING INNOVATION FUND

JUSTIFICATION

It is essential to simultaneously promote technological development within the gambling sector, conduct applied research on how advanced technologies can support more responsible and informed gambling practices, and strengthen universal prevention actions, particularly public awareness campaigns. It is equally important to support institutions that help people with problematic gambling behaviours. In this context, the National Gambling Innovation Fund would serve as a structural instrument to finance and stimulate research, development, and innovation projects that ensure the technological evolution in the sector matches the latest scientific knowledge. Additionally, it should promote incentive

mechanisms for operators to contribute to this fund, such as tax reductions, thereby helping to offset the costs of adopting innovative tools that enhance consumer protection. Among these measures, the development of AI models capable of integrating relevant information about players, identifying vulnerable situations, and anticipating risk patterns associated with problematic and pathological gambling is highlighted.

IMPLEMENTATION MODEL

Given that gambling is one of the most profitable economic activities and, consequently, a significant source of tax revenue for the State, a percentage of these revenues could be allocated to establishing the Fund. This would establish an indirect operator-funded mechanism that promotes safer practices, which should be recognised and reinforced by them, ultimately strengthening regulation and public health.

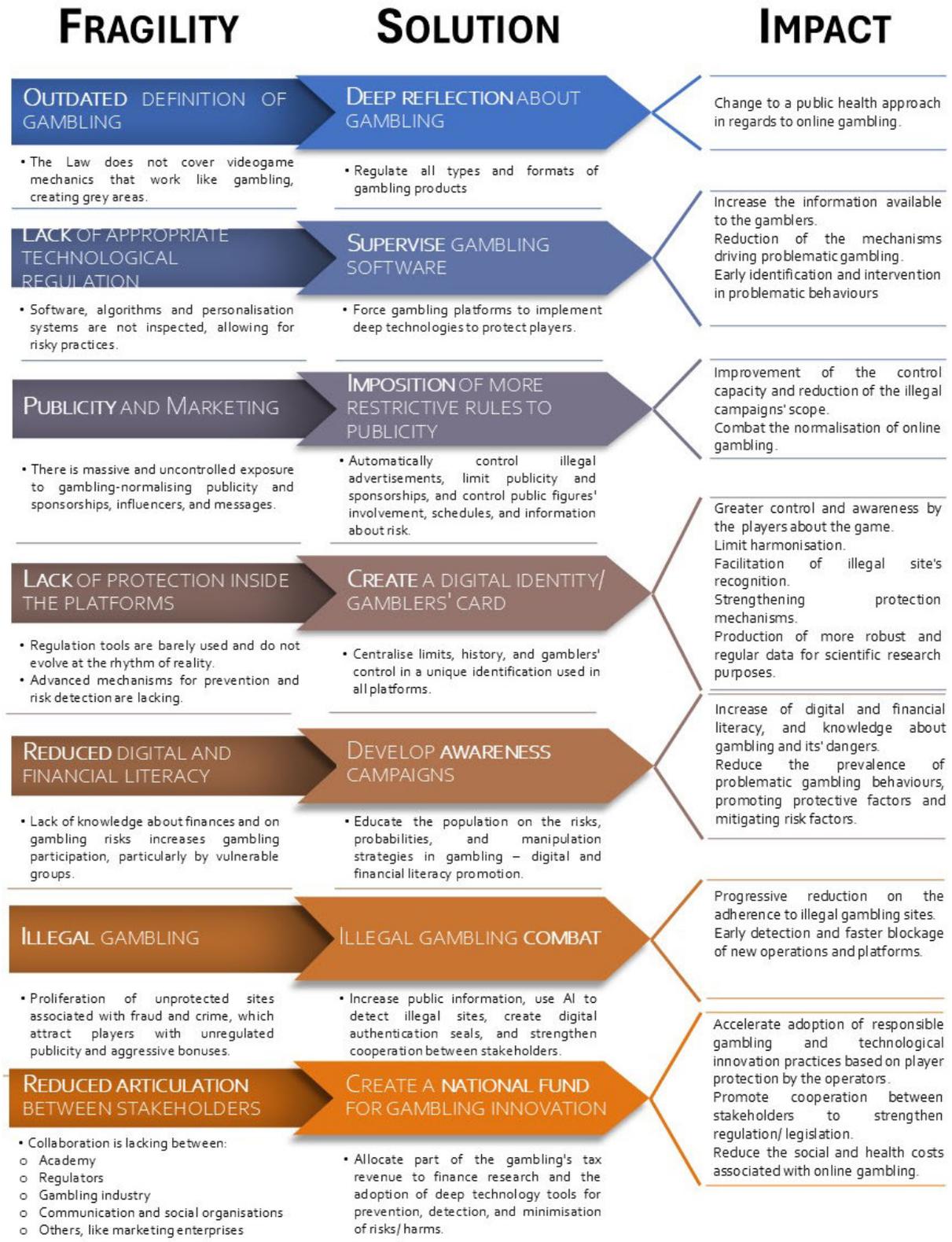
LIMITATIONS

- ✗ The initial period may require additional public investment, as well as the identification or appointment of an independent entity responsible for ensuring the Fund's resources are managed and distributed transparently, efficiently, and equitably.

EXPECTED IMPACT

- ✓ Accelerate the adoption of responsible gambling practices by the operators, promoting cooperation among regulators, operators, academia, public social and health services, and civil society /social sector organisations.
- ✓ Stimulate technological innovation aimed at consumer protection.
- ✓ Expedite the implementation of advanced risk prediction and mitigation systems.
- ✓ Strengthen the effectiveness of the regulatory and legislative framework.
- ✓ Reduce social and health costs associated with online gambling.
- ✓ Promote more effective intervention strategies.

Figure 1 – Summary Table of Vulnerabilities, Proposed Solutions, and Expected Impacts.



Source: BET-DeTECH Project.

Conclusion

The proposal to incorporate advanced technologies into online gambling platforms, safeguarding players protection, and effectively regulating its use, reflects a structural need to address the rapid technological evolution. Traditional regulatory and legislative frameworks are outpaced by the growing complexity of gambling today, allowing risk patterns to remain invisible until the damage becomes irreversible. It is, therefore, imperative to replace a largely reactive regulation and supervision system with intelligent, proactive, autonomous mechanisms based on advanced technologies, data analysis, and scientific evidence.

Advanced technologies can offer all stakeholders the possibility to act preventively, reduce risks, and minimize harm, strengthening both consumer protection and effective regulation. Their transparent inclusion should be promoted with the purpose of transforming this activity into a safer practice. This prioritisation of technological solutions' strategic integration must also reflect legal

adaptation to the growing emerging risks associated with this activity. The proposed transformation will require close collaboration among regulators, operators, academia, public social and health services, and civil society/ social sector organisations, in order to consolidate a safe, transparent, and responsible gambling ecosystem.

However, technological innovation cannot operate in isolation. Increasing digital and financial literacy at different developmental stages, among different target audiences, and in various formats, seems fundamental to achieve a consistent transformation of the online gambling landscape, including in Portugal.

In summary, advanced technologies represent an increased risk for the development of problematic and pathological gambling, but they also offer an unprecedented opportunity to contribute to a safer activity that respects the delicate balance between individual freedom and protection.

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